



8th ESSD Congress, Dublin 2018

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Session 01. Free Papers 1: Paediatric Dysphagia

PREVALENCE OF DYSPHAGIA IN CHILDREN WITH NEUROMUSCULAR DISORDERS

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Introduction: Dysphagia is known in pediatric neuromuscular disorders (pNMD). The consequences of dysphagia can be substantial: failure to thrive malnutrition choking and aspiration pneumonia. Early detection and identification of risk factors and etiology support preventing complications and morbidity including impact on quality of life. In adults with NMD a prevalence for dysphagia of 36–58% was found. In children information about the prevalence of dysphagia is scarce. The aim of this study was to describe the pooled prevalence of dysphagia in different p-NMD. Secondary we aimed to describe frequency proportions between chewing and swallowing problems.

Materials and Methods: Data were collected from 299 children (mean age 11; 0 range 2; 6–19; 0) with pNMD in 11 hospitals and rehabilitation centers in the Netherlands. An SLT with experience in pNMD used the short screening and/or the extensive speech language assessment of the Diagnostic list of Dysphagia and Dysarthria in pNMD (DDD-pNMD publication in preparation) to establish if dysphagia was present or not. The DDD-pNMD is currently the best available assessment by lack of a golden standard.

Results: In all of the 14 groups of pNMD except HSN type II dysphagia was present (Table). Pooled overall prevalence of dysphagia was 474%. Of 116 children with dysphagia 90% of them had chewing problems 42% showed swallowing problems and 32% showed combined problems.

Conclusions: The overall pooled prevalence of dysphagia was high: 474% in the population of pNMD although there are marked differences between diagnostic groups. This high prevalence in combination with the variable onset and consequences of dysphagia justifies monitoring by periodic screening of the whole pNMD population as soon as a child is diagnosed.

pNMD	Total	Dysphagia	
	n	n	%
SMA type I	1	1	100
SMA type II	19	9	47
SMA type III	6	2	33
SMA variants (NOS)	3	2	67
HMSN type II	23	5	22
HSAN type II	2	0	0
Myasthenic syndromes	8	7	78
Duchenne & Becker muscular dystrophy	97	36	37
FSHD	9	3	33
Muscular dystrophy (NOS)	20	7	35
Congenital myotonic dystrophy	5	5	100
Juvenile myotonic dystrophy	22	14	64
Congenital myopathy	63	38	60
Metabolic myopathy	21	16	81
Total	299	145	
Weighted prevalence			47.4
95% BI			41,7-53,1

ADAPTATION OF 2–5 MONTHS OLD INFANTS TO FLOW SHAPE AND FLEXIBILITY OF TEATS DURING BOTTLE FEEDING

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Introduction: Normal neonatal nutritive sucking is a complex activity involving several biomechanical aspects swallowing related to respiratory phase swallow-rate/minute suck-swallow ratio and swallow non-inspiratory flow (SNIF). No information is available on these aspects in infants aged 2 months and older. The aim of this study was to describe the biomechanical aspects in those infants during bottle feeding to assess whether infants are able to adapt their nutritive sucking to different characteristics of teats and to assess which biomechanical variables influence the occurrence of SNIF.

Methods: Measurements were performed during drinking with both the Philips-Avent Natural 2.0 (teat 1 breast-shaped silicon hardness 40 high-flow) and Classic + (teat 2 cherry-shaped hardness 50 low-flow). One minute of drinking with each teat was selected for

analysis. Data was collected on activity of the submental muscles using surface electromyography synchronized with nasal airflow-measurements and cervical auscultation using the Digital Swallowing Workstation (Kay Pentax USA) (Fig. 1).

Results: Sixteen term-born infants (6 boys) aged 7–22 weeks were included. All infants were able to drink with both teats and showed varying inhalation and exhalation after swallowing. The swallow-rate per minute was significantly higher while drinking with teat 1. Infants varied between a suck-swallow ratio of 1:1 to 4:1. A suck-swallow ratio of 1:1 occurred significantly more often while drinking with teat 1. During drinking with teat 2 a suck-swallow ratio of 2:1 occurred significantly more often. SNIF was seen in all infants but not after every swallow. The occurrence of SNIF was significantly influenced by the suck-swallow ratio explaining 52.1% of the variance.

Conclusion: This study demonstrates that infants of 2–5 months old show a wide range of variation in biomechanical aspects during bottle feeding and show oral motor adaptation to the flow shape and flexibility of the teat.



Figure 1. Measurement with Digital Swallowing Workstation

DYSPHAGIA IN DUCHENNE MUSCULAR DYSTROPHY VS. BECKER MUSCULAR DYSTROPHY: COMPARABLE OR DIFFERENT?

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Introduction: Patients with Duchenne Muscular Dystrophy (DMD) or Becker Muscular Dystrophy (BMD) frequently have dysphagia. BMD is a milder form than DMD with later manifestation of symptoms although cardiomyopathy may occur relatively early. Our clinical experience show impaired mastication and swallowing relatively early in BMD. The aim of this historic cohort study was to assess differences between DMD and BMD patients with respect to mastication and swallowing difficulties using clinical symptoms quantitative muscle ultrasound (QMUS) of the orofacial muscles and Maximum Bite Force (MBF) measurements.

Methods: The charts of 92 DMD and BMD patients seen at our outpatient clinic in 2016 were reviewed. Only patients in the early ambulatory stage (EAS) of the disease were included. The 6-min walk test (6MWT) was used to measure walking capacity (z-scores). Data of MBF and QMUS were collected. QMUS was used to measure

muscular thickness (MT) and echogenicity (EG) to assess the degree of muscular affliction underlying dysphagia. Symptoms of mastication and swallowing problems were assessed with a questionnaire. **Results:** Eleven DMD and 11 BMD patients were included (Table 1). BMD patients had a greater 6MWT distance than DMD patients ($p = 0.003$) but mastication difficulties were reported more often in BMD (27%) versus DMD (18%). Swallowing difficulties were reported by 9% in both groups. The temporalis muscle was significantly thicker and hypertrophied in BMD patients ($p = 0.039$) while it was normal in DMD. EG and MT of other orofacial muscles did not differ. MBF was lower (not reaching significance $p = 0.06$) in BMD patients.

Conclusion: BMD patients showed better walking capacity than DMD patients but mastication and orofacial muscles were equally or more severely affected. Future research should confirm our finding that some muscles groups (e.g. orofacial) may be relatively early affected in BMD. Clinically early assessment of dysphagia in BMD patients is recommended.

Table 1. Comparison of measurements of DMD (n=11) and BMD (n=11) patients in the EAS.

	Mean z-score \pm SD		p-value
	DMD	BMD	
Age	7.7 \pm 1.7	10.7 \pm 1.5	0.003*
6MWT	-3.2 \pm 0.9	-1.6 \pm 1.1	0.003*
Masseter muscle			
MT	-0.0 \pm 0.6	-0.1 \pm 0.6	0.806
EG	3.5 \pm 1.4	3.1 \pm 1.3	0.468
Temporalis muscle			
MT	0.0 \pm 1.0	1.0 \pm 1.1	0.039*
EG	2.4 \pm 1.8	2.3 \pm 1.4	0.878
Digastric muscle			
MT	0.5 \pm 1.2	-0.1 \pm 1.2	0.242
EG	2.4 \pm 2.2	2.1 \pm 1.6	0.468
Geniohyoid muscle			
EG	0.8 \pm 1.6	1.3 \pm 1.3	0.352
Transverse muscle			
EG	2.2 \pm 1.4	1.6 \pm 1.2	0.300
Superior long. muscle			
EG	0.9 \pm 0.8	0.9 \pm 0.9	0.971
Thickness of the tongue	-0.2 \pm 0.8	-0.3 \pm 1.0	0.770
Maximum bite force	-0.5 \pm 0.6	-1.1 \pm 0.9	0.060

DMD, Duchenne muscular dystrophy; BMD, Becker muscular dystrophy; EAS, early ambulatory stage; 6MWT, 6-Minutes Walk Test; MT, muscle thickness; EG, echogenicity.

MT, EG, thickness of the tongue, 6MWT, and maximum bite force were described in z-scores.

* Statistically significant differences between z-scores in DMD and BMD patients in the EAS, determined with independent samples t-test.

DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF CHILDREN WITH CEREBRAL PALSY WHO HAVE FEEDING AND/OR SWALLOWING DISORDERS

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Introduction: This study was planned to examine the demographic and clinical characteristics of children with cerebral palsy (CP) who have feeding and/or swallowing disorders.

Materials and Methods: This study included 90 children with CP aged between 3 and 12 years referred for feeding and/or swallowing disorders and their mothers. Gross Motor Function Classification

System (GMFCS) was used for motor functional level Pediatric Functional Independence Measure (Wee-FIM) for activity of daily living Tongue Thrust Rating Scale (TTRS) for tongue thrust severity Karaduman Chewing Performance Scale (KCPS) for chewing performance level Pediatric version of the Eating Assessment Tool (PEDI-EAT-10) for dysphagia and Drooling Severity and Frequency Scale for drooling.

Results: The study was completed with 39 female and 51 male children with a mean age of 70.35 ± 28.3 months. The consanguineous marriages rate was 22.2% and the maternal disease history was 15.6%. The diagnosis age was 6.63 ± 8.04 months. According to GMFCS 5.6% of children were in level II 28.8% in level III 10% in level IV and 55.6% in level V. The mean Wee-FIM of the children was 41.74 ± 27.46 . 82.2% of the children had open mouth 56.7% had high palate and 87.8% had pathological tongue thrust. The feeding positions of the children was sitting (56.7%) semi-supine (32.2%) and supine (11.1%). 57.8% of the children were fed on puree consistency and 85.6% had a chewing disorders. Children were found to have profuse drooling in 21.1% severe in 29% moderate in 24.4% and mild in 13.3%.

Conclusion: In this study various feeding and/or swallowing disorders were identified in children with CP and a community-specific general profile for the feeding of these children was obtained. Appropriate prevention and intervention programs will be established and risk groups will be detected by early identification of feeding and/or swallowing disorders in children with CP.

DEFINING SUCCESSFUL FEEDING: AN EVIDENCE BASED SYSTEMATIC REVIEW

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Background/Objective: Successful feeding is a developmental milestone that must be reached for an infant to qualify for discharge from the Neonatal Intensive Care Unit (NICU). The purpose of this evidence based systematic review (EBSR) was to determine the variables reported in the peer reviewed literature that are used to define “successful feeding” in the NICU and to determine if there are any differences in the variables used by practitioners from different disciplines (i.e. therapy and nursing).

Methods: Clinical questions identified by the multidisciplinary team of researchers were as follows: 1. What are the objective variables used to define “successful feeding” in peer reviewed publications? 2. Do studies published by lead authors who are in medicine as compared to lead authors who are in therapy have different criteria for “successful feeding”? Inclusion criteria were established. Four databases (PubMed, CINAHL, JBI, COCHRANE) were searched systematically with predetermined search strings. Two researchers searched each database independently and results were reviewed with a third researcher. Consensus was reached on all included articles.

Results: Initially 68 total abstracts were identified for review. After review of abstracts 16 articles were read. Thirteen articles met inclusion criteria and were included in the final analysis. Of the 13 included articles 6 (46%) of them did not provide any measurable criteria for “successful feeding”. Of the 7 articles that provided successful feeding criteria 3 were from medicine and 4 were from therapy. 18 unique successful feeding criteria were identified and of those 10 (56%) were objective and measurable at the bedside. Only 2 (20%) out of 10 criteria were used across both disciplines.

Conclusion: Results indicate successful feeding is not clearly defined in peer-reviewed literature. There are key differences in the parameters used by professionals in both disciplines.

Oral Presentations
Friday, 28 September
11:00–12:00 Auditorium

Session 03. Free Papers 2: Neurogenic Dysphagia

DYSPHAGIA ASSOCIATED WITH UPPER OESOPHAGEAL SPHINCTER DYSFUNCTION IN INCLUSION BODY MYOSITIS: A SYSTEMATIC REVIEW OF THE EVIDENCE

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Introduction: Inclusion Body Myositis (IBM) is one of the main idiopathic inflammatory myopathies. Dysphagia is a common symptom in patients with IBM. The most impaired function is failed relaxation of the upper oesophageal sphincter (UOS). Various interventions have been proposed such as intravenous immunoglobulin (IVIg) botulinum toxin A injections and corticosteroids. Swallowing interventions (compensatory and rehabilitation techniques and surgical interventions (cricopharyngeal myotomy cricopharyngeal dilation) are also used. The efficacy and effectiveness of interventions for dysphagia associated with UOS dysfunction in people with IBM and dysphagia is unknown.

Materials and Methods: 11 databases (CENTRAL, PubMed, EMBASE, AMED, CINAHL, LILACS, PsycINFO, Web of Science, Scopus, Grey literature and ProQuest Dissertations & Theses) were searched using search terms related to swallowing/dysphagia and IBM. Titles and abstracts were screened by two independent reviewers to reach consensus on inclusion/exclusion of studies for further review. Methodological quality of studies was evaluated using the Downs & Black checklist and Cochrane risk of bias tool.

Results: Searches yielded 599 results with 5 studies included in the final review. Studies varied from case studies to RCTs. Interventions were balloon dilation myotomy IVIg and botulinum toxin. The methodological quality of the studies is poor and GRADE of evidence is very low.

Conclusion: There remains limited evidence for specific interventions in this area. While a number of interventions are used clinically their efficacy and safety is under research leaving clinicians with limited information. We discuss this providing direction for new research.

ROLE OF THE TONGUE IN PATIENTS WITH MS WITH AND WITHOUT DYSPHAGIA

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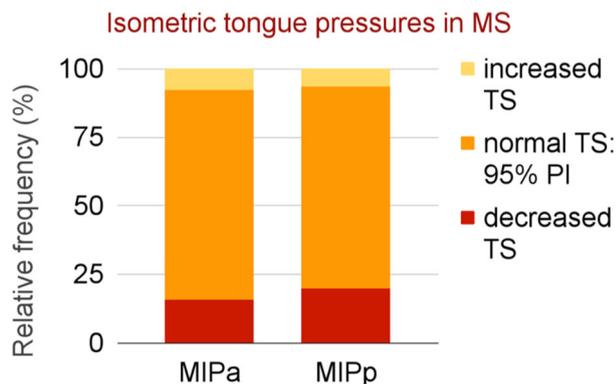
Introduction: Dysphagia is a common but insufficiently investigated comorbidity in Multiple Sclerosis (MS). Data on tongue strength in this population are also lacking. Therefore this research aims to increase knowledge on maximum isometric tongue pressures (MIP) and saliva swallowing pressures (MSP) in MS.

Materials and Methods: 145 MS-patients (56 men, 89 women; age 20–70 yo; mean age 51.4 yo) with varying severity (EDSS-score 0–9; mean 5.2) participated in this study. MIP and (regular and effortful) MSP were measured anteriorly and posteriorly by means of the IOPI and compared with healthy controls ($n = 300$). Swallowing function and swallowing related quality of life were assessed using FOIS Yale

Swallow Protocol EAT-10 and DHI. Unpaired sample *t* test Pearson's correlation coefficient one-way ANOVA and Mann-Whitney *U* test were used for statistical analysis by means of R.

Results: Mean MIP was significantly lower in MS compared to healthy controls (MIPa: 44.7 kPa; *p* = 0.002; MIPp: 38.8 kPa; *p* < 0.001). Individual results revealed that up to 20% of the participants had a decreased tongue strength. No significant differences were found for MSP. Type of MS disease severity and disease duration showed no significant effect on MIP nor MSP. MIPa and MIP p values however differed significantly between the categories of FOIS EAT-10 and DHI indicating presence or absence of dysphagia.

mean (SD) in kPa	MS	healthy	<i>p</i> -value
MIPa	44.7 (14.02)	49.1 (13.31)	.002
MIPp	38.8 (16.36)	45.4 (13.36)	.000
NSPa	23.0 (12.40)	22.1 (9.57)	.88
NSPp	23.0 (11.33)	21.1 (8.01)	.62
ESPa	34.1 (15.65)	34.1 (15.29)	.95
ESPp	31.8 (14.80)	34.1 (14.34)	.18



Conclusions: This multi-centre study reveals the first data on MIP and MSP in MS. MIP values are significantly lower in MS compared to healthy controls. No changes in MSP were found indicating a decrease in functional reserve of the tongue strength. This research advocates for inclusion of tongue strength measures in the assessment of dysphagia in MS.

EVERY DAY COUNTS: PROVISION OF A SPEECH AND LANGUAGE THERAPY SWALLOWING ASSESSMENT SERVICE ON SUNDAY MORNINGS WITHIN ACUTE STROKE UNIT ROYAL VICTORIA HOSPITAL BELFAST

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Introduction: Dysphagia following stroke affects 37–55% of patients (Martino et al. 2005). The presence of dysphagia increases risk of pneumonia which is one of the leading causes of death following acute stroke (Vernino et al. 2003). Recent data from the sentinel stroke national audit programme found patients with longest delays in comprehensive dysphagia assessment by speech and language therapy had a higher risk of pneumonia (Bray et al. 2016). Delays beyond 24 h were associated with an additional 4% increase of incidence of pneumonia.

Objectives: The standard acute stroke unit SLT service covers 8 am–5 pm Monday to Friday. As a result patients can remain NBM on restricted or modified oral intake over a weekend whilst awaiting comprehensive dysphagia assessment or reassessment by speech and language therapy the following week. In order to reduce delays in dysphagia assessment a weekend working strategy has been implemented. This is the first stroke unit in Northern Ireland to provide this service.

Method: A 5 month pilot was funded for 3.45 h on a Sunday morning within the acute stroke unit. Data was collated on a weekly basis on reasons for referral and intervention outcomes.

Results: During the pilot period 119 patients who were NBM were assessed on the acute stroke unit. Of these 76 patients were commenced on oral intake and in 10 cases hospital discharge was facilitated. Other outcomes included timely commencement on oral medications and reduced requirement for enteral feeding. Following the pilot permanent funding for the service was secured. Since the pilot a further 95 patients have been assessed with 58 NBM patients commenced on oral intake. Additionally 16 hospital discharged were facilitated.

Conclusion: When dysphagia is managed early it can lead to fewer patients unnecessarily kept NBM administration of urgent oral medications reduced length of hospital stay and associated costs and improved patient experience and wellbeing.

DYSPHAGIA IN PATIENTS WITH ESSENTIAL TREMOR AFTER DEEP BRAIN STIMULATION OF THE VENTRAL INTERMEDIATE NUCLEUS

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Introduction: Deep Brain Stimulation (DBS) of the ventral intermediate nucleus (VIM) nucleus is a mainstay treatment for severe and drug-refractory essential tremor (ET). Whereas stimulation-induced dysarthria (SID) as the most frequent side effect has been extensively described possible impairment of swallowing after VIM-DBS has not been systematically investigated yet although the neuroanatomical overlap of structures involved in the control and execution of speech and swallowing movements suggests such stimulation-induced dysphagia. The aim of this study was to analyze the occurrence and underlying pathophysiology of dysphagia after VIM-DBS with flexible endoscopic evaluation of swallowing (FEES).

Materials and Methods: From 2011 to 2017 12 patients with ET and bilateral VIM-DBS who were referred to the dysphagia outpatient clinics of the German university hospitals of Frankfurt and Muenster because of subjective dysphagia after VIM-DBS were enrolled. All patients were systematically assessed including FEES in the following conditions: (i) stimulation on (stim-ON) and (ii) after deactivating the stimulation for a variable time (stim-OFF). Presence and severity of dysphagia were rated according to a standardized dysphagia score

Results: Dysphagia in stim-ON could be objectified in all patients with mild dysphagia in 42% moderate in 42% and severe dysphagia with penetration/aspiration of two consistencies in 16% of subjects. The main finding was premature spillage and mild pharyngeal retention.

In stim-OFF all patients experienced a significant improvement of swallowing with a mean reduction in dysphagia scores of 82%.

Conclusions: Mild to moderate oropharyngeal dysphagia may occur as a side effect of VIM-DBS. The endoscopic dysphagia pattern suggests an impairment of cerebellar pathways possibly combined with interference with corticobulbar fibers in the internal capsule. VIM-DBS ET patients complaining of swallowing disorders should be stringently screened.

NIH-SS FOR THE PREDICTION OF POST-STROKE DYSPHAGIA: DISTINCTION BETWEEN SUPRA- AND INFRATENTORIAL REGION IS ESSENTIAL

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Introduction: For the early detection of post-stroke dysphagia (PSD) valid screening parameters are a crucial part of a step-wise diagnostic procedure. This study examines the role of the widely used National Institute of Health Stroke Scale (NIH-SS) as a low-threshold screening parameter with a special focus on differences between supra- and infratentorial lesions due to their differing role in the pathophysiology of PSD.

Patients and Methods: A random sample of 1000 stroke patients treated at our hospital in 2004–2014 was screened for this retrospective analysis. Patients were eligible if they had confirmed ischemic or haemorrhagic stroke and had received NIH-SS scoring and FEES upon admission. The NIH-SS was correlated with dysphagia severity as measured by the validated six-point fiberoptic endoscopic dysphagia severity score (FEDSS) and the ideal cut-off score to predict PSD defined as FEDSS > 1 was calculated applying ROC-analysis. Supra- and infratentorial strokes were analysed separately.

Results: NIH-SS and FEDSS showed a strong positive correlation in the whole study population ($N = 687$, $R^2 = 0.745$) and in analysed subgroups ($R^2 = 0.494$ for supra- and $R^2 = 0.646$ for infratentorial strokes $p < 0.0005$ respectively). For supratentorial strokes the ideal NIH-SS cut-off was > 9 (sensitivity 68.3% specificity 61.5% positive predictive value (PPV) 89.7% negative predictive value (NPV) 28.4%). For infratentorial strokes a lower cut-off > 5 was calculated (sensitivity 67.4%, specificity 85.0% ,PPV 95.1%, NPV 37.8%).

Conclusions: The NIH-SS may be used as an adjunct to predict PSD with moderate sensitivity and specificity. Scores above the cut-offs should lead to further assessment. Cutoff values between lesion locations differ because the NIH-SS rather relates to anterior-circulation stroke symptoms whereas infratentorial strokes are associated with the highest prevalence of dysphagia. Differentiation between supra- and infratentorial regions is therefore essential.

FAMILY CARER'S VIEWS AND EXPERIENCES OF MANAGING FEEDING AND SWALLOWING CHALLENGES IN THE PERSON WITH DEMENTIA. A SYSTEMATIC REVIEW AND META-SYNTHESIS

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Introduction: Approximately 80% of people with dementia have feeding and swallowing problems placing them at risk of

malnutrition. The majority of people with dementia live in the community and families are considered the most common care-providers. To date there is relatively little known on the impact of managing feeding and swallowing in dementia from the perspective of the family carer. Therefore it is timely to explore the views and experiences of family carers in relation to managing feeding and swallowing care in their relative with dementia.

Methods: This systematic review was completed by reviewing all qualitative studies on this subject using systematic review methodology. The reviewer searched the electronic databases Pubmed, Cinahl, PsycInfoEmbase, Proquest, Scopus and Web of Science to identify relevant studies. Then the a priori inclusion and exclusion criteria were applied to the identified studies. The studies eligible for inclusion were then formally appraised for methodological quality and relevance to answering the review question using the "Quality assessment criteria and scoring tool". The search and selection strategy identified five studies from five countries meeting the inclusion criteria and obtaining a "high" quality assessment score. Data from these studies was extracted onto a predesigned data extraction form and then analysed and subsequently synthesised using thematic analysis and meta-synthesis.

Results: The synthesis identified three thematic headings namely (1) Wellbeing and Normality (2) Loss and Dependency (3) Adaptation and Support. This meta-synthesis suggests that the management of feeding and swallowing in the person with dementia is complex and burdensome which family carers are not equipped for emotionally or in terms of knowledge and skills.

Conclusion: This systematic review provides insights as to how services for family carers managing the nutritional needs of their relative with dementia could be improved.

Oral Presentations

Friday, 28 September

14:30–16:00 Auditorium

Session 06. Free papers 3: Instrumental Dysphagia Evaluation

HOW COMMON IS PENETRATION IN HEALTHY SWALLOWING?

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Introduction: Aspiration of material below the true vocal folds is considered abnormal in healthy swallowing and a risk for respiratory sequelae. Literature suggests that transient penetration of material into the laryngeal vestibule (i.e. Penetration-Aspiration Scale [PAS] scores of 2 or 4) may occur in individuals with healthy swallowing. It is unknown how the frequency of penetration is impacted by bolus consistency in healthy individuals. In this study we explored the frequency of penetration across a range of liquids (thin to extremely thick) in healthy adults.

Materials and Methods: 51 participants (24 male) mean age 42 (range 21–70) each swallowed 27 boluses (20%w/v barium) under videofluoroscopy acquired at 30 images/s. This included 3 boluses of thin and 6 boluses each of slightly- mildly- moderately- and extremely-thick barium thickened to meet levels 0 to 4 of the International Dysphagia Diet Standardisation Initiative (IDDSI) guidelines. Blinded ratings of PAS scores were performed in duplicate for each bolus with disagreements resolved by consensus. Ordinal logistic regression was used to explore the odds of PAS scores of 1 versus ≥ 2 ; for each consistency.

Results: For 32 participants (63%) PAS scores of 1 were seen across all consistencies. Fourteen participants displayed at least one transient penetration event with ejection. Five participants displayed at least one event with a PAS score of 3 or 5 (no ejection). The odds of penetration ($PAS \geq 2$) were 2.92 times higher for thin liquids (IDDSI level 0) compared to levels 1–4; 4.1 times higher for IDDSI levels 0–1 versus 2–4; 4.7 times higher for IDDSI levels 0–2 versus 3–4; and 5.58 times higher for IDDSI levels 0–3 versus level 4.

Conclusions: Penetration of thin or slightly thick liquids occurred in 31% of this healthy sample aged ≤ 70 . Penetration was less common with thicker liquids with frequency decreasing significantly with each step of increased thickness on the IDDSI framework.

AP PHARYNX AS A PREDICTOR OF PHARYNGEAL CONSTRICTION RATIO

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Background: The subjective assessment of videofluoroscopic swallow studies (VFSS) is inaccurate. The pharyngeal constriction ratio (PCR) is a validated reliable measure of pharyngeal contractility. A higher PCR denotes a weaker pharynx. The determination of PCR is time consuming and requires two area measurements in the lateral VFSS view. A reliable less time intensive surrogate for PCR is desirable.

Purpose: To evaluate the ability of the anterior–posterior pharyngeal diameter (AP-Pharynx) to predict the PCR.

Methodology: Charts of patients with dysphagia undergoing routine VFSS during last 1 year period were retrospectively reviewed. Data regarding patient demographics EAT-10 and FOIS scores VFSS variables including pharyngeal area (PA hold) PES opening in lateral and A-P view total laryngo-hyoid elevation PCR hypopharyngeal bolus transit time and AP-Pharynx were noted. AP-Pharynx was measured at the point of maximum pharyngeal constriction with a 20 ml liquid bolus.

Results: The mean (SD) age of the entire cohort ($N = 425$) was 64 (± 14) years. 51.5% ($n = 219$) was male. The correlation between PCR and AP-Pharynx was strong (Pearson $r = 0.812$; $p < 0.001$). The mean (SD) AP-Pharynx for individuals who aspirated was 4.20 cm (± 0.65) in comparison to 3.55 cm (± 0.53) for individuals who did not aspirate ($p < 0.001$). Individuals with an AP-Pharynx > 4 cm were 5.6 \times more likely to aspirate (95% CI 4.0–7.9). There were also significant correlations between the AP-Pharynx and functional oral intake (FOIS) and subjective dysphagia (EAT10).

Conclusion: The AP-Pharynx is a single measurement on VFSS that appears to be a valid surrogate for pharyngeal strength (PCR). An elevated AP-Pharynx is correlated with aspiration (PAS) functional oral intake (FOIS) and subjective dysphagia (EAT10) ($p < 0.001$).

EFFECT OF TOPICAL NASAL ANAESTHESIA (TNA) ON SWALLOWING AND COMFORT IN HIGH-RESOLUTION IMPEDANCE MANOMETRY (HRIM)

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Introduction: Use of TNA is common in HRIM. Guiu Hernandez et al. reported that TNA did not improve comfort with a 2.75 mm

catheter but did affect pharyngeal pressure magnitude in healthy participants. This study investigated the effect of TNA on swallowing and procedure tolerability during HRIM with a 4.2 mm catheter.

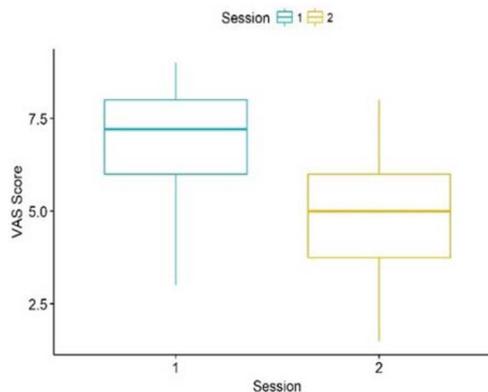
Methods: 20 healthy participants (mean age = 33 years) underwent two randomised conditions of HRIM using the ManoScan ESO Z 4.2 mm catheter: with TNA (1 ml of 2% viscous lidocaine hydrochloride mixed with 1 ml of lubricant) and placebo (2 ml of lubricant). Studies were 1 week apart; participants were blinded to condition. Participants performed 3 swallows each of saliva saline (5 ml) and bread (2 cm \times 2 cm) while reclined 45 degrees (esophageal data) and again while seated upright (pharyngeal data). Pharyngeal and upper esophageal sphincter (UES) HRIM parameters were analysed using the Swallow Gateway analysis platform and linear mixed effect models. Visual analogue scale (VAS) scores rating comfort were analysed with paired t-tests.

Results: There were no significant differences in pharyngeal and UES parameters between anaesthetic conditions. There were no significant differences in VAS scores between the placebo (mean = 54.8 standard deviation (SD) = 19.3) and TNA (mean = 60.0; SD = 21.9) ($t[19] = -0.9$; $p = 0.4$) conditions but there was a significant session effect ($t[19] = 5.1$; $p < 0.05$). Given the differing comfort levels between sessions post hoc analyses were done on HRIM parameters from the 1st and 2nd sessions separately: no significant effect of anaesthetic was found.

Table 1. Pharyngeal and UES parameters extracted using Swallow Gateway

HRIM Parameter	Bolus type	Change under TNA	Standard error (SE)	p value*	
Esophageal	UES integrated relaxation pressure (mmHg)	Dry	2.17	1.94	0.28
		Liquid	0.32	0.80	0.69
		Bread	1.12	1.80	0.54
	UES opening time (s)	Dry	-0.01	0.02	0.48
		Liquid	0.01	0.009	0.24
		Bread	-0.02	0.02	0.23
Pharyngeal	UES integrated relaxation pressure (mmHg)	Dry	7.40	2.82	0.10
		Liquid	0.62	0.60	0.31
		Bread	1.47	2.04	0.48
	UES opening time (s)	Dry	-0.04	0.02	0.13
		Liquid	-0.01	0.009	0.31
		Bread	-0.03	0.01	0.06
	Peak pharyngeal pressure (mmHg)	Dry	-0.28	6.41	0.97
		Liquid	4.68	5.46	0.86
		Bread	3.32	5.05	0.52
	Distension-contraction latency (s)	Dry	-0.01	0.01	0.44
		Liquid	-0.006	0.01	0.54
		Bread	-0.001	0.01	0.90
	Mesopharynx/tongue base contractile integral (mmHg.s.cm)	Dry	3.39	5.92	0.57
		Liquid	10.41	7.29	0.17
		Bread	0.63	5.64	0.91
Hypopharynx contractile integral (mmHg.s.cm)	Dry	1.55	5.24	0.77	
	Liquid	4.80	5.39	0.38	
	Bread	-0.42	4.18	0.92	

*adjusted according to false discovery rate step-down procedure³



Conclusion: This study is the first to investigate the effects of TNA on HRIM with the 4.2 mm catheter. While TNA did not improve procedural comfort of HRIM it did not significantly affect pharyngeal and UES measures. There is improved tolerability of the 4.2 mm catheter with practice regardless of TNA use.

THE RELATIONSHIP BETWEEN RESIDUE AND ASPIRATION ON THE SUBSEQUENT SWALLOW IN PATIENTS WITH DEMENTIA

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Introduction: The Normalized Residue Ratio Scale (NRRS) is a normalized pixel-based measure used to capture precise measures of residue severity. Molfenter¹ reported that vallecular residue doubled the risk of aspiration on the subsequent clearing swallow in patients with neurogenic dysphagia. In a study of healthy subjects Steele reported that small amounts of pharyngeal residue are normal. Using these thresholds we sought to confirm if residue predicted airway invasion on subsequent clearing swallows of thin and extremely thick liquid boluses in patients with dementia.

Materials and Methods: Videofluoroscopies of 58 patients with dementia were retrospectively obtained. Sips of thin and extremely thick liquid barium were extracted and revealed 121 of 392 thin and 67 of 234 extremely thick liquid swallows that required clearing swallows. Ratings of swallowing safety and efficiency were made on each swallow including clearing swallows using the Penetration-Aspiration Scale (PAS) and NRRS in the valleculae (NRRSv) and pyriform sinuses (NRRSp). Chi square tests were used to determine the relationship between preswallow residue (above vs below threshold and impaired safety on the subsequent swallow (PAS > 3 vs 3 +).

Results: Over 70% of both thin and extremely thick liquid swallows were safe (PAS < 3). Significant residue was more common in the valleculae for both thin and extremely thick liquids (Table 1). Chi Square tests revealed that the proportion of thin liquid swallows with significant NRRSp that were unsafe on the subsequent swallow (73%) was significantly greater than the proportion of swallows with significant NRRSp that were safe on the subsequent swallow (49%) [$\chi^2(1) = 6.09$; $p < 0.05$; OR: 2.83; 95% CI 1.22–6.57].

Conclusions: Thin liquid pyriform residue triples the risk of abnormal PAS scores on the subsequent clearing swallow in patients with dementia. Future research should determine the impaired physiology causing aspiration and residue.

	Normal Values ²	Dementia	% of swallows above threshold requiring clearing swallows
NRRSv	0.03 (95% CI: 0.01-0.04)	Thin: 0.21 (95% CI: 0.18-0.24)	75%
		Extremely thick: 0.26 (95% CI: 0.21-0.32)	81%
NRRSp	0.00 (95% CI: 0.00-0.01)	Thin: 0.07 (95% CI: 0.06-0.09)	56%

ASPIRATION: DIAGNOSTIC CONTRIBUTION FROM BEDSIDE SWALLOWING EVALUATION AND ENDOSCOPY

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Introduction: The aim of this study was to identify which characteristics collected from bedside swallowing evaluation (BSE) and fiberoptic endoscopic evaluation of swallowing (FEES) are a risk or a protective factor for aspiration.

Materials and Methods: This retrospective study included data on 1577 consecutive patients collected from BSE and FEES. A bivariate analysis was performed to verify the association of each variable with aspiration (Chi square test). The variables associated with aspiration entered into a multivariate logistic model to verify and quantify this association.

Results: Several variables were found to be significantly associated (P value of less than 0.05) with aspiration some being a protective factor against aspiration: cooperation sensation laryngeal elevation direct therapy. The regression model identified the most variables related with aspiration among which tracheotomy material pooling spillage. Patients able to perform dry swallows are 77% less likely to aspirate (protective factor).

Conclusions: Several variables are involved in the protection of airways during swallowing. Their interaction in patients with swallowing disorders offers the clinician the best way to interpret BSE and FEES.

SWALLOWING BIOMECHANICS IN PATIENTS WITH ZENKER'S DIVERTICULUM USING PHARYNGEAL PRESSURE FLOW ANALYSIS AND VIDEOFLUOROSCOPY

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¹Department of Neurosciences Exp ORL, KU Leuven Deglutology, Leuven. ²Department of Clinical and Experimental Medicine, KU Leuven TARGID, Leuven. ³Department of Thoracic Surgery, UZ Leuven, Leuven. ⁴Department of Geriatrics Leuven, UZ Leuven. ⁵Departments of Gastroenterology and Human Physiology, Flinders University, Adelaide

Introduction: Zenker's diverticula (ZD) are associated with dysphagia regurgitation of undigested food and halitosis. It is believed that ZD are formed through pulsion forces in a weak area of the hypopharyngeal wall. Poor upper esophageal sphincter (UES) compliance is the presumed pathophysiologic mechanism yet the underlying pathophysiology is still unknown. This study aimed to characterize pharyngo-esophageal function in ZD patients using high resolution manometry with impedance (HRiM).

Materials and Methods: 21 ZD patients (14 M 70 ± 10 years) and 48 healthy adults (18 M 51 ± 17 years) were included. All patients had HRiM pre-surgery (myotomy and pexy) and 5 patients post-surgery. Swallow Gateway analysis (swallowgateway.com) was used to analyze the recordings and determine metrics of pharyngeal function for 10 ml liquid swallows.

Results: Compared to controls patients had increased swallow dysfunction (SRI) intrabolus distention pressures (IBP) UES and pharyngeal contractile pressures (UESCI PhCI); and decreased UES relaxation (UES IRP) opening time (UES Open Time) and aberrant flow timing (DCL) (Table 1). All pre-surgery patients had reduced opening extent (UES Max Adm) due to impaired relaxation (20/21) low distention pressures (4/21) or low pharyngeal contractility (9/16). 4/21 patients aspirated. Basal UES pressure was not altered in pre- or post-surgery patients compared to controls.

Conclusions: ZD patients demonstrate altered swallowing biomechanics consistent with obstructive pathology. In the subgroup of patients assess post-operatively the biomechanical measures remained consistent with structural pathology.

Table 1: 10ml liquid data shown as median [IQR]. Controls significantly different to ZD pre or ZD post using Mann Whitney U Test (* $p < 0.05$ ** $p < 0.005$ *** $p < 0.001$)

Table 1: PFA metrics	Controls (n=48)	ZD pre (n=21)	ZD post (n=5)
SRI	3 [1,4]	5 ** [3,11]	6 [2,9]
UES Max Adm, mS	9.04 [7.31,10.60]	4.99 *** [4.04,6.41]	4.55 ** [3.61,5.42]
IBP, mmHg	10 [4,16]	19 ** [11,50]	18 ** [14,36]
UES IRP, mmHg	0 [-3,4]	16 *** [6,24]	20 [-3,26]
UES Open Time, s	0.65 [0.58,0.71]	0.56 * [0.48,0.66]	0.48 * [0.40,0.61]
UES BP, mmHg	82 [54,150]	121 [49,245]	97 [65,294]
DCL, s	0.47 [0.43,0.55]	0.38 *** [0.32,0.44]	0.31 * [0.21,0.40]
PhCI, mmHg.cm.s	387 [257,585]	735 *** [529,1145]	633 [343,844]
UESCI, mmHg.cm.s	456	1043 ***	639 *

ESOPHAGEAL FUNCTION IN PATIENTS WITH OROPHARYNGEAL DYSPHAGIA

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¹Emma Children's Hospital AMC. ²Flinders University

Objective: Evidence of esophageal dysfunction has been previously reported in laryngectomy patients. (1) This raises a question whether esophageal findings should be considered relevant to symptoms in patients with oropharyngeal dysphagia (OPD). We therefore investigated esophageal function in neurogenic OPD patients.

Methods: High resolution impedance manometry (HRIM) recordings from 49 broad neurogenic ODP patients (brainstem stroke excluded) were analyzed using Swallow Gateway (swallowgateway.com) to determine metrics of pharyngeal and esophageal function during swallowing of 5 ml thin liquid boluses. Severity of global pharyngeal dysfunction was assessed using the validated Swallow Risk Index (SRI). (2) The Chicago Classification of esophageal motility disorders was applied. Relationships between SRI and measures of esophageal function were examined by Spearman Rank correlation.

Results: 18/49 (37%) patients had an esophageal motility disorder ($n = 14$ esophago-gastric junction outflow obstruction $n = 2$ each absent and spastic contractility). There were no significant differences in SRI in those with/without major esophageal disorders. The SRI ranged from 0.1 to 63.1 (mean SRI 9.8); 26 (53%) patients had an abnormal SRI (> 3.6) with 9 (18%) exceeding the threshold defining severe dysfunction predisposing to aspiration risk (SRI > 15). Increased severity of pharyngeal dysfunction did not significantly correlate with esophageal distal latency ($r = 0.134$; $p = 0.370$) IRP4 ($r = 0.222$; $p = 0.134$) or pressure-flow measures of intra-bolus distention pressure ($r = 0.117$; $p = 0.433$). However SRI did correlate with increasing distal contractile integral ($r = 0.348$; $p = 0.017$) and a

trend was observed for improved esophageal bolus clearance (impedance ratio $r = -0.256$; $p = 0.09$).

Conclusion: Some neurogenic OPD patients demonstrate evidence of esophageal motor disorders. Increased severity of pharyngeal dysfunction related to increased rather than reduced esophageal contractility and clearance.

PSYCHOMETRIC PROPERTIES OF VISUOPERCEPTUAL MEASURES OF VIDEOFLUOROSCOPIC AND FIBRE-ENDOSCOPIC EVALUATIONS OF SWALLOWING: A COSMIN REVIEW

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¹Curtin University. ²Monash University. ³University of Oslo

Introduction: Fiberoptic Endoscopic Evaluation of Swallowing (FEES) and Videofluoroscopic Swallow Studies (VFSS) are widely used in dysphagia assessment; however there is no consensus on a visuoperceptual measure to analyse the FEES of VFSS video recordings. Measures require sound psychometric properties to be suitable for clinical or research purposes. To date no review of psychometric properties of FEES and VFSS measures has been conducted. This review assessed the quality of the psychometric properties of visuoperceptual measures of FEES and VFSS.

Materials and Methods: Electronic databases (CINAHL, Embase Medline, and Pubmed) were searched for studies reporting on psychometric qualities of visuoperceptual measures which are used to analyse recordings from FEES and VFSS. All dates until February 2017 were included. The Consensus based Standards for the selection of health Measurement Instruments (COSMIN) checklist was used to evaluate the methodical quality of studies. The measures' overall quality was then assessed by combining COSMIN ratings with pre-defined quality criteria.

Results: Forty-five studies reporting on 39 measures met the inclusion criteria for this review. Data about the measures' psychometric properties was very limited. Twenty-one measures had information available about reliability only while 18 reported results of up to five of the possible nine psychometric properties categorised within the COSMIN framework. The majority of the measures' psychometric properties were rated as 'indeterminate' overall due to flaws in study design statistical analyses and reporting practices of studies.

Conclusions: There is insufficient evidence to recommend any individual measure included in this review as valid and reliable to interpret VFSS and FEES recordings. Further research is needed which utilises robust methodological design and reporting to develop new measures for visuoperceptual evaluation of FEES and VFSS meeting current psychometric standards.

COMPARING TRIAL-TO-TRIAL HYOID DISPLACEMENT VARIABILITY BETWEEN YOUNG AND OLD ADULTS

D.L. Brates¹, S.M. Molfenter¹

¹New York University

Introduction: Variability in hyoid movement is known to occur even when bolus properties (e.g. volume consistency) are controlled. Limb muscle studies show that trial-to-trial variability increases with age due to neuromuscular changes. To our knowledge there has been no

systematic investigation of kinematic variability within a swallow series. This study compared trial-to-trial variability of hyoid displacement between young and old adults.

Methods: Videofluoroscopic swallow studies (VF) of 44 healthy seniors (mean age = 77, SD = 7.2) and 20 young adults (mean age = 32, SD = 5.7) were analyzed. Six swallows (3 × 5 ml and 3 × 20 ml thin liquid) were cut from each VF and randomized. Hyoid displacement was measured in the anterior superior and hypotenuse planes and expressed as a percentage of the C2–C4 distance. Coefficient of variation (CV) was calculated across all 3 trials of each volume in each dimension to represent variability. Two-way ANOVAs were run to test effects of age (young/old) and volume (5 ml/20 ml) on CV.

Results: A significant main effect of age was found for all three displacement measures with older adults displaying higher CVs (Table 1). No significant effects of volume were observed.

Variable	Mean CV (Young)	Mean CV (Old)	F	p
Anterior Displacement	16.7	27.0	6.5	0.01*
Superior Displacement	16.6	26.4	10.8	0.00*
Hypotenuse Displacement	12.4	18.1	6.1	0.01*

Conclusions: The results revealed that older adults demonstrate more trial-to-trial hyoid displacement variability compared to young adults. This is consistent with evidence of the effect of age on motor output variability in limb muscle literature. Neuromuscular changes such as slowed signal transmission and motor unit reorganization may have led to increased fluctuation in motor output in the older group. This study is a first step towards understanding how trial-to-trial kinematic variability functions in the context of the aging swallow. Clinically this has implications for planning and interpreting VF suggesting that more trials may be indicated for older adults to achieve a representative “snapshot” of swallow physiology.

Oral Presentations

Saturday, 29 September

9:00–10:00 Auditorium

Session 09. Free Papers 4 Critical Care/Other

ORAL STAGE DYSPHAGIA IN ADULTS PRESENTING WITH TEMPOROMANDIBULAR DISORDERS

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Introduction: Temporomandibular disorders (TMDs) are the most common non-dental orofacial pain disorders. These may cause oral stage dysphagia (OD). Yet little is known about the nature and extent of this dysphagia or its impact on patients. The aim of this study was to investigate the epidemiology impact and patient perceptions of TMD-related OD with the view to improve future care provision and research in this area.

Materials and Methods: A cross-sectional prospective study was completed in 2 national specialist centres in the Republic of Ireland. 126 participants were recruited. Epidemiology impact and patient perspectives on management were assessed using a specifically devised protocol that included the Diagnostic Criteria for Temporomandibular Disorders (1) the TOMASS (2) the DHI (3) and a patient information survey. Descriptive and statistical data analyses were completed.

Results: 95% (*n* = 120) of participants with TMDs reported some level of OD. Median rating of OD severity on the DHI was classified as moderate. Masticatory issues were prevalent (95%). Swallowing difficulties (53%) and weight loss (50%) were also common. OD impacted moderately on participation and well-being across daily and social activities. Almost half (43%) of participants had no information on OD management during TMD care and required information about treatment options.

Conclusions: Little is known about OD in this area. This research highlighted the broad range of OD symptoms reported by adults with TMDs and their impact on functioning and psychosocial well-being. These findings motivated the design of a novel TMD-related OD educational resource. The need to improve clinical practice and research on this topic is evident. Further work involves the refinement and implementation of the original assessment protocol and educational tool.

PREDICTION OF EXTUBATION FAILURE IN ACUTE STROKE PATIENTS: VALUE OF ASSESSMENTS FOR SALIVA MANAGEMENT AND SWALLOWING FUNCTION

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Introduction: Determining the optimal time point for extubation is a clinical challenge in stroke patients. Classical weaning criteria or state of consciousness are not reliably predictive of extubation success. Parameters related to secretion handling perform better (Steidl et al. *Cerebrovasc Dis.* 2017;44:1–9). We compare tools for the evaluation of saliva management and swallowing function regarding their predictive value for extubation failure.

Patients and Methods: 133 orally intubated stroke patients deemed ready for extubation by the treating physician were included in this prospective observation trial. Classical extubation criteria Glasgow coma score (GCS) a semiquantitative airway score (sqAS) and an oral motor control score (OMC) were assessed prior to extubation a water swallow screening test and scoring of a six-point fiberoptic endoscopic dysphagia severity score (FEDSS) were performed after extubation. Scores were correlated. Binary logistic regression analysis was used to assess their predictive value for extubation failure. Ideal cut-off values were determined by ROC-analysis.

Results: Reintubation rate was 24.1% after 24 ± 43 h in mean. Reasons were: aspiration (50.0%) primary pulmonary complications (28.1%) coma (15.6%) and need for surgical interventions (6.3%). Reintubated patients showed significantly lower GCS sqAS and OMC scores. They showed aspiration in the water swallow test more often and had worse FEDSS (*p* < 0.001). FEDSS OMC and sqAS were strongly correlated (*p* < 0.001). Only FEDSS remained an independent predictor for extubation failure in adjusted regression analysis (adjOR 4.2 per point increase *p* < 0.007). A FEDSS cut-off > 4 best identified patients with extubation failure (sensitivity: 84.6% specificity: 76.5%).

Conclusions: The risk of extubation failure is strongly correlated with dysphagia severity in acute stroke. Clinical assessment of secretion handling may be used for decision making. FEES after extubation best predicted necessity of reintubation.

DYSPHAGIA SCREENING TO PREDICT COPD EXACERBATION: A CROSS-SECTIONAL STUDY

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¹Iizuka Hospital

Introduction: COPD patients are known to have dysphagia even at an early stage. Dysphagia screening is therefore recommended in COPD patients. However there are few studies on which method detects COPD patients at risk for exacerbation. The simple swallowing provocation test (SSPT) one of the standard screening tests and also the only test with evidence of relation to COPD exacerbation is not as simple for physicians or patients. This study aimed to identify a more adequate measure for COPD dysphagia screening.

Subjects: Stable COPD patients in our hospital from March to September 2017 who consented to this study.

Methods: The following dysphagia screening tests were performed: 10-item Eating Assessment Tool (EAT-10) Frequency scale for the symptoms of GERD (FSSG) Repetitive saliva swallowing test (RSST) water swallowing test (WST) SSPT tongue pressure measurement blood test and body composition analysis. Multiple regression analysis was performed to investigate the independent determinants of exacerbations in the past year.

Results: Seventy cases were included. Twenty-seven had exacerbations in the past year. The independent risk factors for past exacerbations were GOLD stages body mass index skeletal muscle index serum total protein/pre-albumin/triglyceride levels tongue pressure RSST swallowing frequency and SSPT.

Discussion: It is known that COPD exacerbation in the previous year is the strongest predictor for future exacerbation and mortality. However many unrecognized or unreported exacerbations make it difficult to identify a patient's true exacerbation frequency. GOLD stages and SSPT are also reported as predictors. Our results show that blood tests body composition analysis and RSST may also be predictive of COPD exacerbation. These are easily obtained and may be more adequate screening methods as COPD is commonly managed in the primary care setting and the patient population is increasingly aging.

SPONTANEOUS SALIVA SWALLOWING FREQUENCY: A SYSTEMATIC REVIEW

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Introduction: Saliva is needed to moisten solid food to make it soft enough to swallow but also to keep the mouth and pharynx moist and clean by frequently but semi-consciously collecting and swallowing small amounts of resting saliva where frequency of swallowing depends on the amount of saliva. Because reports on normal saliva swallowing frequency (SSF) are rare or inconsistent the aim of this study was to review (1) normal SSF and (2) if and to what extent SSF changes by dysphagia.

Method: We performed a systematic review in PubMed and Embase using an extensive search strategy and independently included studies in which SSF was measured in adults being healthy or suffering from a disease causing dysphagia. Exclusion criteria: n < 10 and registration < 30 min.

Results: The search identified 795 studies of which 84 were eligible. Based on full text appraisal 13 studies could be included with sufficient and reliable data. Mean normal SSF calculated as swallows per

hour weighted for sample size was 45/h (20.5–70.8; 7 studies) while awake and 10/h (2.4–16.4; 4 studies) during sleep. Mean SSF in awake PD patients was 35/h (24–48; 3 studies) during sleep 31/h (1 study) and in stroke patients 24/h (13.8–33.6; 2 studies) but most studies reported on non-dysphagic patients. One PD study compared droolers (and minimal dysphagia) with non-droolers showing similar SSF. One acute stroke study showed lower SSF in dysphagic patients (14/h) compared to non-dysphagic patients (33/h) and suggested a threshold of < 24/h predicting dysphagia but without a rationale for this lower SSF.

Conclusion: Taken into account that saliva production varies during the day and is reduced during the night swallowing saliva averagely once every one-and-a-third minute while awake and once every six minutes during the night appears to be truthful. However SSF in people with dysphagia including consequences for health status assessment and treatment is surprisingly understudied.

PROSPECTIVE EVALUATION OF THE “STANDARDIZED ENDOSCOPIC SWALLOWING EVALUATION FOR TRACHEOSTOMY DECANNUATION IN CRITICALLY ILL NEUROLOGIC PATIENTS”—DATA FROM 2013–2017

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Introduction: Removal of a tracheostomy tube in critically ill neurologic patients is a difficult decision and depends particularly on the physician's individual experience. An objective measure of readiness for decannulation was introduced in 2013 called “The Standardized Endoscopic Evaluation for Tracheostomy Decannulation in Critically Ill Neurologic Patients” (1). This protocol includes the stepwise evaluation of secretion management spontaneous swallowing and sensitivity during fiberoptic endoscopic evaluation of swallowing (FEES). Compared to clinical evaluation it was proven to allow for faster but nonetheless safe decannulation with a reintubation rate of only 1.9%. In the present study we reevaluated our former findings with data from 5 years after the original publication.

Materials and Methods: In this prospective observational single-center study patients with acute neurologic diseases from our neurological ICU were included from January 2013 to December 2017. Patients had to be tracheotomized and completely weaned from mechanical ventilation. Assessed parameters were decannulation according to the above-mentioned protocol time from end of mechanical ventilation to first FEES and decannulation failure. Decannulated patients were monitored throughout their stay for complications related to tube removal.

Results: 386 patients were included of whom 231 (59.8%) could be decannulated sometime during their stay according to the protocol. First FEES was performed 2.32 ± 10.75 days after end of mechanical ventilation and could be performed safely and without complications in all patients. 3.9% of patients had to be re-intubated/re-cannulated after decannulation 2.3% due to severe dysphagia or respiratory failure.

Conclusions: The “Standardized Endoscopic Evaluation for Tracheostomy Decannulation in Critically Ill Neurologic Patients” is a safe and efficient tool to evaluate readiness for decannulation in patients on the neurological ICU.

Oral Presentations
Saturday, 29 September
11:00–12:00

Session 11. Free Papers 5 Dysphagia Intervention

CEREBELLAR RTMS PREVENTS SWALLOWING DYSFUNCTION INDUCED BY A CORTICAL VIRTUAL LESION

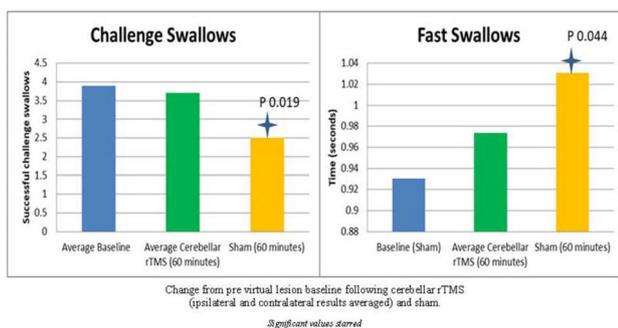
A. Sasegbon¹, A. Simons¹, E. Michou¹, S. Hamdy¹

¹University of Manchester

Introduction: Repetitive transcranial magnetic stimulation (rTMS) is a neurostimulatory technique which can be used to alter neuronal activity within regions of the brain. Here we aimed to compare the effects of ipsilateral and contralateral 10 Hz cerebellar rTMS versus sham stimulation on swallowing behaviour following a virtual lesion to the pharyngeal motor cortex.

Methods: Healthy human participants ($n = 10$) were intubated with a pharyngeal catheter. Baseline swallowing performance was measured using a water swallowing reaction time task. Participants received 10 min of 1 Hz rTMS (virtual lesion) to the pharyngeal motor cortex which elicited the largest pharyngeal motor evoked potentials. This caused a disruption of swallowing behaviour. Over 3 separate visits to the laboratory participants were randomised to receive 250 pulses of 10 Hz cerebellar rTMS to the ipsilateral side contralateral side or sham. Swallowing performance was then measured at 15 min intervals for an hour after rTMS.

Results: rTMS was well tolerated by all subjects. Sham stimulation was associated with an increase in fast swallow time latency ($\chi^2 = 11.429$; $p = 0.044$) with changes from baseline at 15 min post intervention ($Z = -1.988$; $p = 0.047$) and 60 min post intervention ($Z = -1.988$; $p = 0.047$) and poorer performance in challenged swallows at 30 min post intervention ($Z = -2.352$; $p = 0.019$). By contrast participants who received ipsilateral or contralateral cerebellar rTMS showed no evidence of disruption of fast and challenge swallows compared to baseline ($p > 0.05$) implying a reversal (Fig 1).



Conclusion: Ipsilateral and contralateral 10 Hz cerebellar rTMS were able to block the disruptive effects of a virtual lesion in the swallowing motor cortex. There were no differences between ipsilateral and contralateral cerebellar stimulation on swallowing behaviour suggesting that activation of either cerebellar hemisphere may be therapeutically useful in dysphagic stroke.

EFFICACY OF TRPA1/M8 AGONISTS TO IMPROVE THE KINEMATICS AND THE NEUROPHYSIOLOGY OF SWALLOW RESPONSE IN PATIENTS WITH OROPHARYNGEAL DYSPHAGIA

D. Alvarez-Berdugo¹, N. Tomsen¹, L. Rofes¹, M. Bolívar², V. Arreola¹, V. Nascimento², A. Martín², O. Ortega¹, L. Gosoni³, P. Clavé¹, S. Michlig³

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Introduction: Current treatment for oropharyngeal dysphagia (OD) is moving from compensation based on bolus viscosity to treatments to improve swallowing. Pharyngeal sensory stimulation through TRP agonists is a promising strategy to treat patients with OD by improving the swallow response.

Aims: The aim of this study is to assess the efficacy of different TRPA1/M8 agonists as a treatment for OD in patients with neurological diseases or ageing.

Materials and Methods: 58 patients with swallow safety impairment due to ageing stroke or neurodegenerative disease were included in a 3 arms double-blind randomized clinical trial (NCT02193438). Swallow safety and efficacy as well as the swallow response were assessed by videofluoroscopy (VFS) before and during the administration of nectar viscosity boluses supplemented with: a) 756.6 μ M cinnamaldehyde and 70 μ M zinc (CIN-Zn) b) 1.6 mM citral (CIT) and c) 1.6 mM citral and 1.3 mM isopulegol (CIT-ISO). The effect of these agonists on the latency and amplitude of pharyngeal sensory evoked potentials (PSEP) was also assessed by electroencephalography.

Results: TRPA1 stimulation with CIN-Zn reduced the penetration-aspiration score ($p = 0.009$) and the prevalence of penetrations ($p = 0.039$). TRPA1 stimulation with either CIN-Zn or CIT reduced the time to laryngeal vestibule closure (CIN-Zn $p = 0.002$; CIT $p = 0.023$) and the upper esophageal sphincter opening (CIN-Zn $p = 0.007$; CIT $p = 0.035$) times. The combination of CIT-ISO had no effect either on VFS signs or on swallow kinematics. Only CIN-Zn reduced the latency of the P2 peak of the PSEP; on the other hand the combination of CIT-ISO increased the latency of P2 peak.

Conclusion: TRPA1 stimulation with CIN-Zn or CIT improves swallow response which in the case of CIN-Zn is associated to an improvement in cortical activation and leads to a significant improvement on swallow safety. These results set the bases for the development of new active treatments for OD using TRPA1 agonists.

CLINICAL AND BIOMECHANICAL EFFECTS OF TRANSCUTANEOUS ELECTRICAL STIMULATION ON CHRONIC POST-STROKE OROPHARYNGEAL DYSPHAGIA: RESULTS AT ONE YEAR FOLLOW UP OF A RANDOMIZED CONTROLLED TRIAL

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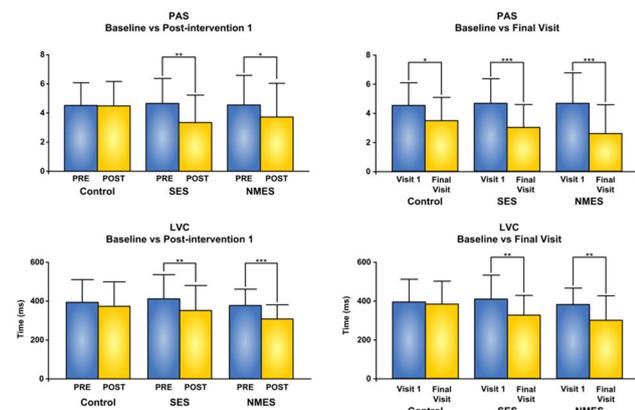
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Introduction: Chronic post-stroke oropharyngeal dysphagia (OD) is associated with severely impaired pharyngeal sensory and motor function. We assessed the clinical outcome and biomechanical effect of sensory (SES) and motor (NMES) electrical stimulation on chronic post-stroke OD patients in a randomized controlled trial at 1-year follow up.

Methods: Ninety post-stroke patients (74.13 ± 11.45 years) with chronic OD (NIHSS 3.6 ± 4.1, Rankin 2.6 ± 1.7) were randomly assigned to (a) a control group with compensatory treatment including fluid thickening (CT) (b) SES group: CT plus sensory electrical stimulation (75% of motor threshold) (c) NMES group: CT plus neuromuscular electrical stimulation (motor threshold). Patients were treated with up to two cycles (6 months apart) of 15 sessions of 1 h stimulation during 2 weeks and followed up with up to five clinical and videofluoroscopic (VFS) assessments during 1 year.

Results: Swallow function significantly improved in patients of the SES and NMES groups for both prevalence of safety impairment ($p < 0.001$) PAS ($p < 0.001$) and laryngeal vestibule closure time ($p < 0.01$) after the first treatment and at 1 year follow up. This improvement caused a significant reduction in the need for thickening agents ($p < 0.001$). At 1 year follow up patients in the control group also presented reduced prevalence of signs of safety and efficacy impairment however the reduction was significantly smaller than that observed with SES and NMES and not related to any reduction in the laryngeal vestibule closure time. No major adverse events related to SES or NMES were observed.

Conclusions: Transcutaneous electrical stimulation is a safe and effective therapy for post-stroke OD. After 1 year follow up both SES and NMES greatly improved the safety of swallow and reduced the need for fluid thickening in these patients.



DO FLUID CONSISTENCIES USED IN A VIDEOFLUROSCOPY CLINIC COMPLY WITH INTERNATIONAL GUIDELINES? A PROSPECTIVE CLINICAL AUDIT OF CURRENT SLT PRACTICE

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Introduction: Videofluoroscopy (VFS) is one of the most widely used instrumental assessments in the assessment and management of oropharyngeal dysphagia. It is imperative that consistencies used

during VFS are consistent reliable and relate to real-life foods and drinks. The International Dysphagia Diet Standardisation Initiative (IDDSI) is a global project working towards standardising terminology and definitions for texture modified foods and thickened liquids. The aim was to evaluate the current fluid consistencies used in the VFS clinic using the IDDSI specifications as a benchmark.

Methods: A prospective clinical audit was completed by 3 post-graduate SLT students at a VFS clinic in an acute hospital over a 3 month period (February–April 2018). Fluid consistency thickness (Levels 0, 1, 2, and 3) was assessed using the IDDSI Flow Test. Fluid thickness was analysed at the start and end of the clinic.

Results: Forty fluid consistencies were audited over 10 weeks. 23 (57.5%) of the consistencies passed the flow test. Level 0 fluids consistently passed at the start and end of each clinic (100%). All other fluids (Level 1, 2 and 3) passed the flow test 50% of the time. In total 17 (42.5%) fluids failed the flow test and were assigned into 8 categories please see Table.

Category	Number of Fluids	%
Too thick at start, passed at end	1	2.5
Too thin at start, passed at end	1	2.5
Passed at start, too thick at end	4	10
Passed at start, too thin at end	3	7.5
Too thin at start, too thin at end	6	15
Too thick at start, too thick at end	2	5
Too thick at start, too thin at end	0	0
Too thin at start, too thick at end	0	0

Of the failed fluids 9 (53%) failed the flow test once (either at the start or end of the clinic). Of those 9, 7 (77%) passed the flow test at the start but changed thickness as the clinic progressed and subsequently failed the test. Eight fluids (47%) failed twice both at the start and the end of the clinic.

Conclusion: A wide variation in the thickness of liquids prepared at VFS has been shown. Fluid thickness may alter as the clinic progresses. This variability raises concern regarding patient safety. A number of contributing factors may be impacting on the audit results. Ongoing work using clinical audit tools to explore contributing factors and implement recommendations in clinical practice is underway. A re-audit is planned.

LESS IS MORE: REDUCING BIOFEEDBACK FREQUENCY TO FACILITATE ACQUISITION AND RETENTION OF THE MENDELSON MANEUVER IN HEALTHY ADULTS

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Introduction: Past studies have shown that biofeedback can facilitate dysphagic patients in acquiring swallowing maneuvers. However it is unclear how frequent we should provide such biofeedback. Motor learning studies have shown that consistent feedback may facilitate the acquisition of a new motor task but hinder the long-term retention of the acquired motor skills. The current study aimed to compare the effect of bandwidth feedback (individualized reduced feedback frequency schedule) and consistent feedback on acquisition and retention of Mendelsohn maneuver.

Materials and Methods: Thirty healthy adults were assigned to a bandwidth feedback group ($n = 15$) or a consistent feedback group ($n = 15$). In the first session participants were first instructed to perform the Mendelsohn maneuvers without any feedback (baseline

assessment) followed by an acquisition phase with 3 training blocks and finally an immediate retention phase where feedback was removed. All participants returned for a delayed retention phase a week later. During the acquisition phase the consistent feedback group received game-based sEMG signal as feedback in all trials but the bandwidth feedback group only received feedback when the performance deviated from an acceptable bandwidth of error.

Results: The performance accuracy of each group in each phase was calculated and compared. Both groups had significant improvement after training ($p < 0.05$). The bandwidth feedback group had significantly better performance than the consistent feedback group in the delayed retention phase with strong effect size ($r = 0.56$).

Conclusions: The current study supports the use of an individualized feedback frequency schedule to facilitate the acquisition and retention of Mendelsohn maneuver.

BOLUS CONSISTENCY AND MODULATION OF THE PHARYNGEAL SWALLOW

L. Ferris¹, C. Cock¹, S. Doeltgen¹, M. Schar¹, T. Omari¹

¹Flinders University

Background: High-resolution pharyngeal manometry (HRPM) with integrated impedance analysis can assess swallow biomechanics. To date characterizations of the pharyngeal swallow response have focused on volume effects however the effects of consistency challenges are also important for dysphagia assessment. This study assessed the response to bolus consistency.

Methods: Twenty healthy subjects (10F; aged 21–72 mean 44 years) underwent repeat investigations with 8F and 10F HRPM catheters (Medical Measurement Systems). A standardized conductivity bolus medium was used (SBMkit Trisco Foods Pty Ltd). Bolus volumes (3, 5, 10, 20 ml) of thin (IDDSI level 0) mild (IDDSI level 2) and extremely thick (IDDSI level 4) consistencies were tested. An online portal (swallowgateway.com) was used to analyze swallow function metrics. The main effects of bolus consistency accounting for volume and catheter effects were determined using repeated measures ANOVA with adjusted pairwise comparisons.

Results: Data from 4 subjects was excluded due to piecemeal swallowing of the largest 20 ml boluses. Swallow function metrics are displayed in Table 1. Consistency level had no effect on velopharynx and hypopharynx but lead to elevated UES opening extent (UES Max Ad) elevated UES integrated relaxation pressures (IRP) and reduced UES open time. Of particular interest was a decrease in UES pre-swallow basal pressure and post-swallow UES contractile pressures when thicker consistency boluses were swallowed. The proximal esophagus was the only region demonstrating elevated contractile response to viscosity challenges.

Conclusion: The metrics presented may be used to identify swallow modulation difficulties amongst pharyngeal dysphagia patients. When fully accounting for bolus volume effects the oral administration of thinner consistency boluses appears to generate an anticipatory response associated with greater pre-deglutitive activation of the cricopharyngeus muscle.

Contractile Metrics	IDDSI pairwise comparisons			Consistency Effects RM ANOVA	F	p value	np ²
	Level 0	Level 2	Level 4				
Velopharyngeal Tongue Base Contractile Integral (mmHg)	202 (22)	194 (22)	200 (24)	0.642	0.533	0.041	
Hypopharynx Contractile Integral (mmHg)	127 (17)	119 (16)	126 (16)		2.159	0.132	0.126
UES max Admittance (ms)	4.8 (0.1)	5.1 (0.1)*	5.5 (0.2)*		↑47.371	<0.0001	0.760
UES Integrated Relaxation Pressure (mmHg)	-8.5 (1.0)	-7.6 (1.0)	-3.4 (1.1)*		↑66.596	<0.0001	0.816
UES Open Time (ms)	0.62 (0.02)	0.59 (0.01)*	0.56 (0.01)*		↓43.846	<0.0001	0.745
UES Basal Pressure (mmHg)	108 (11)	92 (10)	90 (8)		↓13.952	<0.0001	0.482
UES Contractile Integral (mmHg)	640 (55)	582 (47)*	611 (48)		↓5.271	0.011	0.260
Proximal Esophagus Contractile Integral (mmHg)	422 (86)	450 (83)	507 (80)*		↑6.193	0.006	0.292

Oral Presentations
Saturday, 29 September
14:50–15:30 Auditorium

Session 14. Free Papers 6 Dysphagia in Cancer

RISK FACTORS ASSOCIATED WITH RADIATION-INDUCED TRISMUS IN PATIENTS WITH HEAD AND NECK CANCER

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¹Davis Medical Center, University of California

Introduction: Trismus has a significant impact on deglutition and quality of life in patients undergoing treatment for head and neck cancer (HNC); however the prevalence and factors associated with the development of trismus are not well defined.

Purpose: The purpose of this investigation was to identify risk factors associated with the development of trismus in persons undergoing chemoradiation (CRT) for HNC and determine the prevalence of trismus in this patient population.

Methodology: The charts of all patients undergoing CRT for HNC between 11/18/2014 and 9/26/2017 were reviewed. The pre- and 3 months post- treatment interincisor distance Karnofsky performance score (KPS) radiation dose tumor site and stage adherence to swallowing exercises and patient subjective and objective swallowing measurements were collected. Trismus incidence (defined as interincisor distance < 40 mm) was determined and a multiple logistic regression was performed to evaluate the combined effect of various risk factors on trismus development.

Results: The mean age (SD) of the cohort ($N = 145$) was 61.81 (± 11.42) years and 72% were male. The incidence of trismus was 22% (32/145). Individuals with advanced tumor stage (T3/4) were significantly more likely to develop trismus ($p = 0.009$). The mean pre-treatment EAT-10 score was 13.4 (± 12.7) for individuals who developed trismus and 8.4 (± 11.4) for those who did not develop trismus ($p < 0.05$). Median adherence to swallowing exercise was 75% of the prescribed amount and was less for those who developed trismus ($p < 0.05$).

Conclusion: The incidence of trismus was high (22%). Multivariate analysis revealed advanced tumor stage pre-operative EAT-10 scores and swallowing exercise adherence were independent risk factors for trismus development at 3 months post-radiation treatment.

SYMPTOMS OF ANXIETY AND DEPRESSION IN DYSPHAGIC HEAD-AND-NECK CANCER PATIENTS AND THE RELATIONSHIP WITH ASPIRATION AND PATIENT CHARACTERISTICS - A CROSS-SECTIONAL COHORT STUDY

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Introduction: Recognizing affective symptoms in dysphagic head-and-neck cancer (HNC) patients is important as these symptoms may

interfere with health-related QOL cancer rehabilitation in general and in particular oropharyngeal dysphagia (OD) rehabilitation. This study investigates the relationship between aspiration and other patient characteristics versus clinically relevant symptoms of anxiety and depression in dysphagic HNC patients.

Materials and Methods: Eighty-four HNC patients with complaints of OD were included in the study. All patients underwent a standardized examination protocol comprising the Functional Oral Intake Scale (FOIS) the Hospital Anxiety and Depression Scale (HADS) questionnaire and a fiberoptic endoscopic evaluation of swallowing (FEES) to identify aspiration. Each FEES swallow was scored by two blinded expert raters. Adjusted linear regression analyses was used to investigate the associations.

Results: Fifty-two patients (61.9%) presented clinically relevant symptoms of anxiety or depression. Male patients presented significantly lower symptom scores of anxiety and depression compared with female patients ($p = 0.038$). A significant negative association was found between the presence of aspiration and clinically relevant symptoms of anxiety and depression ($p = 0.035$) representing less or no clinically relevant symptoms of anxiety and depression in patients who aspirated during FEES examination. A weak association was found between clinically relevant symptoms of anxiety and/or depression and patient characteristics such as age type of oncological treatment and tumor location.

Conclusions: The presence of aspiration was not accompanied by higher symptom scores of anxiety and depression. However clinically relevant affective symptoms were present in more than half of all HNC patients with OD. These results emphasize the importance of an affective symptom screening tool as part of the evaluation protocol of dysphagia in HNC patients.

DYSPHAGIA IN SOLID CANCERS: PREVALENCE AND PREDICTORS

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¹Trinity College, Dublin. ²Academic Department of Palliative Medicine Our Lady’s Hospice & Care Services

Introduction: Dysphagia is often associated with head neck or upper gastrointestinal tract (GI) cancers. It also occurs in those with solid tumours outside anatomic swallow regions. These account for 68% of all cancers [1] but existing studies inadequately examine dysphagia prevalence in this population. This study aimed to establish prevalence and predictors using comprehensive screening and assessment.

Materials and Methods: 385 individuals (155 female median age 68 range 22–91) with solid malignancies outside the head neck or upper GI tract were recruited from public and private settings by consecutive sampling. Participants varied in disease extent. Dysphagia was screened by Eating Assessment Tool and empirical questionnaire and confirmed by clinical exam including Mann Assessment of Swallowing Ability. Predictors were examined by logistic regression and included:

Predictor	Measure
Care setting	Hospice/hospital
Care team	Medical/radiation oncology, palliative care
Cognition	4 A’s Test (4AT)
Disease extent	Locoregional/metastatic
Disease site	Primary site
Performance status	Eastern Cooperative Oncology Group-Performance Status (ECOG-PS)
Treatment	Chemo-, hormone-, radio-, targeted therapy

Results: 73/385 (19%; 95% CI 15–23) had dysphagia. 64/73 (88%) were previously undiagnosed. Dysphagia predictors were:

	<i>p</i>
Impaired cognition (4AT score≥1)	0.03
Poorer performance status (ECOG-PS)	<0.001
Hospice setting	0.002
Palliative care	0.004

Dysphagia was not associated with disease extent primary site or cancer treatment except when radiotherapy affected the head neck or oesophagus ($p = 0.01$).

Conclusions: Dysphagia was common under-diagnosed and present throughout the disease trajectory. It emerged alongside functional decline placing an already burdened and unwell population at further clinical risk. This was the first study to adequately identify dysphagia prevalence in those with malignancies outside the head neck and upper GI tract. Swallow screening should be routine for this population.

DYSPHAGIA IN SOLID CANCERS: CLINICAL CHARACTERISTICS AND IMPACT

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¹Trinity College, Dublin. ²Academic Department of Palliative Medicine Our Lady’s Hospice & Care Services

Introduction: Dysphagia is common in those with solid tumours outside anatomic swallow regions. No studies have evaluated the clinical characteristics or impact of dysphagia in this population. We examined these from both clinical and patient perspectives.

Materials and Methods: 385 individuals (155 female median age 68 range 22–91) were recruited by consecutive sampling from public and private settings. Participants were screened by Eating Assessment Tool (EAT-10) and empirical questionnaire. Suspected dysphagia was examined by: cranial nerve (CN) exam; Functional Oral Intake Scale (FOIS); Mann Assessment of Swallowing Ability (MASA); Oral Health Assessment Tool (OHAT); structured interview. Global quality of life (QoL) was measured by single-item question. Quantitative data were examined by logistic regression qualitative data by thematic analysis.

Results: Screening identified 73/385 (19%; 95% CI 15–23) individuals with potential dysphagia. These were evaluated by MASA. 61/73 (84%) had dysphagia risk; 22/73 (30%) aspiration risk. Oral preparatory (56%) oral (53%) and pharyngeal (71%) stages were affected. Dysphagia scores were ‘none’ to ‘moderate’ (median 194/200 range 161–200) but 54/73 (74%) required diet modification (FOIS < 7) and 30/73 (41%) safe swallow strategies. Poorer MASA score was predicted by:

	<i>p</i>
4AT score of 3	0.004
Hospice care	<0.001
More CN deficits	<0.001
Palliative care	0.001
Poorer OHAT score	0.024

Dysphagia was associated with lower QoL ($p = 0.002$). Participants reported fear of swallowing and loss of participation and pleasure about feeding. They listed taste changes and xerostomia as contributory dysphagia factors.

Conclusions: Dysphagia was associated with overall decline poor oral health and neurological deficits suggesting a multifactorial aetiology. It was not severe but diet modification was often required and participants reported high impact. No single tool profiled dysphagia sufficiently suggesting the need for comprehensive multimodal assessment.

ADAPTATION OF THE PENETRATION-ASPIRATION SCALE TO OPEN PARTIAL HORIZONTAL LARYNGECTOMY: RELIABILITY ANALYSIS

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Introduction: Reduction of swallowing safety after Open Partial Horizontal Laryngectomy (OPHL) is a common finding. The penetration-aspiration scale (PAS) is a widely used validated scale to evaluate the presence of penetration and aspiration. However its application to patients who underwent an OPHL is limited by the anatomic modifications of the larynx. As no other tool was specifically developed for this population the study aimed to adapt the PAS to the anatomy of patients with an OPHL and to assess its reliability.

Methods: Anatomical landmarks were identified for the entrance to the laryngeal vestibule and for the neolarynx after OPHL type I II and III during fiberoptic endoscopic evaluation of swallowing (FEES). FEES recordings of 90 patients who underwent an OPHL (27 OPHL type I 31 type II 32 type III) were independently assessed by two trained SLPs with an experience > 4 years in the field of dysphagia. Videos were re-assessed by both SLPs after 2 weeks in a random order. Unweighted Cohen's kappa was used to examine inter- and intra-rater reliability.

Results: Inter-rater reliability was $k = 0.863$ for the whole sample $k = 0.924$ for OPHL type I $k = 0.865$ for OPHL type II and $k = 0.808$ for OPHL type III. Intra-rater reliability was $k = 0.854$, $k = 0.914$, $k = 0.790$ and $k = 0.850$ respectively.

Conclusion: The PAS adapted to OPHL shows good levels of inter- and intra-rater reliability. Its application to clinical and research practice can contribute to establish a common language among clinicians and to allow the comparison of results from different studies.

A PRELIMINARY STUDY TO DETERMINE THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE FOR THE 100 ML WATER SWALLOW TEST FOR HEAD AND NECK CANCER PATIENTS

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Introduction: The timed 100 ml Water Swallow Test (WST) is a simple clinical assessment of swallow performance expressed as swallow volume (ml/swallow) and swallow capacity (ml/s). The minimal clinically important difference (MCID) is a representation of the minimum change in outcome scores that patients perceive as significant. The aim of this study is to calculate the MCID for the WST in Head and Neck Cancer (HNC).

Methods: WSTs collected on 133 HNC patients (mean age 60.8, 83.5% males) at pre-treatment 3 and 12 months post chemoradiotherapy were used to calculate the MCID using two methods.

- 1) Distribution-based: half the standard deviation of the sample
- 2) Anchor-based: The MD Anderson Dysphagia Inventory (MDADI) was used as an anchor.

Three anchor points were described based on the total MDADI score results.

Category 1: 20–59

Category 2: 60–79

Category 3: 80–100

Consequently movement between categories can be further divided into five subcategories as follows:

Category – 2 = deterioration of 2 stages

Category – 1 = deterioration of 1 stage

Category 0 = no change

Category + 1 = improvement by 1 stage

Category + 2 = improvement by 2 stages.

Results: Distribution-based method (DBM):

The MCID using half standard deviation is 4.15 ml for swallow volume and 3.25 ml/s for swallow capacity.

Anchor-based method: Categories – 2 and 1 were excluded for having less data points. Category – 1 showed the smallest mean difference. Therefore the MCID for swallow volume is 4 ml and for swallow capacity is 4 ml/s (Table 1).

Table 1 Changes in MDADI categories from baseline to twelve months in swallow volume and capacity

		From baseline to twelve months				
		Change in MDADI category	Number of pts	Mean	Standard deviation	Confidence Interval (95%)
Swallow Volume (ml/s)	Deterioration of 2 stages (-2)		19	-9.63	8.6	-13.79, -5.48
	Deterioration of 1 stage (-1)		45	-3.71	8.08	-6.14, -1.28
	No change (0)		60	-1.07	7.54	-3.02, 0.88
	Improvement by 1 stage (+1)		9	-2.56	6.2	-7.33, 2.22
Swallow Capacity (ml/s/sec)	Deterioration of 2 stages (-2)		19	-7.84	6.4	-10.93, -4.7
	Deterioration of 1 stage (-1)		45	-4.16	6.25	-6.03, -2.28
	No change (0)		60	-2.17	5.62	-3.62, -0.71
	Improvement by 1 stage (+1)		9	3.56	6.04	-1.09, 8.2

Conclusion: This study shows that the MCID for the 100 mL WST in HNC is 4 mL for swallow volume and 4 ml/s for swallow capacity using the anchor-based method-comparable with the DBM (4 ml and 3 ml/s respectively). Determining the MCID can be useful to clinicians and researchers as an outcome measure in determining clinical significance. It can also be valuable for patients self-management and monitoring progress over time.

Poster Sessions
Friday, 28 September
12:30–13:00

Session 05. Poster session 5A: Screening and Clinical Assessment 1

ESTABLISHING THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE FOR THE DYSPHAGIA SEVERITY RATING SCALE AND FUNCTIONAL ORAL INTAKE SCALE

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Introduction: Clinician-reported scales e.g. the Dysphagia Severity Rating Scale (DSRS) and the Functional Oral Intake Scale (FOIS) are widely used for assessment of dysphagia. The Minimal Clinically Important Difference (MCID) the minimum difference in a score that is clinically relevant for the DSRS and FOIS have yet to be reported.

Materials and Methods: An on-line survey both anonymous and voluntary was distributed to UK Speech and Language Therapists (SLTs) through Professional Networks. SLTs were sent copies of the two dysphagia scales and asked to assess what change in score they considered to be clinically meaningful. The DSRS has 3 subscales: food fluid and supervision (each with 5 levels) and these are summed to give a total. The FOIS has 7 levels and levels 4–7 only relate to food consumption.

Results: Eighty-four SLTs completed the survey. Many respondents (48%) had 10 + years' experience of working with adults with acquired dysphagia. For the DSRS the majority of SLTs reported that only one subscale needed to change (90%) by 1 point (85%) as a minimum to be considered clinically meaningful; 30% of respondents felt that the change needed to be on either the food or fluid subscale. For the FOIS most respondents (82%) felt that a change of 1 level was the minimum required to be clinically meaningful.

Conclusions: This study suggests that a minimum difference in one point in the DSRS or FOIS is clinically relevant information that is important when determining the sample size of intervention or natural history studies.

FACE VALIDITY OF THE DYSPHAGIA OUTCOME AND SEVERITY SCALE

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Introduction: The Dysphagia Outcome and Severity Scale (DOSS) assesses the severity of dysphagia recommend texture of food and drinks and determines the independence level of the citizen. Danish practitioners have translated the DOSS according to WHO's recommendations. The aim of this study was to examine the face validity of the Danish version of the DOSS.

Materials and Methods: Eight occupational therapists (OT) experienced with dysphagia were interviewed using the think aloud (TA) technique.

TA was used to ascertain the OT's thoughts and mind-set in relation to the DOSS one item at a time. TA-interviews were performed individually with the OT's. The interviews were audio recorded. The results were analysed after a guideline developed by the scientists. Answers with words as "maybe" "could be" or "do not know" were

classified as not understood while any comments or no doubt and hesitations were classified as understood. In case that more than 75% of the OT's did not understand an item this item was categorized as low face validity.

Results: The results show a significant relative low face validity of the DOSS. 39.6% of the items have low face validity and are recommended to be redefined before being used in Danish practice. The items that have low face validity forms a pattern which shows that items containing new in-forma-tion are not understood until the same information is present in a later item.

Conclusions: With the applied method the results show a significant low face validity of the DOSS. Based on this it is recommended to conduct further examination of the instrument before introducing it into practice. The validation of the instrument would qualify with the use of another method such as the Rasch analysis. Furthermore it is assumed that a manual would qualify the validation and contribute to a feasible standardization.

EVALUATION OF THE PREVALENCE OF SCREENING FOR DYSPHAGIA AMONG THE HOSPITALISED OLDER PEOPLE

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Introduction: As the world's population ages so the number of old and frail people increases. Respiratory disease is a common reason for hospital admission for older people. Aspiration of saliva which is probably infected is the likely aetiological agent. The presence of an abnormal swallow has been found to be high in frail older people admitted to hospital. Despite the high incidence of swallow problems and aspiration pneumonia amongst older people many hospital services do not routinely screen older people for dysphagia.

Materials and Methods: A survey using a web-based tool was emailed to contacts working in hospitals. They were asked (1) Type of hospital? (2) Does your hospital screen older (> 80) people for swallowing difficulties? (3) Are nursing staff and medical staff trained to administer a swallow screen? (4) Is a swallowing rehabilitation programme offered to older people? (5) Which rehabilitation programme is offered and used?

Results: 135 people responded from 25 countries. 74.1% work in acute hospital 16.3% in rehab and 9.6% in community hospital. 63.7% responded that they do not or only occasionally screen older people for dysphagia; 48.9% of the medical staff and 28.1% of the nurses were not trained to administer a swallow screen. The majority offered a rehabilitation swallowing programme (62.2%) with chin tuck (84.3%) Shaker manoeuvre (80.7%) and tongue strengthening (88.0%) being much more common than neuromuscular electrical stimulation (24.1%).

Conclusions: The results of this study suggest that many health facilities are not routinely screening older people for swallowing problems and the majority do not train their staff. The majority of facilities were offering a rehabilitation programme but 37.8% were not. In addition it is likely that many people are not receiving appropriate proactive intervention because swallowing problems are not being proactively sought.

DYSPHAGIA: A HARD TIME SWALLOWING PILLS? DO WE NEED DIFFERENT RECOMMENDATIONS FOR DIFFERENT TYPES OF DYSPHAGIA?

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Introduction: Dysphagia patients are often receiving several different medications. If tablets dissolve where they are not supposed to disintegrate this might lead to local irritation and lack of effectiveness.

In the study presented we compare the pill swallowing capability of patients with Parkinson's disease (PD) and patients within 2 years after treatment of oropharyngeal carcinoma (OC) as well as a control group for difficulties in swallowing different pill sizes and preparations.

Methods: 118 outpatients from the PD clinic with all stages of disease 36 patients within 2 years after treatment of OC (primary or adjuvant (chemo-) radiation) and 33 healthy controls were examined clinically as well as via flexible endoscopic evaluation of swallowing (FEES) using four different placebos differing in size form and surface structure.

The results of the three groups were compared and examined for statistically significant correlations with other swallowing problems.

Results: Impaired swallowing of pills is very frequent in both dysphagia groups but the kind of problems differed between the two cohorts. PD patients have the least problems with capsules while large oval tablets as well as very small round tablets presented difficulties. OC patients on the other hand had the least problems with small round tablets while capsules were the most difficult.

Conclusion: The ability to swallow pills is significantly impaired in both groups. Interestingly the "difficult pills" are different depending on the type of disease. Therefore patients need different recommendations for the size and texture of tablets depending on their diagnosis and several different placebos need to be tested during FEES in dysphagia patients.

DYSPHAGIA IN HOSPITAL: BUILDING AND IMPLEMENTATION OF A CLINICAL PATHWAY

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Dysphagia is present in 8.1–80% of patients with stroke and it increases the risk of pulmonary infection up to 11 times doubles the length of hospital stay reduces the probability of a good outcome and returning home. Clinical pathways allow to get the guidelines into specific hospital context and constitute the best tool to standardize and monitor rehabilitation practices

The aim of this work is to create a clinical pathway for dysphagia caused by acute stroke in adult patients through the analysis of a data set from the year 2016 in order to evaluate the initial situation and through a review of the scientific literature existing at the moment. We also want to create a distance training course about the new pathway.

This clinical pathway addresses to adult patients (> 16 years old) with oropharyngeal dysphagia caused by acute stroke. The works started in March 2017 and the final document was ready for August 2017 after the analysis of a sample of 60 medical records of the year 2016 and after the review of the literature.

The sample was composed by 19 women (mean age 64.8 years) and by 41 men (mean age 65.8 years). The length of stay was 14 days on average. Screening was performed in 15 patients out of 60 (25%). In 11.7% of patients the screening was positive for dysphagia: for none of these there was an examination by the speech and language pathologist (SLP) while for 3 out of 15 (20%) there was an instrumental examination by the otolaryngologist.

In the face of a 90% standard swallowing screening is performed in 26.6% of patients (variance of -63.7%). We observe a zero percentage of patients with positive screening undergoing a SLP examination (variance of -90%). Even for otolaryngology and nutritional visits in 12.5% of patients (variance of -77.5%).

Future steps include: protocol testing operators training application of the clinical pathway to the entire hospital and continuous monitoring of indicators for detecting changes in clinical practice.

THE BEDSIDE SWALLOW SCREEN: IS THERE A BASIC SWALLOW SCREEN?

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Introduction: Difficulties eating and drinking due to dysfunction during the oral-pharyngeal phase of swallowing are common in many clinical situations. There are many different tools available to screen for dysphagia (usually following stroke). The majority of swallow screening tools are based around a water swallow test that was first described 30 years ago. Stroke patients are routinely assessed on admission for swallowing problems. This does not happen for older people despite the incidence of aspiration being very high. There are many reasons for this two common ones are the lack of confidence in conducting the swallow screen and lack of training. This would suggest that the present screening tools are not fit for purpose in the busy acute clinical setting. What would a basic swallow screen look like.

Method: A search of the literature was conducted using the terms swallow screen dysphagia. 26 different swallow screens were identified using 106 different components. Following the initial survey those components that were similar (coughing; choking voice change slowness to eat and change of diet).

Results: Five items occurred more commonly in the swallow screens than the others. Coughing with food/liquid in 24 choking in 12 Voice change in 22 difficulty swallowing food/liquid in 6 and increased time to swallow food in 5. No other element occurred in > 2 swallow screens.

Conclusions: We conclude that a basic swallow screen consisting of five questions may be adequate as a basic swallow screen to be used by nursing and medical staff prior to referral and screen/assessment by a speech and language therapist. We are conducting a pilot study investigating the usability and positive predictive value of such a screen prior to a larger study.

Session 05. Poster session 5B: Instrumental Assessment 1–FEES

RESIDUE AND ASPIRATION RISK: THE ENDOSCOPIC PERSPECTIVE

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Purpose: Residue in the pharynx as parameter of effectiveness predisposes to episodes of penetration/aspiration as parameter of efficiency. The correlation between residue and airway invasion and the residue detection time in affecting the amount of residue and the severity of dysphagia are considered.

Materials and Methods: Two experienced raters blindly evaluated 70 short videoclips of bolus transit recorded during endoscopic evaluations of 16 patients with dysphagia of differing etiologies. The pooling score (*p* score) and the Penetration Aspiration Scale (PAS) were detected after swallowing (T1) and after the 5th dry swallow (T5). The correlation between the *p*-score (sub test 3 and 4 for ‘site of residue’) and the PAS (3–5 and 6–8) was performed (ROC curve analysis and Youden Index).

Results: The inter-rater agreement between the 2 raters in scoring the *p* score was good (ICC > 0.800) for FEES for every consistency (T1 vs T1 and T1 vs T5) with exception of liquid (Spearman’s Rho > 0.70–sing < 0.05). The *p*-score showed a good trade off between sensitivity and specificity when compared with the PAS penetration (score 3 to 5) and aspiration (6 to 8) scores with a *p* score cut-off of 3 for penetration and 4 for aspiration respectively.

Conclusions: The time of scoring residue (T1 vs T5) is relevant in detecting severity of dysphagia during an instrumental evaluation for different consistencies. The time of detection of a score (T1 or subsequent) should be disclosed if not imposed by the score itself. The *p* score correlates with the PAS score in detecting penetration/aspiration.

ESTABLISHING A PAEDIATRIC FEES ASSESSMENT CLINIC: AN IRISH EXPERIENCE

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Introduction: FEES (Fibreoptic Endoscopic Evaluation of Swallowing) is a recognised tool for the assessment and management of swallowing disorders with good validity when compared with Videofluoroscopy (VFSS). The only instrumental swallow assessment in

our centre is VFSS. In breastfed babies the delivery of oral milk feeds for VFSS does not replicate the experience of breastfeeding. A cohort of patients need access to the FEES procedure. The departments of SLT and paediatric otolaryngology (ENT) began joint FEES assessments in 2017.

Method: FEES was done if VFSS was not an appropriate option e.g. breastfed babies older children with laryngeal pathology. The cases are discussed with the ENT consultant. All assessments were done in the ENT suite with SLT Consultant and nurse present. The flexible nasendoscope was passed by the Consultant. RCSLT guidelines and assessment forms were used.

Results: Since 2017 4 children had FEES age range (37 days—11 years 11 months). 2 were breastfed 1 stroke post cardiac transplant with bilateral vocal cord weakness and dysphagia 1 vocal cord abnormalities with concern around secretion management. 3 completed. 1 refused to eat or drink but useful information was gained about secretion management vocal cord status. 1 breastfed case had normal FEES versus abnormal VFSS 1 day previously.

Discussion: FEES provides an option for swallowing assessment for the breastfed baby and older children with laryngeal issues. Skilled passing of the scope and use of RCSLT guidelines to support practice have provided confidence to the team. Clear pathways for referral are necessary. Issues around training skills and documentation are discussed.

OUTCOMES FOLLOWING IMPLEMENTATION OF A FEES SERVICE AT A LARGE TEACHING HOSPITAL

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Fiberoptic endoscopic evaluation of swallowing (FEES) is a bedside instrumental assessment to evaluate laryngeal and pharyngeal function for secretion management and swallowing. This helps to plan interventions with the goal of promoting safe and efficient swallowing (1). There is evidence to support its validity in dysphagia management earlier oral intake and impact on tracheostomy weaning (2). This study highlights the value of FEES assessment across a teaching hospital with a review of outcomes over 12 months.

Method: A retrospective analysis was conducted of all FEES assessments completed over 12 months across a range of acute SLT services within a 1000 bedded city hospital. Outcomes were collected for secretion severity (3) penetration aspiration scale (4) feeding outcomes and management recommendations.

Results: A total of 100 referrals were received for FEES assessments and 62 FEES were completed over a 12 month period. Figure 1 shows the breakdown across services.

- 45% (*n* = 28) were completed on one of three critical care units; 39% (24) had a tracheostomy and 11% (7) were ventilated
- 47% (29) had the highest secretion severity rating of 3
- 33% (18) had the highest score of penetration aspiration scale of 8
- 21% (13) of NBM patients had a recommendation to commence oral intake and 19% (12) had a diet or fluid upgrade.
- Key recommendations were for dysphagia therapy (40%) secretion management (23%) and reduce SLT review (18%)

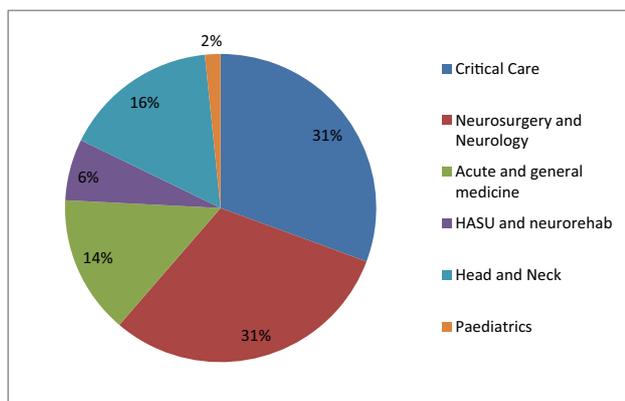


Figure 1 FEES by clinical service

A range of SLT recommendations are shown in Table 1.

Score	Descriptor	Total	%
1	Dysphagia Therapy	25	40.3%
2	Wean/PMV/decannulate	8	12.9%
3	Keep Trache	6	9.7%
4	Nebs/Secretion meds	14	22.6%
5	Posture/Strategy	7	11.3%
6	Refer VFSS	3	4.8%
7	Repeat FEES	9	14.5%
8	Refer to ENT/Neuro	13	21.0%
9	Aid ICU discharge	2	3.2%
10	Aid Hospital discharge	3	4.8%
11	Reduced reviews	11	17.7%
12	PPI	1	1.6%

Conclusion: FEES has high utility when used across SLT services especially for critical care patients and those with secretion management difficulties. Laryngeal and pharyngeal dysfunction cannot be adequately quantified at bedside. This tool helps SLTs to make proactive decisions to reduce risk of aspiration whilst facilitating specific intervention whilst facilitating specific interventions to enable a safe return to oral intake. This information contributes to team decisions.

MYASTHENIA GRAVIS DIAGNOSED DURING FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING

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Introduction: Dysphagia may be the first symptom of Myasthenia gravis (MG) on rare occasions. We present a case of a patient presenting with oropharyngeal dysphagia for whom a diagnosis of MG was concerned during fiberoptic endoscopic evaluation of swallowing (FEES).

Case Presentation: A 52-year-old female presented with an acute abrupt 7-day odynophagia and dysphagia for solids accompanied by rapid weight loss of 7 kg over 2 weeks. She reported on general weakness and difficulty in concentration. Past medical history was

remarkable for nodular goiter and rheumatoid arthritis. Before presentation the patient underwent neurological and gastroenterology evaluations that were normal. However Helicobacter pylori test was positive and she was started on levofloxacin amoxicillin and esomeprazole. Following initiation of this treatment she had a severe deterioration of her dysphagia. Her 10-eating assessment tool was 9/10. Indirect laryngoscopy showed normal vocal cords mobility without any obstructing mass. However there was saliva pooling in the pyriform sinuses. On FEES examination there was liquid and apple puree retention in the valleculas and pyriform sinuses. Despite numerous swallowing trials there was no successful passage. Her complaints included severe gradual increased weakness and we also noticed ptosis. Following the assessment in the dysphagia clinic we recommended nil per os and feeding via nasogastric tube. The diagnosis of MG was confirmed.

Discussion: Myasthenia gravis is a rare disorder. Fluctuating weakness is a typical complaint. Dysphagia in MG includes chewing and swallowing difficulty and reduced swallowing trigger. The present case demonstrates the importance of FEES in the diagnosis of MG. In this case the initial complain was dysphagia. We assume that the addition of levofloxacin provoked her rapid deterioration. In patients with dysphagia as a primary complaint and positive findings on FEES the diagnosis of MG should be thought.

FIBEROPTIC EVALUATION OF SWALLOWING FUNCTIONS IN PATIENTS WITH SCLERODERMA

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Introduction: Scleroderma is characterized by small vessel involvement that leads to tissue ischemia and fibroblast stimulation resulting in accumulation of collagen in the skin and internal organs. Even during the first examination 60% of patients complain of dysphagia. A videofluorographic swallow study identified alterations of epiglottal tilting associated with laryngeal penetration in scleroderma patients [6]. The aim of the study was to assess the swallowing functions of patients with scleroderma. The secondary aim was to assess quality of life and its relation with the swallowing function.

Materials and Methods: Twenty-eight patients with scleroderma (25F3 M) and 40 healthy individuals (33F7 M) were included as study and control groups respectively. Fiberoptic evaluation of swallowing (KAY PENTAX Ltd, USA and Olympus 3.6 mm fiberoptic endoscope) Beck Depression Inventory (BDI) MD Anderson Dysphagia Inventory (MDADI) and the questionnaire about dysphagia and swallowing problems were performed to the patients.

Results: Mean age was 48.39 ± 12.48 and 48.25 ± 12.37 years for study and control groups respectively. Considering the presence of residue with fish-cracker there was a significant difference between groups ($p < 0.05$). Considering the presence of residue with yogurt and water there was not a significant difference between groups ($p > 0.05$). In only one patient with scleroderma penetration and aspiration was detected during swallowing with yogurt and 10 ml water. The average scores for MDADI were 50.32 ± 16.95 and 87.6 ± 10.67 for study and control groups respectively and statistically significant difference was detected ($p < 0.05$). The average scores for BDI were 15.07 ± 12.07 and 8.03 ± 6.84 for study and control groups respectively ($p < 0.05$).

Conclusions: Scleroderma affected swallowing functions significantly. The presence of residue with fish-shaped cracker was the most obvious finding whereas penetration/aspiration was not clinically significant. Swallowing dysfunction reduced the quality of life in patients with scleroderma. Based on the BDI scores patients with scleroderma were more depressed.

NORMATIVE STUDY ON BOLUS POSITION AND BOLUS DWELL TIME DURING FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING (FEES) IN HEALTHY ADULTS

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Introduction: Limited data exist on bolus position and bolus dwell time in the hypopharynx before onset of the pharyngeal swallow assessed during fiberoptic endoscopic evaluation of swallowing (FEES). Primarily this study aimed to collect normative data on bolus position and bolus dwell time before initiation of the pharyngeal phase and secondly to determine if bolus position and bolus dwell time vary as a function of age gender bolus consistency bolus volume and/or swallow spontaneity.

Materials and Methods: In total 10 young and 12 older healthy adults participated. Bolus position and bolus dwell time were assessed during FEES.

Results: All participants contributed at least one swallow with bolus head location in the hypopharynx and positive bolus dwell time before onset of the pharyngeal swallow. Age gender bolus consistency and swallow spontaneity proved to be good predictors of bolus position. Age gender and bolus consistency proved to be good predictors of bolus dwell time or in other words delayed pharyngeal swallow. A significant effect of age gender consistency and volume was observed on the duration of the bolus dwell time.

Conclusions: This study provides the first normative data on bolus position and bolus dwell time in the hypopharynx before onset of the pharyngeal swallow. The results of this study also demonstrate that a “delayed” swallow by itself does not necessarily indicate a pathological swallow when no other impairments of swallowing physiology are present. Therefore the results have strong implications on the evaluation and treatment of dysphagia.

Session 05. Poster session 5C: Physiology

THE COMPARISON OF EFFECTS OF TWO DIFFERENT EXERCISE METHODS ON SWALLOWING FUNCTIONS IN HEALTHY SUBJECTS-PILOT STUDY

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Purpose: The aim of our study was to compare the effects of two different exercise training in healthy individuals on suprahyoid muscle activity dysphagia limit and tongue pressure.

Methods: Thirteen healthy subjects including our study were divided into two groups. The first group (N: 7; 5 female 2 male; average age 27.22 ± 378 years) performed Chin Tuck Against Resistance (CTAR). Group 2 (N: 6; 3 women 3 men; average age 24.44 ± 3.21 years) performed Chin Tuck Egzersize with Theraband. All excersises were performed for 5 days in 8 weeks and 30 min in a day. At the beginning of the study and after 8 weeks suprahyoid muscle activation with superficial EMG device suprahyoid muscle strength with digital myometry

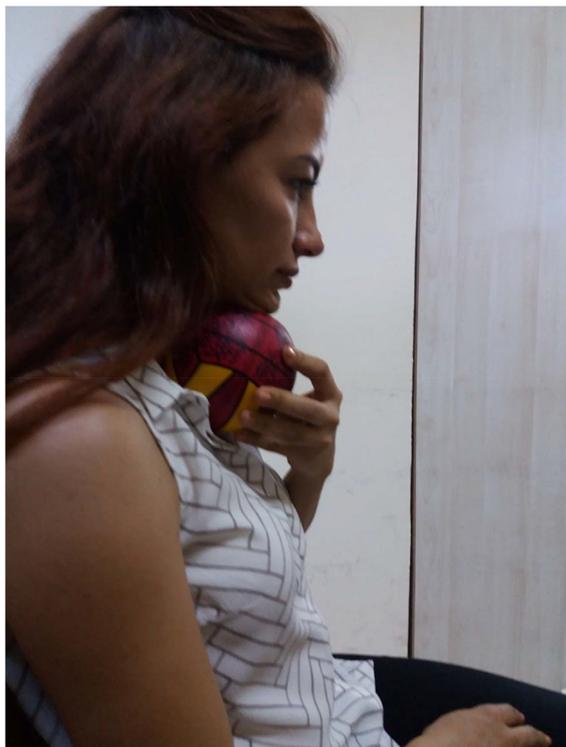
	Study Group (n, %)	Control Group (n, %)	p value
Xerostomia	16 (57.1%)	2 (5%)	*p< 0.05
Dysphagia symptom with liquid	16 (17.8%)	2 (5%)	*p< 0.05
Dysphagia symptom with semisolid food	6 (21.4%)	2 (5%)	*p< 0.05
Dysphagia symptom with solid food	5 (17.1%)	2 (5%)	p> 0.05
Sensation having lump in the throat	11 (39.3%)	4 (10%)	*p< 0.05
Sensation of choking	7 (25%)	3 (7.5%)	*p< 0.05
Need to clean the throat	8 (28.6%)	4 (10%)	*p< 0.05
Velopharyngeal insufficiency	0	0	
Multiple Swallowing	5 (17.9%)	3 (7.5%)	p> 0.05
Weight Loss	10 (35.7%)	2 (5%)	*p< 0.05
Bolus Control	3 (10.7%)	2 (5%)	p> 0.05
Normal swallowing function but with episodic or daily symptoms of dysphagia	13 (46.4%)	8 (20%)	*p< 0.05
Pharyngeal stasis	6 (21.4%)	1 (2.5%)	p> 0.05

Table 1: Symptoms and findings of study and control groups regarding swallowing.

	Study Group (n, %)	Control Group (n, %)	p value	
Yogurt	No residue	19 (67.9%)	32 (80%)	
	Residue in vallecula	1 (3.6%)	4 (10%)	p> 0.05
	Residue in pharyngeal wall	7 (25%)	4 (10%)	*p< 0.05
	Retrocricoid region	1 (3.6%)	0	p> 0.05
	Residue in piriform sinus	0 (0%)	0	p> 0.05
	Total Residue	8 (28.6%)	8 (20%)	p> 0.05
	Penetration	0	0	p> 0.05
	Aspiration	1 (3.6%)	0	p> 0.05
Fish Shaped Cracker	No residue	20 (71.4%)	34 (85%)	
	Residue in vallecula	3 (10.7%)	4 (10%)	*p< 0.05
	Residue in pharyngeal wall	0 (0%)	2 (5%)	p> 0.05
	Retrocricoid region	5 (17.9%)	0	*p< 0.05
	Residue in piriform sinus	0 (0%)	0	p> 0.05
	Total Residue	8 (28.6%)	6 (15%)	*p< 0.05
	Penetration	0	0	p> 0.05
	Aspiration	0	0	p> 0.05
3 ml water	Residue/Penetration/Aspiration	0/0/0	0/0/0	p> 0.05
5 ml water	Residue/Penetration/Aspiration	0/0/0	0/0/0	p> 0.05
10 ml water	Residue/Penetration/Aspiration	0/0/1 (5.6%)	0/0/0	p> 0.05
BDI	As Minimal Depression	13 (46.4%)	32 (80%)	
	As Mild Depression	9 (32.1%)	6 (15%)	
	As Moderate Depression	4 (14.3%)	2 (5%)	
	As Severe Depression	2 (7.1%)	0	
	Depression Groups			*p<0.05
	Mean Score	15.07	8.03	*p< 0.05
Mean MDADI scores	50.32±16.95	87.6±10.67	*p< 0.05	

Table 2: Findings of fiberoptic endoscopic evaluation of swallowing (FEES), MD Anderson Dysphagia Inventory Scores and Beck Depression Inventory Scores of study and control groups.

dysphagia limits (maximum amount of water that can be swallow in a single laryngeal elevation) with superficial EMG and cervical osculation device tongue pressure with IOPI (IOWA ORAL PRESSURE INSTRUMENT) were measured. CTAR and CHIN TUCK EXERCISE WITH THERABAND are illustrated below.



Results: Significant differences were observed in some parameters related to the swallowing function of both the CTAR and the Chin Tuck Exercise with Theraband group. There was no statistically

difference in any parameters between the two groups. The outcome measures of the patients are shown in Table 1.

Discussion: We believe that the chin-tuck exercise with Theraband a new method has the same effectiveness as the CTAR exercise proved to be exercise that increases the suprahyoid muscle activity the most in literature. In our ongoing study we will get more clear results when we increase our sample size.

	CTAR N: 7			CHIN TUCK WITH THERABAND N:6			
	BASELINE	8.WEEK	p (intra-group)	BASELINE	8.WEEK	p (intra-group)	p (inter-group)
Suprahyoid muscle activation (mV)	213,33±75,96	279,15±195,26	*0,046	162,99±24,01	212,29±81,32	0.116	0.715
Suprahyoid Muscle strength (Newton)	257,85±58,87	333,33±58,87	*0,028	256,66±67,42	330,83±37,78	*0,027	0.712
Tongue Pressure (mmHg)	49,57±11,34	56,44±8,67	0.14	53,50±3,87	58,55±9,15	0.152	0.303
Dysphagia Limit (ml)	34,87±7,64	42,50±9,35	0.462	40,83±5,84	45,33±5,16	0.138	0.518

MEASUREMENT OF HYOID MUSCLE ACTIVITY AND HYOID BONE POSITION DURING TONGUE LIFT MOVEMENT

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Introduction: Tongue lift movement (TLM) is used as a swallowing therapy to improve tongue pressure against the hard palate for dysphagic patients. The present study aimed to investigate temporal changes in hyoid muscle activity and hyoid bone position during TLM.

Materials and Methods: Fourteen young healthy volunteers (7 male; mean age 30.4 years old) participated. Maximum tongue pressure (100%) was measured in the anterior and posterior parts of the hard palate using the balloon typed tongue pressure instrument (tongue pressure measurement system JMS Co. Japan). Electromyography (EMG) of supra/infra hyoid muscles and videofluoroscopic images to trace hyoid displacement were simultaneously recorded while participants performed TLM for 10 s with 80% or 100% of maximum tongue pressure at both positions. Interval time between each trial was set at 1 min. After the initial first second in each trial the remaining 9 s were divided into three substages to evaluate temporal changes in muscle activity: early (1–4 s) middle (4–7 s) and late (7–10 s) (Figure 1). The average EMG activity EMG frequency and hyoid position depending on strength (80% 100%) tongue position (anterior–posterior) and substage (early middle late) were analyzed using ANOVA.

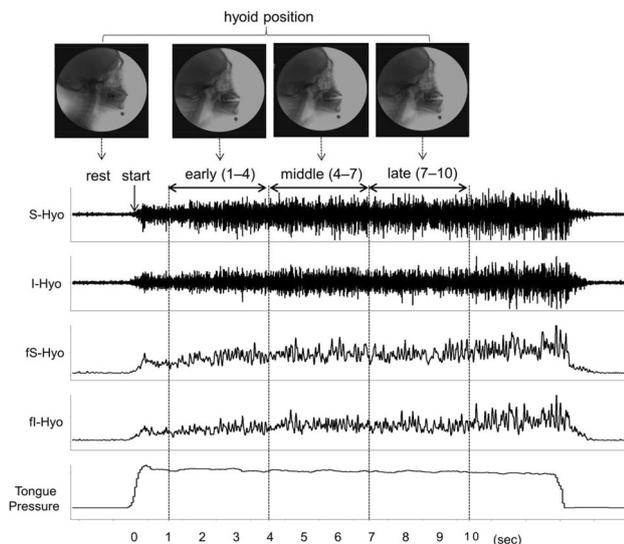


Figure 1. Representative recordings and three substages of EMG. S-Hyo, Suprahyoid muscle; I-Hyo, Infrahyoid muscle.

Results: EMG activity of supra/infra hyoid muscles during TLM was significantly higher at 100% than at 80% strength ($p < 0.01$); however no significant difference was observed between tongue positions. Horizontal hyoid bone movement during anterior TLM was significantly greater than during posterior TLM ($p < 0.01$). EMG activity of supra/infra hyoid muscle in the late stage was significantly higher than during the early stage ($p < 0.05$) while the frequency of EMGs was significantly lower in the late substage compared with the early substage ($p < 0.05$).

Conclusion: Not only the tongue muscle but also supra/infra hyoid muscles contribute to TLM.

A VIRTUAL LESION MODEL TO IMITATE DYSPHAGIA RESULTING FROM PHARYNGEAL SENSORY DISRUPTION IN HEALTHY VOLUNTEERS

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Objective: Neurogenic dysphagia often consists not only of motor-impairment but is also frequently caused by pharyngeal sensory disruption. Patients on the ICU commonly suffer from either but treatment options are still limited. Neuromodulatory treatment devices to enhance adaptive plasticity in the cortical swallowing network recently have come into focus. To investigate the role of sensory impairment and possible influences of neuromodulatory treatment in healthy subjects we propose a virtual peripheral sensory lesion model to simulate pharyngeal sensory disruption.

Materials and Methods: 11 healthy subjects were included in this randomized crossover study. Cortical activation was measured applying 275-channel magnetoencephalography during two sessions (with or without pharyngeal surface anesthesia) while subjects obtained air-puff

stimulation against the pharynx. Individual source reconstruction was performed by applying a linear constraint minimum variance beam-former algorithm and significant differences between conditions were assessed with a nonparametric permutation test.

Results: Pharyngeal air-puff stimulation induced bilateral event-related desynchronization (ERD) mainly in primary and secondary sensorimotor areas located in the caudolateral pericentral cortex the insula the prefrontal cortex and the supramarginal gyrus. Topical pharyngeal anesthesia led to a reduction of ERD in beta (13–30 Hz) and low gamma (30–60 Hz) frequency ranges ($p < 0.05$) in sensory and motor cortical areas.

Conclusions: Topical surface anesthesia causes a withdrawal of sensory afferent information and thereby leads to reduced response to pharyngeal air-puff stimulation in a distributed cortical sensorimotor network in healthy subjects. This simulates the situation in patients with dysphagia related to sensory impairment. The proposed virtual sensory lesion paradigm therefore may serve to investigate the effect of neuromodulatory treatments specifically on pharyngeal sensory impairment.

INCREASED LEVELS OF SUBSTANCE P IN PATIENTS TAKING BETA-BLOCKERS ARE LINKED WITH A PROTECTIVE EFFECT ON OROPHARYNGEAL DYSPHAGIA

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Background: We have recently found a potential protective effect of beta-blockers on oropharyngeal dysphagia (OD). The action mechanism of this protective effect is unknown but we hypothesize that the neurotransmitter substance P (SP) could play a key role in the protective action of beta-blockers on OD.

Aim: To analyze serum and saliva SP levels in patients taking beta-blockers and to explore its relationship with OD.

Methods: Adult (> 50 year) patients taking beta-blockers were randomly recruited from the primary care setting and 1:1 matched by age sex and Barthel Index (BI) with patients not taking beta-blockers. Serum and saliva samples were taken and analyzed for their SP levels using an enzyme-linked immunosorbent assay (ELISA). Socio-demographic and clinical variables were collected. Dysphagia was evaluated in all patients using the clinical volume-viscosity swallow test (V-VST).

Results: We studied 28 patients taking beta-blockers (64.96 ± 7.31 years 57.1% women BI 99.6 ± 1.31 carvedilol-equivalent dose 24.11 ± 18.12 mg) and 28 patients not taking beta-blockers (65.61 ± 6.43 years 57.1% women BI 99.6 ± 1.31). SP serum levels were significantly higher in patients taking beta-blockers (260.68 ± 144.27 pg/ml vs. 175.46 ± 108.36 pg/ml $p = 0.009$) as were SP saliva levels (170.34 ± 146.48 pg/ml vs 102.73 ± 52.28 pg/ml $p < 0.001$) compared with NTBB patients. Prevalence of OD was 32.1% in patients taking beta-blockers and 67.9% in patients not taking beta-blockers ($p = 0.015$). In addition patients with OD had significantly lower SP saliva levels in comparison with patients without clinical signs of OD (98.39 ± 43.25 vs 174.69 ± 147.21 pg/ml $p < 0.001$).

Conclusions: We have found that serum and saliva SP levels are greater in patients taking beta-blockers. Therefore the release of pharyngeal SP might constitute the mechanism of action by which the beta blocking agents exerts a therapeutic effect preventing OD. ClinicalTrials.gov Identifier: NCT03306134.

THE EFFECTS OF LIQUID BOLUS CONSISTENCY ON HYOID EXCURSION IN HEALTHY SWALLOWING

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Introduction: Studies of hyoid excursion in healthy swallowing have reported highly variable measures in millimeters. Normalization of hyoid measures to a cervical spine reference scalar has been shown to neutralize sex differences attributable to height [1]. Normative confidence intervals for peak XY position (vs C4) have been reported as 140–165% of the C2–C4 scalar for healthy young adults swallowing 22%w/v thin barium in 5, 10, and 20 ml volumes. In this study we explored variations in peak hyoid position in healthy adults across the range from thin to extremely thick consistency.

Materials and Methods: 51 participants (24 male) mean age 42 (range 21–70) each took naturally sized sips of 27 liquids (20%w/v barium) under videofluoroscopy (30 images/second): 3 boluses of thin; 6 boluses each of slightly- mildly- moderately- and extremely-thick barium (IDDSI Levels 0 to 4). Hyoid position was tracked frame-by-frame by trained raters and peak position was measured along the XY vector in C2–C4 scaled units relative to the anterior inferior corner of C4. Descriptive statistics were compared to previously reported norms for thin barium. Mixed model repeated measures ANOVAs were used to determine the effect of thickener (starch vs xanthan gum) bolus consistency and sip volume.

Results: Participants showed slightly greater peak hyoid excursion than previously reported norms with the 95% confidence interval for thin liquids ranging from 168 to 170% of the C2–C4 scalar. Within each IDDSI level no significant effects of sip volume or thickener were found. Across consistencies a small but non-significant increase in peak hyoid excursion was observed (95% CI upper boundary: 173% of the C2–C4 scalar).

Conclusions: When calculated in anatomically scaled units measures of peak hyoid excursion are highly stable across the range from thin to extremely thick liquids in healthy adults. There is no significant influence of liquid bolus consistency on peak hyoid position.

INFLUENCE OF AGE ON EATING BEHAVIORS AND BOLUS PROPERTIES OF STEAMED RICE

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Introduction: We previously demonstrated that chewing duration of steamed rice widely varied and swallowing initiation was not dependent on food properties in healthy young subjects. In this study we examined how aging affected the eating behaviors including chewing and swallowing.

Materials and Methods: 28 healthy young participants (13 females average age = 29.6 years) and 14 healthy elder participants (6 females average age = 71.9 years) were asked to ingest 8 g of steamed rice freely. Based on the chewing duration defined by the chewing time until first swallow (100%) they were asked to chew the

same sample and then either spit it out (spitting test) or to swallow it (swallowing test) at 50%, 100%, and 150% of chewing duration. In the spitting test the rheological property of bolus such as hardness cohesiveness and adhesiveness was measured and was compared between the time points (50%, 100%, 150%) and between the groups. In the swallowing test electromyography (EMG) of masseter suprahoid and infrahyoid muscles was recorded. We compared EMG activities among the conditions (free 50%, 100%, 150%).

Results: The chew duration of both young and elderly groups widely ranged among individuals and was slightly shorter in the former than the latter. The hardness of the bolus gradually decreased with a significant negative correlation between time and hardness regardless of the difference in individual chewing duration in both groups. The cohesiveness of the bolus was unchanged until 100% followed by a slight but significant increase in both groups. While there was no time-dependent change in the adhesiveness in the young group it gradually increased with a significant positive correlation between time and adhesiveness in the elderly group. Unexpectedly EMG activity was not related to the chewing duration or bolus properties.

Conclusions: Aging does not drastically affect chewing behaviors with slight changes in adhesiveness of bolus and chewing duration.

BLACK PEPPER OIL INHALATION INDUCES SHORT-TERM EXCITABILITY ON PHARYNGEAL MOTOR SYSTEM IN HEALTHY HUMANS

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Introduction: Previous reports revealed that nasal inhalation of black pepper oil (BPO) increased cerebral blood flow in the insular cortex and improved swallowing function in elderly people. The aim of this study was to examine whether BPO application affects excitability of pharyngeal motor cortex.

Materials and Methods: Seven healthy volunteers (3 males age ranging from 22 to 37 years) participated in this study. The intraluminal catheter was intubated for recording pharyngeal EMGs and infusing distilled water onto the pharynx to evoke swallowing. Bipolar surface EMG electrodes were attached to the skin over the anterior surface of the digastric muscle on the left side in order to identify swallowing response. Single-pulse TMS was delivered over the pharyngeal and thenar motor cortices to induce respective motor evoked potential (PMEP and TMEP). Distilled water was injected onto the pharynx at 0.05 ml/s and the onset latency of the first swallow was measured. Subjects were randomized to receive one of three interventions (100% v/v BPO, 50% v/v BPO, and 100% v/v SAO; sweet almond oil inhalation). Before (baseline) immediately after at 15 min and 30 min after 1-min either intervention MEPs and latencies were recorded. The mean values of the percent change in MEP amplitude and latency were compared between baseline and follow up measurements by one-way repeated measures ANOVA.

Results: Pharyngeal MEPs showed significant increase up to 30 min after 1-min 100% BPO inhalation ($p < 0.05$) whereas increase of MEPs was observed only immediately after 1-min 50% BPO inhalation (Fig. 1). There was no difference in latency.

Conclusions: Inhalation of 100% v/v BPO showed immediate and facilitatory effects on excitability of pharyngeal motor cortex in the healthy adults.

Olfactory stimulus by BPO may possibly facilitate the primary pharyngeal motor cortex via the olfactory cortex or insula.

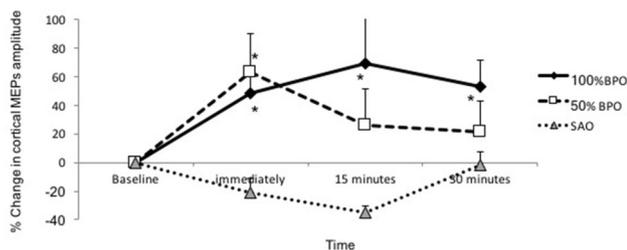


Fig. 1 Changes in excitability of MEPs on dominant hemisphere

VOLITIONAL MANIPULATION OF PRESSURE AT THE UPPER OESOPHAGEAL SPHINCTER DURING SWALLOWING: AN EXPLORATORY STUDY

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Introduction: Pharyngeal swallowing is considered a cortically modulated pseudo-reflexive response; however the extent of cortical control is not fully understood. Prior research has shown the duration of upper oesophageal sphincter (UOS) opening can be volitionally prolonged during execution of the Mendelsohn maneuver. This study explored the capacity of healthy adults to increase the UOS opening duration directly through volitional pressure manipulation.

Materials and Methods: Six healthy adults completed daily training for 2 weeks. Each session consisted of 16 two-minute training blocks each with 4 saliva swallows. Participants were asked to maximally increase the duration of intra-swallow UOS opening (DUOS) without altering pharyngeal pressures ('manipulation task'). High-resolution manometry (HRM) contour plots served as visual biofeedback during training. DUOS was evaluated with HRM (customized software) during manipulation task (with biofeedback) and during 'no manipulation' (natural saliva swallows without biofeedback) prior to training (T1) after one (T2) and two (T3) weeks of training and after 2 weeks of no training (T4) to evaluate task maintenance. Friedman and Wilcoxon signed-rank tests were used to detect differences in DUOS between manipulated and non-manipulated swallows at T1 and to evaluate the effect of training on manipulated DUOS.

Results: DUOS was longer during volitional manipulation (median = 0.66 s) than during no manipulation (median = 0.51 s) at T1 ($p = 0.03$; $r = -0.62$). There was no significant increase in manipulated DUOS at any of the time points compared to T1.

Conclusions: These data provide evidence of volitional prolongation of UOS opening duration with visual biofeedback in healthy adults. Increased UOS opening duration was accomplished prior to training; performance was not further enhanced by daily practice. This may suggest that the amount to which the duration of UOS opening can be prolonged is restricted.

Session 05. Poster session 5D: Paediatric Dysphagia 1

THE FEEDING/SWALLOWING IMPACT SURVEY: ITALIAN NORMATIVE DATA

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Introduction: Pediatric dysphagia has a negative impact on the Quality of Life (QoL) of children and their caregivers. The Feeding and Swallowing Impact Survey (FS-IS) (Lefton-Greif et al. 2014) is a questionnaire investigating concerns and stress associated with caring for a child with feeding/swallowing disorders. The FS-IS is validated in English language. The aim of this study was to collect normative data to validate the Italian version of the FS-IS.

Materials and Methods: The FS-IS was translated into Italian language through a back translation procedure. From February to July 2017 4 nursery schools 4 primary schools and 5 pediatricians were contacted to enroll parents of children aged 0–48 months with no history of feeding/swallowing disorders. Data were divided in six age groups to account for different developmental stages of feeding/swallowing abilities. The FS-IS reports caregivers' concerns on 18 items divided in three domains (Daily activities; Worry; Feeding Difficulties). The score is given on a 5-point Likert scale (1 = never; 5 = always) the higher the score the more the impact on caregivers' QoL.

Results: 316 questionnaires were collected 289 were included in the analysis. Children's mean age was 217 months (DS 131; range 0–48; median 20). 53% were female. Data were not normally distributed (Kolmogorov-Smirnov $p < 0.05$). Percentiles were calculated for each age group for the three domains and the total score (Table 1).

Conclusions: This is the first study to collect normative data for the FS-IS. Sample size is consistent with other normative studies on QoL questionnaires related to dysphagia. In each age group the 90th percentile score reached ceiling. Scores for 10th percentile were higher in the age groups 7–12 months and 19–24 months that mark the beginning of weaning and self-feeding respectively. Future studies with a clinical population are needed to prove the discriminative properties of the Italian FS-IS.

Table 1. FS-IS percentile (pc) score for each age group.

Age Group	Daily Activities	Worry	Feeding	Total
0-6 m (n= 34; 12%)				
90 pc	5	7	6	18
75 pc	5	7	6	21
50 pc	8	9	6	23
25 pc	12	10	6	29
10 pc	17	16	11	36
7-12 m (n=56; 19%)				
90 pc	5	7	6	18
75 pc	5	8	6	20
50 pc	7	9	6	23
25 pc	10	11	8	28
10 pc	15	16	12	40
13-18 m (n=50; 17%)				
90 pc	5	7	6	18
75 pc	6	7	6	20
50 pc	7	8	6	22
25 pc	11	10	7	28
10 pc	14	17	9	35
19-24 m (n=28; 10%)				
90 pc	5	7	6	18
75 pc	5	7	6	19
50 pc	7	8	6	22
25 pc	12	11	7	29
10 pc	14	19	14	45
25-36 m (n=78; 27%)				
90 pc	5	7	6	18
75 pc	5	7	6	18
50 pc	7	8	6	22
25 pc	10	9	8	27
10 pc	14	13	12	37
37-48 m (n=43; 15%)				
90 pc	5	7	6	18
75 pc	5	7	6	18
50 pc	5	7	6	19
25 pc	8	10	6	25
10 pc	14	14	11	37

OROPHARYNGEAL DYSPHAGIA PROFILES IN CHILDREN WITH METABOLIC DISORDERS

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Introduction: Although dysphagia could be seen in children with metabolic disorders there is limited information regarding the underlying nature of oropharyngeal swallowing dysfunction in this patient population. The study aimed to define oropharyngeal dysphagia profiles in children with metabolic disorders.

Materials and Methods: Twenty-two children with metabolic disorders were included. Descriptive information including age gender height weight feeding type was noted. Videofluoroscopic swallowing study was performed and penetration-aspiration severity was determined by the Penetration-Aspiration Scale (PAS).

Results: Twenty-two children with a mean age of 3.18 ± 3.38 years mean height of 85.08 ± 20.74 cm and mean weight of 12.88 ± 10.77 kg were included of which 63.3% were male. The referral feeding type was 54.5% oral-feeding and 45.5% non-oral feeding. The median PAS score of liquid consistency was 8 (min = 1; max = 8) and the median PAS score of pudding consistency was 1 (min = 1 max = 8). 47.6% demonstrated vallecular residue and 57.1% pyriform sinus residue. The recommended feeding type was 36.4% oral-feeding 50% non-oral feeding and 13.6% liquid-restricted diet.

Conclusions: These findings indicate high prevalence of oropharyngeal swallowing dysfunction in both swallowing efficiency and safety. Therefore it is important to evaluate swallowing function and determine the appropriate feeding type in an early period in children with metabolic disorders.

START ORAL FEEDING IN HIGH FLOW VENTILATED INFANTS: DEVELOPMENT OF A STANDARDIZED PROTOCOL

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Introduction: In a Neonatal Intensive Care Unit (NICU) severe sick neonates specially extreme preterm born infants or infants with congenital hernia diaphragmatica (CHD) might have long term respiratory problems requiring breath support. The use of high flow like Nasal Continuous Positive Airway Pressure (NCPAP) or Optiflow is often used in these infants. When weaning of high flow ventilation is not possible at the age of > 36 weeks post menstrual age starting oral feeding will be suggested. However the safety and efficiency of oral feeding in NCPAP ventilated infants is discussed in a few articles because infants could be at risk for aspiration.

The aim of this study was to develop a standardized protocol for introducing nutritive sucking in infants in a safe and efficient way during high flow ventilation.

Methods: The standardized protocol was based on knowledge about the development of oral feeding cue based feeding and the criteria used in the study of Hanin (2014). The protocol consists of non-nutritive sucking and start of nutritive sucking by carefully introducing therapeutic fingerfeeding. To control for safe swallowing and

stress signals of the infant during the feeding moment we used the Checklist Oral Feeding a shortened version of the Early Feeding Skills Assessment and Cervical Auscultation (CA) to indicate breathing and swallowing during nutritive sucking.

Results: This protocol was used in 19 infants. These infants were preterm born infants and/or infants born with CHD. The description of this group and the development of nutritive sucking by using the protocol will be presented at the conference.

Conclusion: Preliminary results suggest that the use of a standardized protocol for the start of oral feeding in high flow ventilated infants is effective and safe in preterm born infants and/or infants born with CHD. Further research is necessary to evaluate the influence of this intervention on the development of the oral feeding skills.

INTEGRATED FEEDING THERAPY ADDS VALUE TO NICU FOLLOW-UP PROGRAMS

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Background: Many NICU graduates continue to display feeding growth and developmental concerns post-discharge. Most NICU follow-up programs do not have feeding therapy as an integrated part of their multi-disciplinary team. We have found that even many infants considered at low-risk of later feeding difficulties end up presenting with significant issues that benefit from feeding therapy input.

Aims: To describe feeding difficulties encountered in a NICU Follow-Up Program.

Methods: Retrospective data was collected on infants attending NICU Follow-Up Program over a 12-month period.

Results: Any high-risk feeders (e.g. those discharged on tube feeding) were referred to specialist multi-disciplinary feeding clinics with specialist physicians (e.g. GI pulmonology) nutrition and feeding therapy. Any low-risk feeders attending NICU follow-up clinic had their feeding screened by a feeding therapist. Greater than 80% of babies screened meet the criteria for feeding therapy services. These are babies who otherwise would not have been reviewed by feeding therapy unless the parents self-referred into a feeding clinic. Common issues encountered include: concerns regarding swallow safety and aspiration risk work of breathing during feeding inefficient feeding and or other concerning feeding behaviors. Interventions offered include: providing advice regarding changing bottle nipples and preparing thickened feeds facilitating MBS and referral to sub-specialty providers and providing advice regarding appropriate feeding equipment seating and strategies. Parents reported that the feeding therapy services are valued and the integrated nature of the clinic visits saves them time and stress.

Conclusion: Many preterm infants considered at low-risk of later feeding difficulties end up presenting with significant issues that benefit from feeding therapy input and our clinic data shows that integrated feeding therapy adds value to NICU follow-up programs.

SILENT ASPIRATIONS DETECTED BY VIDEOFLUOROSCOPY IN PEDIATRIC PATIENTS

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Introduction: To describe the clinical characteristics and videofluoroscopic findings of pediatric patients with oropharyngeal dysphagia and silent aspirations.

Methods: Retrospective descriptive study from November 2011 to November 2017 by review of medical records and videofluoroscopy findings in patients with suspected dysphagia. Following variables were analyzed: age sex type of dysphagia (oral or pharyngeal) severity of dysphagia (efficacy and safety) aspirations and types of aspirations (silent or with cough).

Results: A total of 250 patients (male 61.7%) were reviewed the clinical records and videofluoroscopic findings. Of these 94.8% presented some aspirations of which 37.6% ($n = 94$) were silent aspirations. Twenty-five percent had decreased arterial oxygen saturation with aspiration. Dysphagia was predominantly moderate and severe (90.4%) with mixed involvement (efficacy and safety) in 96.8% of cases. The efficacy of oral phase was affected in 80% of cases (ineffective labial seal 80.8% poor bolus formation 93.6% and lingual apraxia 87.2%). The glossopalatine seal was ineffective in 86.1%. Eighty-five percent had an adapted diet before to performing the videofluoroscopy but only 61.7% remained with exclusive oral intake after videofluoroscopy.

Conclusions: Patients susceptible to presenting silent aspirations are a heterogeneous although neurological diseases are more frequent especially cerebral infantile paralysis. The most of aspiration events do not show a decrease in arterial oxygen saturation. Although more than half of patients maintain exclusive oral intake this does not prevent the appearance of new episodes of silent aspiration. Further investigations would be necessary to determine if aspiration episodes after diet modifications are due to inadequate compliance or progression of their main diagnosis in order to perform an active adaptation to the patient's baseline situation.

EVIDENCE INTO PRACTICE: THE EVOLUTION OF FEEDING SERVICES IN THE NICU

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Premature birth is defined as birth before 37 weeks' gestation. Worldwide the incidence of premature birth is 8–12%. The establishment of

oral (per os PO) feeding competence is a challenge for most infants born prematurely. Unlike full-term infants who are almost always able to successfully PO feed from birth most preterm infants will require some duration of tube feeding until they mature sufficiently and are medically stable enough to feed fully PO. Medical care in the NICU has changed significantly over the last decade (most notably with the current emphasis on non-invasive respiratory support) and those involved in feeding management in this population need to be aware of these changes and the impact they have on feeding issues.

Based on 30 + years combined experience in the NICU as well as more than a decade of research experience each in this field the authors will review major changes in medical care in the NICU as well as major feeding issues demonstrated in this population. The presenters will discuss feeding assessment tools that are available the strengths and limitations of these tools and the ways that information used from these tools can be used to guide therapy goals and evaluate therapy success. The presenters will also discuss the theory and evidence behind various feeding interventions in the NICU. Practical demonstrations (including patient video) of various therapy techniques will be provided. The importance of parent education as well as the importance of parent involvement in goal setting and implementation of therapy will also be emphasized.

MATURATION OF THE GASTROINTESTINAL TRACT: IMPACT ON FEEDING AND SWALLOWING IN PRETERM INFANTS

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Introduction: Clinicians working with preterm infants require specialized knowledge of the impact of gastrointestinal (GI) immaturity on feeding readiness. Clinical competency in application of multi-system aspects of development allows the clinician to implement a holistic approach to feeding and facilitate optimal outcomes.

Materials and Methods: Full text publications were assessed via journal databases and reviewed for inclusion ($n = 52$) and additional references were identified via reference lists from retrieved articles ($n = 12$). Search terms included “gastrointestinal maturation” “gastrointestinal development” “gastrointestinal maturation preterm” and “gastrointestinal maturation feeding.” Inclusion criteria included: relevancy peer reviewed and published within last 10 years. Exclusion criteria included: not written in English and published prior to 2008. A total 29 articles met inclusion criteria.

Results: Maturation of the GI tract is a major determining factor for feeding readiness in preterm infants. Integrity coordination and biomechanics of upper esophageal sphincter lower esophageal sphincter and esophageal body are essential for swallowing esophageal peristalsis and protection of the airway (Pena, Parks, Peng, Fernandez, Di Lorenzo, Shaker and Jadcherla 2010). A premature GI tract has increased permeability low levels of protective mucus and secretory IgA and decreased regeneration abilities leading to greater risk of tissue damage (Pena, Parks, Peng, Fernandez, Di Lorenzo, Shaker and Jadcherla 2010).

Conclusions: GI maturation must be considered when assessing feeding readiness in preterm infants. GI immaturity leads to increased

feeding difficulties and increased risk of long-term complications. The vulnerability of the immature GI tract and risk of life-long comorbidities warrant close monitoring throughout childhood to ensure developmentally appropriate feeding milestones are met and to promote safe positive feeding experiences.

PRETERM INFANT FEEDING AND SWALLOWING TREATMENT: ETHICAL CONSIDERATIONS

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Introduction: Clinicians in the neonatal intensive care unit (NICU) determine feeding recommendations but not all treatment options are without significant risk. It is imperative to consider the ethical aspects of recommendations.

Materials and Methods: Full text publications were assessed via journal databases and reviewed for inclusion ($n = 24$). Search terms included “preterm necrotizing enterocolitis” “preterm feeding ethic” “necrotizing enterocolitis feeding” and “necrotizing enterocolitis ethic.” Inclusion criteria included: relevancy peer reviewed and published within last 10 years. Exclusion criteria included: not written in English and published prior to 2008. A total 8 articles met inclusion criteria.

Results: Transitioning an infant from breastmilk to formula significantly increases the risk of necrotizing enterocolitis (NEC) (Kasivajjula and Maheshwari 2014). This increased risk of NEC in preterm infants is suspected to be due to intestinal immaturity a highly immunoreactive intestinal mucosa inflammatory response to intestinal stimuli and hyperosmolar feeds that damage the immature intestinal mucosa (Hall Eaton and Pierro 2013). Additionally increased viscosity of thickened formula results in prolonged digestion time increased gastric residuals and lengthy intestinal transit increasing the accumulation of adverse gastrointestinal factors and harmful bacteria increasing the risk of NEC (Hall Eaton and Pierro 2013).

Conclusions: While many clinicians are aware of the risk of NEC and commercial thickeners in infants there is frequently a lack of discussion about the potential complications related to offering thickened feeds. The clinician has an ethical responsibility to provide caregivers with this information to support informed decision-making. However a discussion regarding the possible increased vulnerability to NEC due to transitioning to thickened formula rarely occurs.

Session 05. Poster session 5E: Treatment 1

BIOFEEDBACK TO IMPROVE THE SAFETY AND EFFICIENCY OF SWALLOW FUNCTION IN PEOPLE WITH PARKINSON'S DISEASE AND DYSPHAGIA: A SYSTEMATIC REVIEW

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Introduction: The effect of external feedback has already been demonstrated in voice recovery and in physiotherapy suggesting that people with Parkinson's disease (PD) may benefit from visual feedback information more than other patient groups. Preliminary studies suggest that biofeedback for swallowing treatment may be effective in PD. The aim of this study was to examine the evidence on the effectiveness of biofeedback swallowing treatment in people with PD. A secondary outcome was to evaluate the safety of this intervention approach and identify adverse effects associated with biofeedback to improve swallow function in this population.

Methods: A systematic review was planned and the protocol was published on PROSPERO 2017. All published and unpublished RCTs and non RCTs with no language restrictions were sought. Twelve databases (EMBASE PubMed CINAHL Web of Science Scopus Science Direct AMED The Cochrane Database of Systematic Reviews ProQuest Dissertations and Theses A & I Google Scholar) were searched from inception to May 2017. Screening of titles was conducted using Covidence (www.covidence.org) by two review authors independently examined the data. Methodological quality of the included studies was assessed using Downs and Black checklist.

Results and Conclusion: 10,785 records were identified. Four studies were included. Overall methodological quality of the included studies was poor. Data was analysed descriptively. Despite the heterogeneity of the studies on type of biofeedback used study design outcome measures and small sample sizes we conclude that biofeedback with visual cues is safe and show promise in swallowing rehabilitation treatment in PD.

DYSPHAGIA THERAPY WITH SURFACE ELECTROMYOGRAPHIC BIOFEEDBACK: A FEASIBILITY RANDOMISED CONTROLLED TRIAL IN ACUTE STROKE

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Introduction: During swallowing the timing and the amplitude of submental muscle activity involved in hyolaryngeal excursion can be visualised using surface electromyography (sEMG). Patients can use this biofeedback to enhance their performance in swallow exercises which may help to improve hyolaryngeal excursion. Research has been inconclusive as to whether therapy with biofeedback improves swallowing. Further research is needed to determine its feasibility and effectiveness in the 50% of stroke patients who have dysphagia.

Objectives: To investigate the feasibility of delivering dysphagia therapy with sEMG biofeedback in acute stroke.

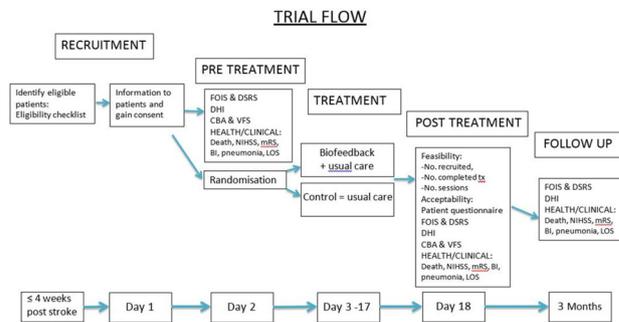
Eligibility: Inclusion: Newly diagnosed stroke dysphagia (Functional Oral Intake Scale-FOIS \leq) age \geq 18. Exclusion: Neurological condition previous dysphagia severe cognitive/language/visual impairment medically unwell poor prognosis.

Methods: 30 patients will be recruited from the Acute Stroke Unit at Derby Teaching Hospitals NHS Foundation Trust and randomised 1:1 to therapy with biofeedback or control using minimisation on age stroke and dysphagia severity. The researchers analysing videofluoroscopies (VFS) and collecting 90 day follow up data will be blinded to treatment allocation.

Intervention: Groups will receive the following: Biofeedback group—10 \times 45-min sessions of swallow strength and timing

training with sEMG biofeedback (BiSSiT software) Control group—Usual care.

Trial flow and Outcomes: Primary outcome is feasibility (number recruited session completion) and acceptability (patient questionnaire). Secondary outcomes are efficacy: Swallow physiology (VFS) dysphagia severity (Dysphagia Severity Rating Scale -DSRS clinical bedside assessment-CBA FOIS) QOL (Dysphagia Handicap Index-DHI); clinical-death pneumonia impairment (National Institute of Health Stroke Scale-NIHSS) disability (Barthel Index-BI) dependency (modified Rankin Scale-mRS) Length of Stay (LOS) feeding tube dependency.



AN AUDIT OF RISK-FEEDING PRACTICES WITHIN AN ACUTE NHS TRUST ARE WE GETTING IT RIGHT?

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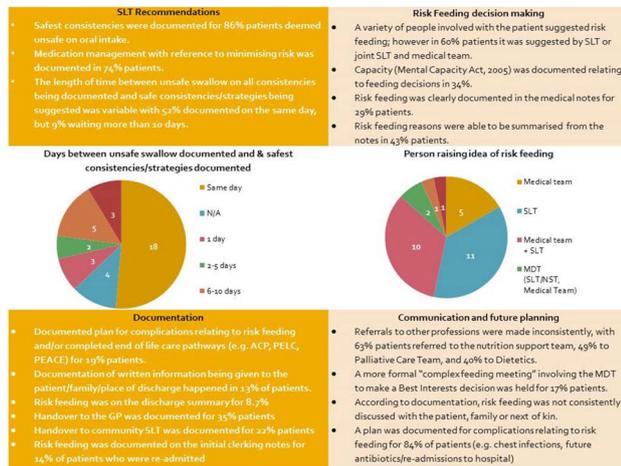
Introduction: Risk-feeding refers to a medical decision to provide a patient with oral intake despite having an unsafe swallow which can put them at increased risk of choking aspiration pneumonia and death. The decision-making process regarding whether to provide artificial nutrition and hydration and/or to continue to allow food and drink by mouth to enable optimal quality alongside an unsafe swallow provokes emotive and quality of life decisions for patients and their carers. Risk-feeding is a complex and an ethically fraught area and thus a holistic systematic and co-ordinated approach by medical staff and the multi-disciplinary team is imperative.

Materials and Methods: A retrospective audit of 35 patients within the acute setting was conducted to evaluate current practices in the decision making process and the management of patients who are risk-fed within the trust. The information was analysed to evaluate whether any improvement in practice could be implemented given that the decision for a patient to feed at risk is likely to have significant medical implications.

Results: Data analysis revealed that there was great variability in the current management of risk feeding across multiple domains including; mental capacity assessment⁶ accurate documentation number of professionals involved communication use of restraint days patients were nil by mouth timely referral to SLT handover to community

professionals and acknowledgement of risk-feeding decisions on re-admission to hospital.

Conclusions: The findings from this audit revealed that there was no evidence of consistency in the implementation and practice of risk feeding at BHRUT resulting in different patient experiences and inequity of care. It is recommended that a formal set of best practice guidelines be created for use trust-wide to support professionals and the multi-disciplinary team in the management of these patients in-line with best practice and existing guidelines and literature.



INTER-INDIVIDUAL VARIABILITY IN THE RESPONSES TO RTMS AS A TREATMENT FOR CHRONIC POST-STROKE DYSPHAGIA

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Background: Non-invasive brain stimulation techniques such as repetitive transcranial magnetic stimulation (rTMS) can be used to promote neural plasticity for stroke rehabilitation. rTMS has been shown to improve swallowing functions in acute and subacute stroke survivors with dysphagia. However its therapeutic effects in the chronic stroke population remained relatively less explored. Moreover some evidence suggested that the responses to rTMS vary among individuals.

Aim: To study the effects of 5 Hz rTMS on swallowing functions of individuals with chronic post-stroke dysphagia.

Methods: Twenty-one chronic (> 1 year) stroke survivors (mean age = 62.8 years) with dysphagia were randomly assigned into the active rTMS group ($n = 17$) or the sham rTMS group ($n = 4$). All of the participants received 10 days of subthreshold 5 Hz rTMS over the tongue area of the motor cortex. Sham rTMS was delivered via a sham rTMS coil. The swallowing functions were assessed at baseline 2 months 6 months and 12 months after rTMS using videofluoroscopic swallowing study. Individual changes in swallowing functions of each participant in the active rTMS group were compared with the individual changes in the sham rTMS group.

Results: Ten out of the 17 participants in the active group showed improvements in swallowing functions at 2 months after rTMS ("responders"). They showed greater reduction in the amount of post-swallow pharyngeal residue oral transit time pharyngeal transit time

and stage transit time when compared to the sham rTMS group. Six and two of them maintained the improvements up to 6 and 12 months post-rTMS respectively. These responders had higher motor threshold of the tongue than those who did not show improvements after rTMS. **Conclusion:** Individuals with mildly or moderately impaired but not severely impaired cortical excitability may benefit from the current rTMS protocol. Future rTMS protocols may need to be individualized to accommodate for the variability.

A RADIOLOGICAL STUDY OF EFFECTS OF NASOGASTRIC FEEDING-TUBE (NGT) ON SWALLOWING FUNCTIONS IN SUB-ACUTE STROKE DYSPHAGIC SURVIVORS

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Introduction: It is common for severely dysphagic acute stroke survivors to be on nasogastric tube (NGT) feeding during the first month of recovery. However it is unclear from the literature how the NGT may affect swallowing functions. This study aims to investigate the effects of NGT in situ on penetration and aspiration in dysphagic subacute stroke survivors.

Materials and Methods: Prospective consecutive-basis recruitment with a total of 36 (average of 30 days post-stroke) dysphagic survivors (13 females 23 males mean age = 76.64 years) with NGT in situ at a rehabilitative public hospital was conducted. All participants underwent two 1.5 h-interval video-fluoroscopic swallowing studies (VFSS) the first session was conducted with NGT and followed by a session without NGT. Wilcoxon signed-rank test was used to compare the Penetration-Aspiration Scale (PAS) ratings done by an experienced speech therapist on same bolus consistency and volume with and without the NGT.

Results: Significantly poorer PAS scores with medium effect sizes were found with the NGT in situ when compared without NGT on (i) thin liquid 10 ml ($p = 0.003$; $Z = -2.958$) and 15 ml ($p = 0.003$; $Z = -2.962$); (ii) thick liquid 5 ml ($p = 0.017$; $Z = -2.391$) and 10 ml ($p = 0.005$ $Z = -2.797$). No significant differences were found on thin liquid (5 ml); thick liquid (15 ml); pureed (51015 ml) and minced diet (5 ml).

Conclusions: The current study concludes that NGT imposed negative impacts on swallowing mechanism during VFSS on lower consistencies (drinks) but may induce less negative impacts on higher consistencies (foods). Clinically removal of physical barrier i.e. NGT is indicative during VFSS. Otherwise patients may be mis-diagnosed as having swallowing problem and thus deprived the chance of resuming oral feeding regime upgrading to higher consistencies bigger volumes of oral intake and may inevitably lead to mismanagement in dysphagia rehabilitation. Dysphagic patients' well-being may be sacrificed.

TREATMENT OF SEVERE OROPHARYNGEAL DYSPHAGIA FOLLOWING CRANIO-CERVICAL NECROTIZING FASCIITIS: A CASE REPORT

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Necrotizing fasciitis of the head and neck also named cranio-cervical necrotizing fasciitis (CCNF) is usually defined as a severe progressive bacterial infection generally of polymicrobial origin of the cervical fascia and the surrounding tissues. This case being of dental origin resulted in multiple head and neck surgery prolonged oro-tracheal intubation and subsequent tissue swelling. We report a 41-year-old man with severe dysphagia due to CCNF. He received intensive swallowing therapy with a modified version of the McNeill Dysphagia Therapy Program (MDTP) a systematic evidence-based therapy framework that focuses on progressive strengthening and coordination of swallowing with progression towards a normalization of swallowing behaviour. Intensity of exercise is incorporated both by the volume of work (number of swallows) completed in a treatment session and by the manipulation of volume and viscosity of materials swallowed. It has been studied in a wide variety of patient groups (PD MS Stroke h/n ca) but at the time of the study there were no documented cases on the method being used on a patient with cervical necrotizing fasciitis. During a two months treatment period the patient went from dietary stage 1 on the functional oral intake scale (FOIS): tube dependent. No oral intake to 6: total oral intake with no special preparation but must avoid specific foods. At the time of discharge there was still decreased mobility and function in the neck and shoulders.

EFFECT OF A GUM-BASED THICKENER ON THE SAFETY OF SWALLOWING IN PATIENTS WITH POST-STROKE OROPHARYNGEAL DYSPHAGIA

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Introduction: Increasing liquid viscosity with thickeners to avoid aspiration is a valid therapeutic strategy for oropharyngeal dysphagia (OD). We investigated the effect of a xanthan gum-based thickener (Nutilis Clear®) on safety and efficacy of swallowing by evaluating six viscosities (150–2000 mPa s) compared to thin liquid in post-stroke OD (PSOD) patients.

Materials and Methods: 120 patients were included (≥ 28 days after stroke) in this reference controlled multiple dose fixed order single-blind and single-centre study. Boluses of 10 ml thin liquid pudding (2000 mPa s) honey (1400, 800, 450 mPa s) and nectar thick (250, 150 mPa s) were given in duplicate and with a stop rule for safety. Each swallow was evaluated with Videofluoroscopy and Penetration Aspiration Scale (PAS). Safety and efficacy of swallowing and swallowing kinematics were analyzed with McNemar’s Bhapkar’s test or MMRM.

Results (ITT population): Prevalence of patients with safe swallow (PAS 1–2) at thin liquid was 40.0% and significantly increased at each viscosity: 68.3% at 150 mPa s, 74.2% at 250 mPa s, 79.2% at 450 mPa s, 88.3% at 800 mPa s, 91.7% at 1400 mPa s, and 88.3% at 2000 mPa s ($p < 0.001$ for each viscosity). PAS score at thin liquid (mean \pm SD 3.7 ± 2.3) was significantly higher ($p < 0.001$ for each viscosity) than each viscosity: 1.9 ± 1.4 for 150 mPa s 1.8 ± 1.6 for 250 mPa s 1.7 ± 1.6 for 450 mPa s 1.4 ± 1.2 for 800 mPa s 1.2 ± 0.6 for 1400 mPa s and 1.4 ± 1.2 for 2000 mPa s. Increasing viscosity significantly shortened LVC time at 150–2000 mPa s ($p < 0.05$). The prevalence of patients with pharyngeal residue at

each viscosity (35.8–42.5%) was not significantly different compared to thin liquid (40%) ($p > 0.05$).

Conclusions: Prevalence of unsafe swallow with thin liquids in PSOD is very high. Increasing bolus viscosity with the gum-based thickener significantly increased the safety of swallow in patients with PSOD in a viscosity-dependent manner without increasing prevalence of pharyngeal residue.

THE USE OF SURFACE ELECTROMYOGRAPHY (SEMG) TO REHABILITATE DYSPHAGIA IN CERVICAL SPINAL CORD INJURY (CSCI): A CASE SERIES

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Introduction: Spinal cord injury is a complex condition affecting multiple body systems. CSCI patients have high risk of airway complications and 40% reported incidence of dysphagia. Clinical presentation is subtle with high rates of silent aspiration. Left untreated this can increase respiratory complications hospital length of stay (LOS) and reduce quality of life (QoL). Ability to resume oral intake is an important patient goal and paramount to rehabilitation and reintegration. Clinical evidence suggests that patients spend considerable time nil by mouth or resume oral intake without appropriate input resulting in respiratory compromise.

This case series discusses the use of sEMG for swallowing rehabilitation. sEMG is a non-invasive therapy which focuses on precision of movement using targeted performance and biofeedback.

Methods: Two patients with traumatic CSCI and diagnosis of severe dysphagia underwent sEMG using the EMS Medi-link system with triode electrodes. Data was collected on pre and post videofluoroscopy (VFS) functional oral intake scale (FOIS) treatment dose and duration and patient feedback.

Results: sEMG was administered 5 days a week for 4–6 weeks. Nasendoscopy with simultaneous sEMG was also completed during the treatment block.

	AIS Level	Pre VFS PAS score	FOIS	Post VFS PAS score	FOIS
Patient 1	C1 A (ventilated via tracheostomy)	8 fluids and diet		1 diet 3 fluid	3
Patient 2	C1 D	8 fluids and diet		1 diet 3 fluid	5

Conclusions: Given the complex dysphagia profile seen in this group early instrumental assessment should be routinely used and targeted swallow rehabilitation started early. This can reduce respiratory complications LOS and improve QoL. Biofeedback using sEMG provides the clinician and patient with real time feedback and in this small case series appeared to aid compliance and success of therapy.

Session 05. Poster session 5F: Professional Roles in Dysphagia Management

EARLY SPEECH-LANGUAGE PATHOLOGY CARE IN A EMERGENCY IN PRIVATE HOSPITAL. SÃO LUIS MARANHÃO-BRAZIL

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Introduction: A hospital emergency service has as main objective to provide immediate care minimizing risks prioritizing the patient's problem resolution and its safety in the hospital environment. The speech-language pathologist is the professional trained to identify and evaluate early swallowing alterations and to indicate the safest feeding path for the patient there is a great demand of potentially dysphagic patients.

Purpose: this study was to describe the speech-language pathology care routine in the emergency.

Materials and Methods: A retrospective qualitative and descriptive study. Statistics data were collected from January to July 2017. The inclusion criteria considered were: hospitalized patients in the emergency unit and with speech-language pathology evaluation performed. The data were divided into: age gender and diagnostic SLP management and assessment.

Results: There was a predominance of female patients in the sample 64.4% the elderly 65.2% in the majority. In the entry symptomatology were highlighted: the level lowering of the consciousness with 49.13% followed by respiratory symptoms 34.7% 2% with aspiration pneumonia. The most accomplished speech-language pathology actions were: swallowing functional assessment in 90.63% from the admitted patients guidelines to caregivers and staff and clarification regarding adequate oral hygiene in 100% of the approaches; participation in multidisciplinary visits 100%; change in diet consistency 69.96%; alternative feeding path indication 52.13%. 100% patients at dysphagia risk were identified within 3 h of admission in the emergency no patient developed aspiration pneumonia. Conclusively: identification early aspiration risk was very important because nobody developed pneumonia aspiration need future study.

EPIDEMIOLOGICAL PROFILE OF PATIENTS ATTENDED BY THE SPEECH LANGUAGE PATHOLOGY TEAM AT THE INTENSIVE THERAPY UNIT OF A HOSPITAL IN SÃO LUIS-MA BRAZIL

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Introduction: The performance of the speech-language pathology team in the Intensive Care Unit is important in the prevention of respiratory complications reduction of hospitalization time and life quality of the patients as it allows the patient to return to oral feeding safely and pleasantly.

Objective: The purpose of this study is to outline the epidemiological profile of the patients assisted by the speech-language pathology team at the Intensive Care Unit.

Materials and Methods: Retrospective descriptive study performed at the ICU of a private hospital in São Luís-MA Brazil. The data were collected in the Speech-Language Pathology service database and analyzed with the following variables: medical diagnosis patients at risk of aspiration speech-language diagnostics comorbidities gender age range feeding pathway and speech-language pathology conduct.

Results: A total of 957 patients were admitted to the ICU from November 2016 to May 2017 aged between 18 and 80 years most of whom were elderly (79.5%). 769 (80.3%) presented speech-language pathological demand. The comorbidities found were: infection/sepsis 313 (40.7%) Cardiovascular 190 (24.7%) Neurological 107 (13.9%) Gastrointestinal 90 (11.7%) Respiratory 50 (6.5%) Head/neck cancer septic shock 3 (0.3%) Palliative care autoimmune diseases 2 (0.26%) and others 14 (1.8%). Out of these 80% had some type of dysphagia (mild to severe) 1% aphasia 13% dysarthria. 9.75% used SNE out of

these 5.07% returned to oral feeding; 2.08% performed videodeglutogram. The speech-language pathology conduct adopted for patients at risk of aspiration was: dysphagia management and assessment food consistency change videofluoroscopy alternative feeding route myofunctional articulatory and vocal exercises.

Conclusion: most patients presented risk of aspiration requiring speech-language pathology therapy. Understanding the profile of patients in the ICU is important for the early Risk identification.

DYSPHAGIA IN GRAVES' DISEASE AND HYPERTHYROIDISM: AN EMERGING ROLE FOR SPEECH AND LANGUAGE THERAPISTS

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Introduction: Graves' disease (GD) an autoimmune disorder is one of the main causes of hyperthyroidism. A key feature of GD is an enlarged thyroid (diffuse goitre). Due to the thyroid gland location its increase in size and treatment options including thyroidectomy surgery dysphagia may be a common experience in persons with GD. The role of the Speech and Language Therapist (SLT) remains unclear.

Materials and Methods: A literature review exploring the SLT role in the management of dysphagia in persons with GD was conducted by searching five electronic databases (Embase PubMed Web of Science PsycINFO and Cinahl) for research papers published between 2000 and 2017. MESH terms were supplemented with free-text words. Data relating to GD was examined to determine the existing research and to identify themes and evidence. The search focussed on the adult population and included only papers available in English referencing dysphagia. Articles with comorbid autoimmune disorders were excluded.

Results: 15 studies were identified and included following screening and application of the study criteria. The SLT is absent during the dysphagia assessment process. Emerging trends are the involvement of the patient with GD in the surgery options process and seeking the patients' subjective experience of dysphagia symptoms. The role of the SLT both pre and postoperatively is developing.

Conclusions: Dysphagia appears to be a common symptom in GD. Further research is needed on the role of the SLT in the management of dysphagia in GD.

Keywords: Graves' disease hyperthyroidism goitre thyroidectomy dysphagia post thyroidectomy syndrome.

IMPROVING PATIENT'S AWARENESS OF DYSPHAGIA SYMPTOMS PRE- AND POST- SLP EDUCATION

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Dysphagia affects individuals across the lifespan and is associated with multiple diseases and disorders often leading to aspiration pneumonia and death. It is estimated that up to 90% of all elderly patients have some degree of swallowing impairment. Patient awareness of the presence of dysphagia varies based on educational background cognitive function and underlying comorbidities.

The Eating Assessment Tool (EAT-10) was developed to serve as a patient centered outcome measure. The EAT-10 includes questions regarding physiologic implications of dysphagia as well as emotional social and psychological consequences of dysphagia. An EAT-10 score of 3 or higher is considered to be an indicator of possible

dysphagia and further evaluation by a speech-language pathologist is recommended.

The aim of this study was to determine the prevalence of impaired awareness of dysphagia and to test whether SLP education would change EAT-10 scores in outpatients with oropharyngeal dysphagia referred for a clinical swallow evaluation.

To measure patient's awareness the EAT-10 was administered prior to and post SLP education. Education was provided either post clinical swallow evaluation or in the first session of swallowing therapy. Education included explanation of normal swallowing process disorders of the swallowing mechanism and explanation of results of clinical swallow evaluation.

The sample consisted of 66 patients; 42 female and 24 male. Of the total 48% of them demonstrated an increased EAT-10 score 45% of them had the same EAT-10 score post SLP education on dysphagia. We have shown that some patients with dysphagia appeared to alter their scores by increasing EAT-10 scores possibly due to limited awareness of their symptoms. Dedicated SLP evaluation and education appear to assist with patient's awareness of dysphagia.

THE IMPACT OF SPECIFIC TRAINING IN DYSPHAGIA IN THE CERTIFIED NURSING ASSISTANTS

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Introduction: Certified Nursing Assistants (CNAs) are responsible for feeding residents in healthcare facilities. CNAs however are generally poorly trained in such a task. This poses a major problem since inaccurate practices related for example with positioning might lead to aspiration or inadequate nutritional intake.

This exploratory study aims at assessing the impact of a 45-min conference training session on dysphagia management on a total of nine feeding practices of CNAs.

Materials and Methods: Following baseline assessment of feeding practices (using non-participatory observation) eleven CNAs attended the training session. This session was held by three Speech Therapists and planned in collaboration with health facilities administrators as well as nursing and dietary staff. It focused on dysphagia management including the best practices described in the literature but also addressed some beliefs about feeding institutional factors and residents' characteristics. Also it aimed at addressing some of the CNAs concerns regarding feeding practices and providing solutions to specific feeding problems in certain residents. Changes from baseline in CNAs feeding practices were evaluated following the training session.

Results: Improvements were observed in six out of the nine feeding practices evaluated in this study. No changes were observed for the remaining practices.

Conclusion: Obtained results suggest that training sessions as short as that assessed in this study may be effective in improving some of the feeding practices of CNAs. Further studies are needed to explore whether positive changes can be maintained in time and how to correct resistance to change.

RISK FACTORS OF BRONCHOASPIRATION OF NEUROLOGY INPATIENTS CLINIC IN A TEACHING HOSPITAL

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Introduction: Neurology inpatients clinic have a higher incidence of dysphagia and also increased bronchoaspiration risk. This paper aims to compare risk factors of bronchoaspiration in a neurology inpatient clinic in a teaching hospital considering two periods: with and without a Speech-Language Pathologist (SLP) in the multidisciplinary team.

Materials and Methods: This is a retrospective quantitative and cross-sectional study. Data was based in medical records of 6 months prior to the inclusion of a SLP in a multidisciplinary team and the following 6 months after. We analyzed 175 medical records. Patients without any risks related to oropharyngeal dysphagia and/or hospitalized in other clinics were excluded from the study. Data such as ventilatory support (mechanical ventilation and tracheostomy use) presence of nasogastric feeding tube and clinical events during hospitalization (altered level of consciousness and/or clinical impairment) in these two periods were analyzed using Mann–Whitney and Fisher tests and logistic regression.

Results: In the period before the inclusion of a SLP 10 of 86 patients (13.15%) were diagnosed with bronchoaspiration. Patients presenting clinical events use of nasoenteric feeding tube or ventilatory support had more bronchoaspiration incidents. After the inclusion of a SLP 17 of 89 patients (19.3%) presented bronchoaspiration. Multivariate regression revealed that in the period without SLP clinical events increased the chances of bronchoaspiration. On the other hand in the period with the presence of SLP ventilatory support increased the chances of bronchoaspiration events in neurological patients.

Conclusions: With speech-language pathology management risk factors for bronchoaspiration have been modified. The results suggest that speech-language pathologists can interfere with predictors of bronchoaspiration minimizing risks related to clinical events for neurology inpatients in a teaching hospital.

Table 1. Comparison related to bronchoaspiration in two periods (with and without SLP in the multidisciplinary team).

Risk factors	Bronchoaspiration								
	Without SLP (N=86)			With SLP (N=89)					
	Yes (N=10)		No (N=76)	Yes (N=17)		No (N=72)	p Value		
	Presence	Absence	Presence	Absence	Presence	Absence	Presence	Absence	p Value
Ventilatory support	7 (70.0%)	3 (30.0%)	19 (25.0%)	57 (75.0%)	9 (52.9%)	8 (47.1%)	18 (25.0%)	54 (75.0%)	0.0383*
Nasogastric feeding tube	9 (90.0%)	1 (10.0%)	27 (35.5%)	49 (64.5%)	17 (100.0%)	0 (0.0%)	41 (56.9%)	31 (43.1%)	0.0004*
Clinical events	2 (20.0%)	2 (20.0%)	14 (18.4%)	62 (81.6%)	10 (58.8%)	7 (41.2%)	25 (34.7%)	47 (65.3%)	0.0071

Table 2. Uni and multivariate regression analysis of bronchoaspiration risk factors

Regression	Risk factors	Without SLP			With SLP		
		OR	CI	p value	OR	CI	p value
	Ventilatory support	7.000	1.644-29.804	0.0085*	3.375	1.133-10.054	0.0290*
Univariate	Nasogastric feeding tube	16.33	1.953-135.901	0.0068*	-	-	-
	Clinical events	17.71	3.387-92.647	0.0007*	0.457	0.119 - 1.747	0.2520
	Ventilatory support	-	-	-	3.375	1.133-10.054	0.0290*
Multivariate	Nasogastric feeding tube	-	-	-	-	-	-
	Clinical events	17.71	3.387-92.647	0.0007*	-	-	-

ROLE OF THE SLP IN THE NEUROLOGY INPATIENT CLINIC AT A TEACHING HOSPITAL IN BRAZIL

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Introduction: Oropharyngeal dysphagia increases the patient's hospitalization costs and exposes the patient to pulmonary complications. This study aims to compare the management of dysphagia in the neurology clinic of a teaching hospital in two periods: with and without a Speech-Language Pathologist (SLP) in the multidisciplinary team.

Materials and Methods: This is a retrospective quantitative and longitudinal study. Data was based on medical records of 6 months prior to the inclusion of a SLP in a multidisciplinary team and the following 6 months after. We included inpatients of a neurology clinic that were referred for swallowing screening by the nursing team and medical staff. Data such as age gender diagnosis ventilatory support (mechanical ventilation orotracheal intubation or tracheostomy) comorbidities and clinical events (altered level of consciousness and/or clinical impairment) were collected. The results indicators selected were length of hospital stay time of request for swallowing evaluation time of introduction and withdrawal of the nasogastric feeding tube time of return of oral feeding and bronchoaspiration events. Statistical analysis was performed using the Mann-Whitney-test.

Results: 245 medical records were analyzed. In the period with SLP parameters related to swallowing management were reduced such as "time of introduction of nasogastric feeding tube" (3.50 to 3.01 days) "request time for swallowing assessment" (27 to 10.1 days) "time to introduce oral feeding" (12.67 to 12.38 days) and "withdrawal time of nasogastric feeding tube" (27.11 to 16.6 days). (Table 1).

Table 1. Comparison of clinical indicators and parameters between the periods with and without SLP.

Variables	Periods		p-value
	With SLP (N=89) N(%) Mean (SD) (Min-Max)	Without SLP (N=88) N(%) Mean (SD) (Min-Max)	
Length of hospital stay	23.02 (26.8) (0-157)	17.02 (22.4) (1-150)	0.045*
Time of introduction of nasogastric feeding tube	3.01 (5.44) (0-45)	3.50 (4.91) (1-24)	0.014*
Withdrawal time of nasogastric feeding tube	16.6 (20.69) (1-116)	27.11 (29.04) (4-111)	0.034*
Request time for swallowing assessment	10.10 (17.94) (0-123)	27.00 (46.86) (1-150)	0.073
Time to introduce oral feeding	12.38 (9.23) (1-45)	12.67 (5.66) (8-19)	0.781
Hospital diet			<0.001*
Regular diet	6 (6.81%)	36 (47.3%)	
Soft/Slur diet	6 (6.81%)	0 (0.00%)	
Minced/Moist diet	19 (21.5%)	10 (13.1%)	
Pureed diet	34 (38.6%)	14 (18.4%)	
Enteral diet	23 (26.1%)	16 (21.05%)	
Age	48.62 (16.69) (16-81)	50.5 (17.77) (19-98)	0.507
Gender			0.695
Female	43 (51.7%)	39 (45.2%)	
Male	46 (48.3%)	47 (54.7%)	
Parameters			
Comorbidities	0.52 (0.881) (0-3)	0.90 (1.117) (0-3)	0.020*
Clinical events	1.39 (0.491) (1-2)	1.26 (0.439) (1-2)	0.063
Ventilatory support	1.30 (0.462) (1-2)	1.30 (0.462) (1-2)	0.988
Bronchoaspiration	17 (1.19) (0.395) (1-2)	10 (1.12) (0.322) (1-2)	0.172
Nasogastric feeding tube	1.65 (0.479) (1-2)	1.42 (0.496) (1-2)	0.002*

Subtitle: N = total number; % = percentage; M = mean; SD = standard deviation; Min = Minimum; Max = Maximum; * = < 0.05 significance level.

Conclusions: SLP management contributed to reduce withdrawal time of the nasogastric feeding tube and provided the return of oral feeding. In addition the results show the importance of hiring SLPs in teaching hospitals in Brazil (few number) and established protocols to request earlier the SLP swallowing evaluation and management to prevent bronchoaspiration.

Session 05. Poster session 5G: Dysphagia in Brain and Cervical Damage

SEVERE DYSPHAGIA IN PATIENTS WITH CERVICAL SPINAL CORD INJURY: A RETROSPECTIVE STUDY

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Introduction: Dysphagia following cervical spinal cord injury (CSCI) is a clinically well-recognized association that can increase risk of pneumonia and that can decrease rehabilitative prognosis. The aim of this study is to examine the reason why some patients CSCI need percutaneous endoscopic gastrostomy (PEG) placement for severe dysphagia to identify factors that predict risk for dysphagia and to measure their incidence in the rehabilitation setting following acute spinal cord injury.

Materials and Methods: This is a retrospective study of 27 of 259 patients with acute cervical spinal cord injury hospitalized over 3 years (2015–2017) in Montecatone Rehabilitation Institute. They underwent a PEG placement because of their severe dysphagia. FEES was performed in most cases on patients with suspected swallowing problems following BSE by speech therapists.

Results: General data: In 77% of these cases the age was 60 + and the majority was male. Respiratory data: In 89% of these cases the tracheostomy was present there was artificial respiration in 74% of cases and in 93% the history of aspiration pneumonia was known. Feeding data: after the PEG placement in 55% of cases oral feeding with or without dietary restrictions took place. About spinal cord injury features in 63% of cases there was surgical approach neurologic level of injury was 44% C2–C4 and 44% C5–C7 with 78% ASIA A-B and in 88% the aetiology of injury was traumatic. In 77% there was presence of orthosis.

Conclusions: Swallowing abnormalities are present in a significant percentage of patients presenting to rehabilitation with acute traumatic cervical spinal cord injury. Age and respiratory impairment were identified as significant risk factors for dysphagia for individuals with tetraplegia. In 55% of cases shortly after the nasogastric tube removal oral feeding became possible. Therefore relationship between dysphagia and nasogastric tube presence was found to exist.

CERVICAL SPINE SURGERY AND DYSPHAGIA: CASE REPORTS IMAGING AND REVIEW OF THE LITERATURE

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Introduction: Dysphagia is a frequent but poorly understood post-operative complication of cervical spine surgery (Liu et al. 2017). Aetiology appears multifactorial including neurological structural or respiratory causes. Additional risk factors may include the presence of a tracheotomy tube. There is a paucity of research in this field with a lack of Speech and Language Therapy (SLT) screening tools and

clinical practice recommendations. Given the potential for unrecognized life-threatening dysphagia prompt SLT referral and comprehensive collaborative management is essential.

Methodology: Retrospective analysis of 2 complex cases post anterior–posterior cervical discectomy/corpectomy and fusion.

Results:

1. Dysphagia was characterised by severe pharyngeal phase impairments secondary to suboptimal positioning sensory motor and structural deficits.
2. SLT management included clinical and objective assessments intensive dysphagia rehabilitation and joint working with Ear Nose and Throat Gastroenterology and Allied Health teams.
3. Complications included misplacement of spinal hardware prolonged presence of Miami J collar and recurrent LRTI's requiring manual cough assist suctioning and antibiotic therapy.
4. Full oral intake recommenced 3 months post-surgery in case 1 and 9 months post-surgery in case 2.

Conclusions: Dysphagia diagnostics and management post spinal surgery should have a collaborative individualised focus to promote positive clinical outcomes. However prognostication is challenging in the absence of high quality research. Larger longitudinal studies would be more clinically relevant and may aid in the creation of a practical and reliable universal screen gold standard guidelines and dysphagia outcome measures in this cohort. This may help highlight most at risk patients measure differences in clinical presentations and ultimately improve patient care.

BLUE DYE AS PART OF ASSESSMENT OF SWALLOWING FOR PATIENTS WITH ACQUIRED BRAIN INJURY AND CUFFED TRACHEOSTOMY TUBE: A PILOT STUDY

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Introduction: Blue dye is in the clinic for early neurorehabilitation used on patients with a cuffed tracheostomy tube to assess if the cuff sufficient block the trachea and reduce aspiration of saliva. In connection to treatment of swallowing of saliva using the Facial Oral Tract Therapy cuff pressure is controlled with a manometer. The cuff has often lost pressure which potentially increases the risk of pneumonia. If pneumonia occurs it can prolong the patient's rehabilitation process. The aim of this pilot study was to investigate if blue dye is a reliable way to exam if the inflated cuff sufficiently blocks trachea.

Materials and Methods: A review of the literature regarding blue dye was first performed. Furthermore intervention examining sufficient blocking of trachea by the inflated cuff with blue dye test was performed five times with an hour in between. At the last blue dye a tracheoscopy was added. Seven patients with acquired brain injury and tracheostomy tube where included.

Results: Using blue dye as an assessment tool the literature shows that there is a risk of up to 50% of a false negative result. The pilot study revealed that cuff pressure was low in general. Only 11 out of 34 measures had an acceptable cuff pressure level (22–32 cm H₂O) while 23 measures had a cuff pressure level that was too low (< 22 cm H₂O). One of the cuff measurements was not possible. Tracheoscopy was also negative.

Conclusion: This small pilot study showed that tacheoscopy did not add anything to the blue dye. But if the study was performed on a larger sample size the outcome might have been different. Futhermore

the study showed that the cuff pressure should have been adjusted more frequently. Further research is needed.

DYSPHAGIA EVALUATION AND TREATMENT OUTCOMES IN PATIENTS WITH ACQUIRED BRAIN INJURY (ABI) HOSPITALIZED IN A REHABILITATION CENTER

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Introduction: Dysphagia is prevalent among patients with Acquired Brain Injury (ABI) while outcomes of dysphagia treatments are scarcely studied. The study investigated the outcomes of ABI patients diagnosed with dysphagia during hospitalization in a rehabilitation center.

Methods: A retrospective review of 404 patients admitted to the Head Injury Rehabilitation Department at the Sheba Rehabilitation Hospital during the years 2015–2017.

Results: A total of 339 ENT consultations on 149 patients were performed. Aspiration of saliva was detected in 28% (40/143) and hypoesthesia of the larynx in 35% (48/138) eight patients demonstrated total loss of laryngeal sensation enabling tracheoscopy without a need for local anesthesia.

Fiberoptic Endoscopic Evaluation of Swallowing (FEES) was performed in 127 patients demonstrating aspirations in 43% (55/127) of patients. Silent aspirations amounted to 82% (45/55) of these 76% were suspected to aspirate by a bedside evaluation.

Dysphagia treatment included sensory stimulation bolus modification posture change and maneuvers oral motor exercises modifications in eating and swallowing behavior and by means of a speaking valve in patients with tracheostomy.

Ninety-five percent of patients with tracheostomy (39/41) were successfully decannulated. Eighty-nine percent of 63 patients admitted with tube-dependent feeding (Functional Oral Intake Scale(FOIS) 1–3) returned to full oral feeding while 75% of them showed minimal or no limitations (FOIS 6–7).

The unique treatment needs of specific patient groups will be reported.

Conclusion: Early evaluation of dysphagia by using both FEES and bedside evaluations together with various treatment strategies led to a high rate of decannulation and oral feeding recovery during hospitalization. The high incidence of abnormal laryngeal sensation and silent aspirations highlights the importance of the endoscopic assessment of swallowing in the diagnostic workup of patients with ABI.

THE ASSESSMENT OF THE PEAK OF REFLEX COUGH IN PATIENTS WITH ACQUIRED BRAIN INJURY AND TRACHEOSTOMY

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Introduction: The peak of voluntary cough flow (PCFv) is fundamental for decannulation. Nevertheless the prerequisites for the voluntary cough assessment are: adequate arousal and ability to execute tasks in response to verbal command. These skills are not always preserved in patients with acquired brain injury (ABI). In

recent years the reflex cough test showed positive results in assessing cough and risk of aspiration in patients. Nevertheless there is not defined a standard procedure to evaluate the peak of reflex cough flow (PCFr).

The present study aims to investigate the PCF of the reflex cough in a broad sample of healthy control in order to define normative data and furthermore the presence and the strength of voluntary and reflex cough in patients with ABI with tracheostomy cannula.

Materials and Methods: Healthy controls and patients were recruited from July 2015 to August 2016. All underwent respiratory assessment consisting on: the Tidal Volume Forced Vital Capacity PCFv and PCFr. The PCFr was performed using a spirometer connected with nebulizer by a bidirectional valve. Clinical and instrumental swallowing assessment using FEES was carried out only in the patient groups.

Results and Conclusion: It has been recruited a total of 147 participants including the healthy subjects (no. 105) and patients (no. 42). The PCFr of healthy controls (160.97 ± 80.97 l/min) was significant lower of the PCFv (361.6 ± 84.35 L/min) ($p < 0.01$). The PCFv was not assessed in 26 (60.5%) patients due to severe cognitive deficit. The PCFr (155.31 ± 74.65 l/min) was completed in all patients no significant difference was found with health group. Nevertheless the PCFr correlated positively with presence of dysphagia (FOIS $p < 0.01$ and PAS $p = 0.03$). This study for the first time investigates the PCFr in a large sample of healthy subjects and in patients with ABI and tracheostomy cannula revealing importance of assessing PCFr in patients with ABI.

ORAL CARE PRACTICES FOR DYSPHAGIC PATIENTS WITH BRAIN INJURY: A SURVEY AMONG HEALTH-CARE PROFESSIONALS IN NEURO-REHABILITATION SETTINGS

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Background: To encourage the provision of effective oral care clinical oral health guidelines and their timely modifications has been recommended for hospitalized patients in various countries including Denmark. However the adherence to the oral health guidelines is reported to be low.

Aim: of this survey was to explore the current-status of type and frequency of oral care practices in neuro-rehabilitation settings. In addition the survey also aimed to explore the attitudes beliefs and level of knowledge and training of health-care professionals responsible for oral-care.

Methods: A cross-sectional web-based survey consisting of 71-items was designed and developed. This web-based questionnaire was then circulated among 260 health-care professionals responsible for oral-care in a neuro-rehabilitation setting.

Results: 62% ($n = 162$) professionals with 17 years (median) of work experience responded to the survey. 80% ($n = 129$) of the respondents had experience of providing oral-care in dysphagic patients. The methods (toothbrush/es; toothpaste/s; foam swab; mouthwash/es; moisturizer etc.) and frequency (once/twice/thrice each shift etc.) of oral-care practices in dysphagic patients (87–92%) were low compared to the non-dysphagic patients (78–80%). The majority of the respondents indicated that oral health: has impact on general health (84%); can cause pneumonia (81%). On the other hand they thought oral health doesn't improve no matter what they did (83%); cleaning the oral cavity was an unpleasant task (32%) and there were other important tasks to be taken care of rather than oral health (58%).

Conclusion: Our recent survey suggests that oral care is an essential component of patient care. However it has not been the prime focus due to various barriers such as unfocused policies lack of training low priority given to oral care and the perception that oral care does not provide significant benefits.

EARLY FUNCTIONAL ABILITIES AT ADMISSION AND DECANNULATION FROM TRACHEOSTOMY TUBE IN PATIENTS WITH SEVERE ACQUIRED BRAIN INJURY

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Introduction: Fast and safe decannulation from tracheostomy tube is an important rehabilitation goal for patients with severe acquired brain injury (sABI). Few studies have documented functional abilities in patients with sABI and tracheostomy tube due to severe dysphagia or respiratory dysfunctions. The aim of this study was to investigate if early functional abilities measured by the Early Functional Abilities scale (EFA) at admission to early neurorehabilitation can predict decannulation from tracheostomy tube. Further to investigate change in function from admission to discharge and to identify characteristics of patients who cannot be decannulated.

Materials and Methods: In this retrospective study 243 tracheostomy patients were included from previously collected data on patients with sABI admitted to a multidisciplinary specialized ICU rehabilitation unit from 2011 to 2016. Relationship between EFA and decannulation was analyzed with logistic regression models. Changes in function from admission to discharge were assessed with EFA Functional Independence Measure (FIM) Rancho Los Amigos Scale (RLAS) and Functional Oral Intake Scale (FOIS). Other variables analyzed were sex age type of brain injury BMI previous injury need of mechanical ventilation at admission period on mechanical ventilation time from injury to admission and length of stay.

Preliminary Results: Median change in EFA FIM and RLAS showed functional improvement during neurorehabilitation for patients decannulated and patients discharged with a tube. Patients who were decannulated made significantly more progress compared with patients not decannulated. No median change was seen in FOIS for non-decannulated patients. Results from regression model are pending.

Discussion: It is expected that the results will be able to provide clinicians with a better understanding of which patients may and may not be decannulated during neurorehabilitation in order to direct resources more appropriately.

SWALLOWING IMPROVEMENT IN VEGETATIVE OR PAUCI RELATIONSHIP STATE PATIENTS : OLFACTORY AND GUSTATORY STIMULATION IMPLICATIONS

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Introduction: Severe brain traumatism patients in vegetative or minimal consciousness state (MCS) have frequently a non oral alim-entation because of swallowing disorders. In this case they also

cannot have swallowing reeducation which is based on an active participation and the ability to understand orders even if oral alimentation is the beginning of relationships. In this study we tested the hypothesis that olfactory and gustatory stimulations could influence swallowing in MCS patients.

Methods: 16 patients in MCS have followed a stimulation protocol during 21 weeks. A cross-over has been established in order to formed a control group. This protocol started with a first clinical swallowing assessment. During the nine first weeks the first randomized group was stimulated (taste and olfaction: fruits chocolate the vanilla mint) while the second one was not. After the second swallowing assessment the two groups were switched and evaluated a third time at the end of the second group stimulation.

Results: At the end of the stimulation protocol abilities necessary to swallow were increased: the number of salivary at rest swallowing the meal time for patients with oral nutrition and the lingual and pharynx mobility. Lingual mobility improved for 12 patients pharyngeal mobility in 12 and number of swallows increased in 10. The length of the meal did not changed in the four patients having an oral intake. There was no correlation between the Wessex Head Injury Matrix scale (scale of consciousness) and the improvement of swallowing.

Conclusion: Swallowing improvement are hopeful in MCS patients because it is an open window on external stimulations. It could combine taste and olfactory stimulation which are important for this kind of patients often deprived of eating pleasure since a long time.

Session 05. Poster session 5H: Dysphagia and Respiratory Diseases

BUILDING AN SLT SPECIALITY SERVICE IN RESPIRATORY CARE: THE IMPLEMENTATION OF THE RCLT ADULT RESPIRATORY CARE POSITION PAPER INTO PRACTICE

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Introduction: SLTs play a vital role in the management of patients with respiratory conditions in the acute care setting and have key skills in understanding the inter-relationship between dysphagia and respiratory conditions. The RCLT position paper has provided the acute care SLT with a diagnostic framework to facilitate specialist subtyping of respiratory dysphagia conditions allowing for improved understanding of the pathophysiology of same thus enabling treatment advances.

Materials and Methods

1 Literature review across SLT and respiratory dysphagia completed and implementation of key references namely RCLT position paper (2015) and GOLD guidelines (2017) alongside attendance at pulmonary rehab study day enabled SLT to build case for specialist role in respiratory care.

2 Met with respiratory team and presented on advances in SLT role and from profiling role became a facilitator in the COPD Pulmonary Rehab Program.

3 Joint working with respiratory physiotherapy to advance SLT knowledge of oxygen delivery options from non invasive ventilation (NIV) to Airvo high flow and low flow options and impact on SLT management.

4 Implementation of 3 core respiratory dysphagia subtypes into our diagnosis of acute care patients- primary respiratory dysphagia respiratory component dysphagia and laryngeal sensitivity dysphagia enabling appropriate management of same profiling of our role within this specialist area and building SLT expertise for e.g. use of strategies often of more benefit than fluid modification in this clinical cohort.

5 Close working links built with health promotion (namely smoking cessation) Ear Nose and Throat (ENT) Respiratory and Gastroenterology.

Results: Core member of respiratory MDT with specialist dysphagia and respiratory knowledge. Use of dysphagia subtyping advancing our knowledge of pathophysiology of dysphagia in these patients. Dysphagia subtypes will be illustrated by case studies within the presentation.

EFFECTS OF MANUAL THERAPY ON HYOID DISPLACEMENT AND PHARYNGEAL TRANSIT TIME IN COPD

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Introduction: Several aspects of swallowing have been reported to be abnormal in people with COPD including decreased displacement of the hyoid and longer pharyngeal transit time (PTT). There is a paucity of literature on the effectiveness of treatment strategies to manage swallowing impairment in COPD.

Objective: Our goal was to investigate the effects of manual therapy (MT consisting of stretching and contraction-relaxation exercises for the accessory respiratory muscles and diaphragm liberation) on hyoid displacement and PTT in COPD.

Methods: 18 COPD patients with a mean age of 66.06 ± 8.86 years (11 men) and a mean 1-second forced expiratory volume of 40.28% ± 16.73% were evaluated before and after a 12-session course of MT. Swallowing measures were collected using pre- and post-treatment videofluoroscopy with thin liquid and paste consistency barium. PTT was defined as the time between opening of the glossopalatal junction and closure of the upper esophageal sphincter in seconds (s). Hyoid displacement was expressed in degrees (°) relative to a line running along the maxilla from the mastoid to the alveolar process. To compare pre- and post-treatment measures a Wilcoxon rank sum test was applied.

Results: A significant decrease ($p = 0.03$) in median pharyngeal transit time from 0.8 s (interquartile range IQR 0.5–1.6 s) to 0.6 s (IQR 0.3–0.9 s) was found on paste consistency post treatment. Similarly an increase in hyoid displacement ($p = 0.02$) from 8° (IQR 7°–13°) to 11.5° (IQR 8°–14.5°) was seen on paste consistency post treatment. No differences were found on thin liquid swallows.

Conclusion: The manual therapy program reduced pharyngeal transit time and increased hyoid displacement with paste consistency boluses in patients with COPD.

POSITIVE AIRWAY PRESSURE AS A FACILITATOR IN THE DECANNULATION PROCESS IN A PATIENT WITH OBESITY AND HIPOVENTILATION SYNDROME: A CASE REPORT

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Introduction: Obesity affects respiratory function and can lead to chronic hypoventilation. The health consequences related to Obesity and Hypoventilation Syndrome (SOH) are significant and often the early diagnosis and establishment of appropriate therapy are performed late. Clinical findings frequently observed are a neck with a larger diameter and a decrease in the upper airway (VAS) which may result in ventilatory support and ultimately in tracheostomy in order to reverse the obstruction at the level of the VAS.

Description: 69-year-old woman admitted to the hospital with respiratory failure and severe respiratory acidosis (pH 7.04 and PCO₂ 106) and need for invasive mechanical ventilation GCS-6 and Severe Oropharyngeal Dysphagia (FOIS 1 DOSS 1) with nasogastric tube. Difficult ventilatory weaning with two failed extubation attempts tracheostomy was performed. During the weaning and decannulation we used a Passy Muir unidirectional cannula with daytime occlusion tolerance of the fenestrated inner cannula. Due to the difficulty in tolerating nocturnal occlusion of the during sleep several studies of respiratory function were performed where the decision was made to start nocturnal CPAP by nasal mask with a pressure of 8 cm H₂O and occluded fenestrated cannula with cap. Good tolerance was observed with adhesion of 9:20 min and an AHI of 2.6. After 3 days the patient was successfully decannulated. Several FEES were performed with definition of a rehabilitation program for safe and effective swallowing with good improvement (FOIS 6 DOSS 6).

Conclusion: After discharge from hospital the patient maintains night-time CPAP with a pressure of 8 cm H₂O and adherence of 100% nights more than 4 h. The intervention of an interdisciplinary team was fundamental to the success of the decannulation process centered on the rehabilitation of sensory-motor functions.

OROPHARYNGEAL DYSPHAGIA IN PATIENTS UNDERGOING (CHEMO) RADIOTHERAPY FOR LUNG CANCER: A PROSPECTIVE STUDY

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Introduction: Lung cancer is the fourth most common cancer in Ireland. While oropharyngeal dysphagia (OPD) is a recognised sequela of chronic respiratory disorders there is a paucity of data investigating the prevalence of OPD in the lung cancer population. Surgery with curative intent is the treatment of choice in early disease. Late diagnosis with poor performance status at the time of diagnosis is common. This study aimed to identify the prevalence of OPD and its characteristics in patients (pts) undergoing (chemo) radiotherapy (CRT) for lung cancer.

Materials and Methods: Swallow screening referrals of pts undergoing CRT for lung cancer were made to speech and language therapy (SLT) January-July 2017. Six parameters were included: case history oromotor assessment 100 ml water swallow test (WST); Eating Assessment Tool (EAT-10) and MD- Andersen Dysphagia Inventory and Food Trials. Pts requiring instrumental assessment were identified. Outcome measures were: introduction of specific safe swallow guidelines (SSGs); Functional Oral Intake Scale (FOIS) Penetration Aspiration Scale (PAS) and Eisenhuber Residue Scale; referral to primary and continuing care (PCCC). Data was analysed using Descriptive Analysis.

Results: 60 pts completed at least 5 parameters of the swallow screening protocol. 35 pts (58%) required introduction of new SSGs; 10 pts required instrumental assessment (16.7%) and 7 (11.75) completed same. Of these 4 pts (57.1%) had PAS scores ≥ 3 . 7 pts (100%) had oropharyngeal residue. 30 pts (50%) had a FOIS score ≤ 6 . 9 pts (15%) required referral to PCCC.

Conclusions: To the authors' knowledge this prospective study is the first to examine the prevalence of OPD and its characteristics in patients with lung cancer undergoing CRT. Further research is indicated to identify the impact of OPD on pt QOL and on pt ability to complete cancer treatment.

THE EFFECTS OF THE CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) TREATMENT ON THE SWALLOWING FUNCTION IN PATIENTS WITH MODERATE AND SEVERE OBSTRUCTIVE SLEEP APNEA SYNDROME

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Introduction: Obstructive sleep apnea syndrome (OSAS) causes morphologic changes in neural structures of the pharyngeal tissue due to repetitive vibration and micro trauma formed by apnea attacks in patients and leads to disturbances in neural regulation (12). As a result of this pathophysiological condition loss of function and sensitivity occurs in the pharyngeal tissue. The pharyngeal residue early spillage and delayed triggering of swallowing reflex which can also be seen subclinically in OSAS patients increases the risk of tracheal aspiration and laryngeal penetration (34). The purpose of our study is to investigate the effects of continue positive airway pressure (CPAP) treatment on swallowing dysfunction.

Materials and Methods: This study was carried out at the Ege University between August 2016 and December 2017. Forty-four patients who diagnosed with moderate to severe OSAS after polysomnography evaluation were performed fiberoptic evaluation of swallowing test (FEES). 25 patients were detected to have swallowing dysfunction and they were included in this study. Sixteen of these 25 patients completed the study.

Results: There was no statistically significant relationship between severity of OSAS and swallowing dysfunction ($p > 0.05$). Statistically significant improvements were observed in pre-treatment and post-treatment swallow tests with semi-solid yoghurt in terms of presence of vallecula residues in patients ($p < 0.05$). Statistically significant improvements were observed in pre-treatment and post-treatment swallow tests with semi-solid yoghurt in terms of severity of vallecula residues in patients ($p < 0.05$). There was a statistically significant difference between smoking and the groups with or without swallowing dysfunction ($p < 0.05$). All results were shown in Tables 1 and 2.

Conclusion: In our study swallowing dysfunction was detected in OSAS patients and significant improvement was observed the residual accumulation and residual severity after CPAP treatment.

	Swallowing Dysfunction		p values
	Yes (N=25)(%66,8)	No (N=19)(%43,2)	
SYMPTOMS			
Xerostomia Yes / No	14 (%56) / 11 (%44)	10 (%52,6) / 9 (%47,4)	0,824
Cough Yes / No	5 (%20) / 20 (%80)	1 (%5,3) / 18 (%94,7)	0,213
EAT-10 SCORES			
Eat-10 Test ² 3 Yes / No	2 (%8) / 23 (%92)	3 (%15,8) / 16 (%84,2)	0,638
POLYSOMNOGRAPHY FINDINGS			
Hypopnea Yes / No	14 (%56) / 11 (%44)	10 (%52,6) / 9 (%47,4)	0,356
Apnea Yes / No	22 (%88) / 3 (%12)	16 (%84,2) / 3 (%15,8)	0,999
Excessive Daytime Sleepiness Yes / No	14 (%56) / 11 (%44)	11 (%57,9) / 8 (%42,1)	0,900
Mean Epworth scores	10,92 ± 5,33	9,74 ± 5,18	0,465
Mean Saturation O ₂	96,20 ± 1,53	96,78 ± 1,06	0,169
Min-O ₂ saturation	80,28 ± 8,19	81,72 ± 11,47	0,633
REM (%)	11,74 ± 6,78	12,67 ± 6,55	0,652
NREM-1 (%)	4,13 ± 2,54	4,06 ± 2,22	0,922
NREM-2 (%)	60,24 ± 15,10	64,03 ± 11,97	0,375
NREM-3 (%)	23,89 ± 13,75	19,26 ± 9,60	0,218

Table 1: Comparison of two groups according to symptoms, EAT-10 scores and polysomnography findings.

symptom can be related to the alterations in the pharyngeal muscular biomechanics. Among the technics discussed about rehabilitation of the hyolaryngeal biomechanics it stands out the application of respiratory spirometry to flow. These are devices that help in the pulmonary re-expansion improvements in the work and mechanic of ventilation besides influence in a positive way in the respiratory muscles strengthening. In this scenario it stands out the Respirom®. The objective of this research is to verify the effects of the muscular respiratory training in the biomechanics of swallowing and variables of the respiratory function in COPD subjects.

Materials and Methods: The respiratory muscle training (RMT) was performed at domicile for five weeks performing an inspiratory training using Respirom® and other expiratory using the device reversed doing three sets of ten repetitions daily. The biomechanics of swallowing was evaluated by Videofluoroscopy swallowing study using temporal variables (pharyngeal transition time) and visual-perceptual (number of deglutition residues in piriform sinus and valleculae penetration/aspiration). For statistical analysis it was used the Shapiro–Wilk test Chi square Student t test and association with the Pearson test.

Results: 4 patients were evaluated with an average age of 74.75 ± 8.9 years. There was a eduction of the pharyngeal transit time with a strong negative relation with the maximal expiratory pressure (MEP) after RMT. It was found also a strong and significant relationship in the correlation between the respiratory variables MEP and %FEV1.

Conclusions: The RMT influenced in the biomechanics of swallowing mainly in reducing the pharyngeal transit time and in the increase of FEV1 due to the improvement of the MEP.

Session 05. Poster session 5 J: Dysphagia in Critical Care 1: Tracheostomy

COMPARISON OF DYSPHAGIA-RELATED TRACHEOSTOMY MANAGEMENT BY DUTCH SLTS IN HOSPITALS REHABILITATION CENTERS AND NURSING HOMES

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Introduction: In hospitals speech-language therapist (SLT) are involved in tracheostomized patients on intensive care units (ICUs) and when decannulation during hospital stay is not possible (yet) management continues in a rehabilitation center (RC) or nursing home (NH). Courses for this advanced care are provided but little is known about SLT treatment across settings. Thus we conducted a study to compare dysphagia-related tracheostomy management between SLTs in ICUs, RHs and NHs.

Methods: Questionnaires were sent to SLTs of 92 Dutch hospitals 16 RCs across the country and 29 NHs near cities with large hospitals. Questions focused on dysphagia management and involvement in decannulation with answering options from 1 (never) to 5 (always).

Results: SLTs of 62 ICUs 12 RCs and 11 NHs completed the questionnaire. In all settings swallowing therapy is usually to always done with a deflated cuff (ICU 90%; RC 100%; NH 73%) and using a speaking valve (ICU 63%; RC 64%; NH 64%). SLTs usually to always use ‘effortful swallow’ (ICU 84%; RC 91%; NH 64%) or ‘swallow-cough-swallow’ technique (ICU 60%; RC 91%; NH 45%) but few SLTs use any form of suctioning (ICU 11%; RC 18%; NH 18%). Differences are found in decannulation involvement: SLTs in RCs are significantly more involved in (steps to) decannulation: see Table.

	Swallowing Dysfunction (n=16)		p values
	Pretreatment	Posttreatment	
Residue in Retrocricoid area n(%)			
10 ml water	1(%6,2)	1(%6,2)	-
Yogurt	2(%12,5)	1(%6,2)	-
Cracker	0	0	-
Residue in Valleculae n(%)			
10 ml water	1(%6,2)	0	
Yogurt	11(%68,8)	4(%25)	0,016*
Cracker	4(%25)	2(%12,5)	0,688
Residue in Pharyngeal wall n(%)			
10 ml water	0	0	
Yogurt	4(%25)	1(%6,2)	0,250
Cracker	1(%6,2)	0	
Penetration (all foods) n(%)			
	0	0	
Aspiration (all foods) n(%)			
	0	0	

Table 2: Comparison of pretreatment and posttreatment FEES findings of moderate and severe OSAS patients with swallowing dysfunction.

EFFECTS OF RESPIRATORY TRAINING ON SWALLOWING IN COPD PATIENTS

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is characterized by a chronic obstruction in the airflow. In regards of the comorbidity associated to COPD it can be pointed out dysphagia. This

Role SLT in:	ICU	RC	NH	p
Decannulation overall	2 (1-4)	5 (1-5)	2 (1-5)	0.012
Tube downsizing	2 (1-5)	4 (1-5)	1 (1-2)	0.006
Cuff deflation trials	2 (1-5)	5 (1-5)	1 (1-5)	0.032
Use of a speaking valve	2 (1-5)	5 (1-5)	4 (1-5)	0.029
Corking trials	2 (1-5)	4 (1-5)	1 (1-4)	0.002
Use of fenestrated tubes	2 (1-5)	2 (1-5)	1 (1-4)	0.062

Conclusion: Dysphagia-related management of tracheostomized patients by SLTs is largely similar across ICUs RCs and NHs suggesting adequate continuation of care. However their involvement in decannulation is higher in the RCs which seems plausible because patients in RCs are closer to full recovery and SLTs in RCs may have more the specialist’s role than on ICUs.

FUNCTIONAL EVOLUTION OF ORAL INTAKE IN TRACHEOSTOMIZED INDIVIDUALS WITH DYSPHAGIA

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Introduction: The impact of tracheostomy on swallowing has been studied however research is needed to characterize the process of oral intake in patients with oropharyngeal dysphagia. This research aimed to characterize the functional evolution of oral intake in tracheostomized individuals with neurogenic oropharyngeal dysphagia.

Materials and Methods: Retrospective cross-sectional study. Data collection was performed through records reviews. Twenty tracheostomized subjects of both genders mean age 59.1 (± 20.4) years with neurological diagnosis confirmed by clinical and/or neuroimaging examinations. All subjects underwent clinical evaluation of swallowing and were graded on the American Speech-Language-Hearing Association’s National Outcome Measurement System (ASHA NOMS). After evaluation all subjects underwent dysphagia rehabilitation with Passy–muir valve.

Results: A mean number of hospital stay was 67.5 days (± 40.6). At the start of hospitalization all subjects (n = 20) had ASHA NOMS in 1 (n = 14) or 2 levels (n = 6). The mean number of days to reach level 3 in ASHA NOMS scale was 23.57 (± 12.51). Regarding the functional evolution of oral intake n = 11 evolved with exclusive oral diet and n = 9 remained with feeding tube. About this subjects with feeding tube n = 6 did not reach ASHA NOMS level 3 and n = 2 remained at level 4. At the end of hospitalization n = 11 had ASHA NOMS ≥ 5.

Conclusions: Tracheostomized individuals with neurogenic dysphagia have long periods of hospitalization. The rehabilitation of dysphagia presents in the long term being possible to introduce oral diet but a part of the individuals maintains oral and alternative method of feeding and others with just an exclusive alternative method of feeding.

PREVALENCE PATHOPHYSIOLOGY AND TREATMENT OF DYSPHAGIA IN CARDIAC SURGICAL INTENSIVE CARE PATIENTS FOLLOWING TRACHEOSTOMY AND/OR PROLONGED INTUBATION: A CASE SERIES

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Introduction: The prevalence of dysphagia in patients who require intubation and ventilation after cardiac surgery is reported at 51–67%. The relationship to duration of intubation and ventilation is unclear. **Aims:** 1. To gather prospective data on the presence severity and recovery of dysphagia according to duration of intubation and ventilation. 2. To explore pathophysiology of swallowing using fiberoptic endoscopic evaluation of swallowing (FEES) 3. To describe physiologically based treatment approaches.

Methods: Thirty-five extubated and five tracheostomised patients were grouped according to duration of intubation. All patients received clinical assessments by speech and language therapy (SLT). Functional Oral Intake Scale scores were recorded at initial (mean 10 h after extubation) and final assessment. FEES were undertaken in 10 patients (5 tracheostomised; 5 extubated) within 72 h of initial assessment. A trained therapy assistant delivered SLT prescribed tailored protocols of swallow strengthening exercises in intensive care. Four treatments per week scheduled to last 45 min each were provided.

Results: Overall prevalence of dysphagia was 45%. Prevalence and recovery time increased with longer intubation times (see table). SLT recommended nil by mouth for two-thirds of these patients. In the sub-group of patients who underwent FEES this revealed 80% delayed onset of pharyngeal swallow; 100% food/fluid residue in pharynx; 70% unprotective cough; 50% silent aspiration on thin fluids and 60% laryngeal pathology (confirmed by ENT). Treatment sessions were frequently truncated due to patient fatigue and lasted on average 20 min.

Conclusion: This study has demonstrated the high prevalence of dysphagia particularly associated with prolonged intubation and ventilation after cardiac surgery. Further work is planned to develop and test an ICU swallowing intervention to improve patient outcomes following prolonged intubation in this setting.

	Group 1	Group 2	Group 3	Group 4	Group 5
Intubation length	< 12 hours	12-48 hours	48-120 hours	5-10 days	10-22 days
No of patients	5	13	7	7	8
Tracheostomy	0	0	0	0	5
Dysphagia incidence	0%	9%(1)	43% (3)	80% (6)	100% (8)
FOIS range	7	05-Jul	01-Jul	01-Jul	01-May
1st FOIS median	7	7	6	3	1
2nd FOIS median	7	7	7	7	5
Average no of SLT sessions	1	1.6	2.8	6	12
Average length of ICU stay (days)	2	8	3.6	15	31
Discharge status	usual residence	usual residence	2= hospital transfer	3= hospital transfer	4 = hospital transfer
SLT follow up after hospital discharge	0	0	1	2	4

SPEECH AND LANGUAGE THERAPY IN HEART AND LUNG TRANSPLANT: THREE YEAR REVIEW

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Background: There is increasing recognition in the literature regarding the effects of oropharyngeal dysphagia in patient's post lung transplant (LT) with two-thirds of LT recipients demonstrating penetration or aspiration on instrumental assessment. No studies were found documenting the prevalence of oropharyngeal dysphagia post heart transplant (HT). Transplant recipients are immunosuppressed and avoidance of aspiration in the acute post-operative phase is imperative. This review sought to analyse referral rates to SLT at The Mater Misericordiae University Hospital for patient's post HLT following implementation of the first dedicated SLT post in HLT in Ireland and to determine the prevalence of oropharyngeal dysphagia in this cohort.

Methods: Retrospective audit was completed to analyse 3 years of clinical data for all patients referred for SLT assessment post HLT between January 2015 and December 2017. Referral rates demographic data risk factors for dysphagia intra-operative complications results of dysphagia assessment and presence of penetration and aspiration on instrumental assessment were compiled and analysed.

Results: 45 Heart 104 Lung and 3 Heart Lung Transplants were performed in Ireland between April 2015 and December 2017. 51% of LT recipients 24% of HT recipients and 100% of HLT recipients were referred to SLT. 55% of patients referred underwent instrumental assessment. Penetration/aspiration was detected on instrumental assessment in 75% of HT, 83% of LT and 100% of HLT.

Conclusion: Oropharyngeal dysphagia is prevalent in HLT recipients. Silent penetration and/or aspiration was detected in 75% of HT and 83% of LT recipients on instrumental assessment. Development of a protocol for evaluation of swallow function including routine use of instrumental assessment is beneficial in ensuring timely and accurate swallow evaluation and reducing dysphagia related complications in the post-operative period.

INTENSIVE CARE UNIT AND WARD LENGTH OF STAY REDUCTION FOLLOWING SLT-LED CHANGES TO TRACHEOSTOMY MANAGEMENT IN A CARDIAC INTENSIVE CARE UNIT

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Introduction: Following cardiac surgery mortality rates reach up to 57% while when pneumonia is present mortality risk increases by 8.53. Approximately 50–83% of tracheostomised patients present with aspiration resulting in serious consequences. In the UK many Intensive Care Units (ICUs) do not have dedicated specialist speech and language therapy (SLT) input to assess and manage dysphagia resulting in patients commencing with oral intake with the cuff inflated increasing the risk of aspiration while lack of airflow through the larynx increases the risk of silent aspiration. Fiberoptic Endoscopic Evaluation of Swallowing (FEES) can be used in ICU to assess swallowing and detect silent aspiration. This quality improvement project evaluated the outcomes of introducing an SLT-led change-in-practice for tracheostomised patients in a cardiac ICU.

Materials and Methods: The SLT-led change-in-practice entailed: all tracheostomised patients being assessed by SLT and patients only

eating and drinking with the cuff inflated if found to be safe on FEES. Baseline data was collected for all tracheostomised patients in the 11 months prior to the change in practice. Data was also collected for the following 10 months and analysed using run charts.

Results: ICU length of stay (LoS) was reduced by an average of 7.5 days (Fig. 1). Ward LoS was reduced by an average of 13 days (Fig. 2). This equates to cost savings of £260,160 and £90,688 respectively for the 10 months (ICU bed day £1084; ward bed day £218). The number of chest X-rays on ICU to review chest status was reduced by an average of 2.5 per patient. Total mortality for hospital stay and 6-month post-discharge was reduced by 39.1% ($p < 0.29$).

Conclusions: This quality improvement project demonstrates the benefit of SLT input in tracheostomised patients in cardiac ICU. SLT input is vital to identify and prevent silent aspiration which leads to reduction in pneumonia rates LoS and the potential for significant cost savings.

Figure 1 – Run chart for intensive care unit length of stay

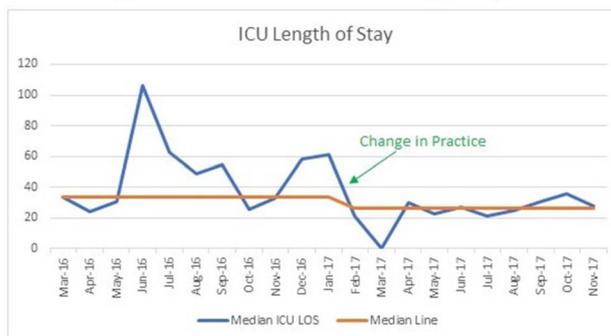


Figure 2 – Run chart for ward length of stay



SPEECH LANGUAGE PATHOLOGY DEANNULATION PROTOCOL FOR CHRONIC-CRITICAL PATIENTS

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¹CIAREC

Introduction: The aim of this work was to evaluate the effectiveness of a speech-language pathology decannulation protocol which contemplates the habilitation and rehabilitation of the upper airway and the swallowing function. The rehabilitation centers of sub-acute

patients have been witnesses of a change in the epidemiological profiles with a marked prevalence of chronic- critical patients suffering multisystemic conditions tracheostomy and dysphagia. Preexistent decannulation protocols which were surveyed as part of this study do not contemplate -in their majority- the complexity and functional alteration of swallowing system as a part of the protocol itself. The permanence of tracheal cannula with insufflated cuff will generate a swallowing deficit due to isolation of the upper airway and swallowing structures. This includes muscular weakness decrease of hyolaryngeal excursion incompetence of protective reflexes of the airway weakness of vocal muscles pharyngo- laryngeal and oral desensitization and Impossibility of verbal communication with its consequent functional deprivation.

The SPL protocol includes five stages of treatment that contemplate in each one: sensitivity muscular capacity to mobilize secretions phonation reflexes pressures hyolaryngeal excursion cough swallowing sphincters. Each stage is evaluated with MECV_V blue dye test and cervical auscultation.

Materials and Methods: An experimental prospective study was conducted with two groups of patients the first a “control group” with standard protocol the second with the SPL protocol. A total of 220 patients were included which were chronic and critical patients from the CIAREC.

Conclusions: The use of the SPL protocol shows an increase of the decannulation success rate (79% vs 66% new and standard protocol respectively). Furthermore a decrease is observed in the duration of enteral feeding and -as an indirect effect- in the hospitalization duration.

The image shows a complex clinical assessment form titled 'CIAREC SPL ASSESSMENT'. It is divided into several sections: 'COGNITIVE STATE', 'COORDINATION', 'SPEECH', and 'VOICE'. Each section contains multiple sub-sections with checkboxes and text boxes for recording clinical observations and test results. The form is designed for systematic evaluation of a patient's swallowing and cognitive abilities.

PREDICTORS AND OUTCOMES OF POST-EXTUBATION DYSPHAGIA

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Introduction: Oral endotracheal intubation (ETT) is a high-risk procedure resulting in impaired airway protection and dysphagia. A retrospective study was conducted on the sensitivity of a newly devised post-extubation screen.

The nurse-led screen was designed to identify those at highest clinical risk of dysphagia including risk factors for aspiration pneumonia plus clinical indicators for post-extubation dysphagia.

Methods: The screen was launched alongside nurse training to raise red flags about post-extubation dysphagia and aspiration risk. Nurses

were encouraged to use the screen in clinical decision-making to inform referral to SALT. An audit was carried out on a sample of 8 completed screens and case notes. The audit included analysis of intubation records for all critically ill adults in 2017 to investigate impact of prolonged or multiple intubations on patient outcomes.

Results: Analysis reveals that the greatest number of predictors correlated with the most severe dysphagia (TOMS and EKOS scores of 0 or 1). All those with Grade 2 + intubation presented with severe and enduring dysphagia reflected in NBM status 2 weeks post assessment. Of 295 patients who underwent ETT multiple intubations were associated with a 30% higher mortality rate. Survival for those intubated for > 15 days was significantly reduced accounting for 26% of total deaths.

Conclusions: Prolonged and multiple intubations are highly predictive of poor clinical outcomes. The more risk factors post-extubation the greater the influence on severity and recovery of dysphagia. Our findings reflect the complexities of this vulnerable cohort echoing research about dysphagia severity and clinical indicators. Screening of post extubation risk factors may lead to more sensitive timely identification of patients requiring SALT intervention.

EARLY SPEECH AND LANGUAGE THERAPY (SLT) INTERVENTION IN CRITICAL CARE : A CASE STUDY OF SEVERE DYSPHAGIA IN GUILLAIN-BARRE SYNDROME

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Introduction: Dysphagia occurs in 80% of patients with GBS and often simultaneously occurs with a decrease in respiratory function and increased morbidity and mortality rates (3, 4, 5, 6). This case study will highlight the relationship between dysphagia and ventilator/tracheostomy weaning over a prolonged intensive care unit (ICU) stay of 100 days.

Case Presentation: Mr. X (a 29 year old) male was admitted to ICU with respiratory failure secondary to GBS. He had two courses of intravenous immunoglobulin (IVIG). He had a percutaneous tracheostomy inserted due to worsening bulbar and respiratory function. He required a tracheostomy for 97 days and was seen by SLT day 2 of his admission to ICU. Initially he was unsuitable to commence cuff deflation trials due to aphagia with subsequent excessive secretions. SLT commenced an early specific treatment plan focused on assisted facial and oromotor stimulation to maintain function. With improvement observed on cranial nerve exam Mr X began therapy led cuff deflation trials with a swallow stimulation programme. Mr X had 3 FEES assessments which directed a tailored treatment plan resulting in an early secretion management plan swallow simulation oral pharyngeal strengthening programme and swallow practise with a functional bolus.

Outcomes: Figure 1 outlines 3 different time points in his recovery and the changes in 5 dysphagia and respiratory parameters. Qualitative feedback was collected from Mr X directly and his family related to their experience of dysphagia on ICU. Mr X commenced oral trials day 54 with a tracheostomy in situ and while still receiving mechanical ventilation. He returned to full oral intake day 90.

Conclusion: This case study supports early SLT intervention on ICU. A proactive SLT approach facilitated early diagnosis of a dysphagia and informed a specific treatment plan. This input is valuable in working with the MDT influencing tracheostomy weaning and return to oral intake.

Days in ICU:	Day 39 day (FEES 1)	Day 54 (FEES 2)	Day 85 (FEES 3)
Secretion Severity Score (7)	3	1	1
Rosenbel penetration/ aspiration score (8)	8	1 (fluids) 3 (yoghurt)	1
Brisbane Outcome Measure for Swallowing: (9)	1	4	7
Rest Ventilator mode:	PSIMV	PSIMV	PSIMV
Ventilator Weaning settings: Sprints: P5:8 PEEP:5	X5 x15 mins	X6 x45 mins	All day
Tracheostomy Weaning during P5 sprint P5:8 PEEP:5: cuff down, PNV application	X3 x15 mins	X4 x30 mins	All day

Table 1: Dysphagia and Respiratory Outcomes

Key:

Secretion Severity Score:
1. Any secretions evident upon entry or following a dry swallow in the protective structures surrounding the laryngeal vestibule that are bilaterally represented or deeply pooled. This rating would include cases in which there is a transition in the accumulation of secretions during observation segment.
2. Most severe rating. Any secretions seen in the area defined as laryngeal vestibule. Pulmonary secretions are included if they are not cleared by swallowing or coughing by the close of the segment.

8-POINT ASPIRATION-PENETRATION SCALE

1. Material does not enter the airway
2. Material enters the airway, remains above the vocal folds, and is not ejected from the airway
3. Material enters the airway, passes below the vocal folds, and no effort is made to eject

Royal Brisbane Hospital Outcome Measure for Swallowing

1. Patient aspirates secretions
4. Tolerates small amounts of thin fluids only
7. Upgrading of modified diet

Session 05. Poster session 5 K: Dysphagia in Geriatric Patients 1**OLFACTORY FUNCTION AND APPETITE IN ELDERLY RESIDENTS OF NURSING HOMES-A COMPARISON WITH THE HEALTHY ELDERLY**

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Purpose: Elderly persons are subject to malnutrition due to various causes. As malnutrition frequently leads to secondary diseases preventive measures against it are needed. Appetite is key to malnutrition prevention and an association between this and olfaction was suggested in previous studies. Olfactory function has been reported to decline in Alzheimer's and Parkinson's diseases. However most malnutrition prevention programs are not disease-based but they target all elderly residents of nursing homes as groups with heterogeneous medical conditions. To effectively prevent malfunction in nursing homes we compared olfaction between the elderly residents of nursing homes and healthy elderly.

Methods: The following items were measured in 71 elderly residents of nursing homes (mean age: 85.2 ± 9.4) with a score of 11 or higher on the cognitive assessment scale HDS-R and 37 healthy elderly controls (81 ± 5.8): the olfactory function test (OSIT-J; full score: 12) score Council on Nutrition Appetite Questionnaire (CNAQ; 40) score and physique (BMI). Each item was analyzed using the Mann-Whitney *U* test.

Results: The elderly residents of nursing homes and healthy groups' mean OSIT-J scores were 3.1 ± 2.5 and 6.6 ± 3.1 mean CNAQ scores were 28.5 ± 3.5 and 29.7 ± 2.8 and mean BMI values were 21.2 ± 3.0 and 22.0 ± 2.8 respectively; there were significant differences between the 2 groups in the mean OSIT-J ($p < 0.01$) and CNAQ ($p < 0.05$) scores.

Discussion: The current survey indicates that olfactory function and appetite deteriorated in elderly residents of nursing homes compared with that of healthy elderly controls suggesting the necessity of considering olfaction as part of malnutrition prevention for the former.

WOULD CHEWING AND/OR SWALLOWING FUNCTION IN KOREAN COMMUNITY-DWELLING ELDERLY BE ASSOCIATED WITH QUALITY OF LIFE AND/OR MEANING IN LIFE?

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Introduction: Chewing and swallowing problems are prevalent in Korean community-dwelling elderly estimating up to 54.6% and 33.7% respectively. Even though there are numerous studies on the 'quality of life' but a relationship between chewing and/or swallowing function with 'meaning in life' has not been investigated. 'Meaning in life' questionnaire comprises of survey items developed from the oriental philosophical perspectives. The purpose of this study is to look into any association between chewing and/or swallowing and quality of life and/or meaning in life.

Materials and Methods: 155 community-dwelling older adults (men:women = 73:77) (age mean \pm SD: 76.0 ± 5.39 y.o.) were recruited. Each participant was asked to respond to survey questions using a 4-point Likert scale on chewing (4 items) (e.g. "I have difficulty chewing dry food.") and swallowing (8 items) (e.g. "I have difficulty in swallowing water or liquids.") aspects. Additionally we conducted 'WHOQoL-BREF' (26 items) (e.g. "How satisfied are you with your sleep?") and 'Meaning in Life' (18 items) (e.g. "It is hard for me to accept role changes as getting older.") questionnaires. Bivariate Pearson correlation analysis was conducted to see if there is statistical evidence for a linear relationship between pairs of variables.

Results: The chewing ability of the elderly was negatively correlated with the WHOQoL-BREF score ($r = -0.250$; $p < 0.01$) and Meaning in Life score ($r = -0.173$; $p < 0.05$). As for swallowing ability WHOQoL-BREF score not Meaning in Life score was negatively correlated to it ($r = -0.170$; $p < 0.05$).

Conclusions: With higher complaint rate on chewing by the elderly and close relationship with quality of life as well as meaning in life continuous monitoring and intervention of chewing function based on its relationship would be warranted. Further research on clinical population would unveil the consequential relationship between elderly's perception on swallowing and meaning in life.

SPEECH AND LANGUAGE THERAPY (SLT) EXPERIENCE OF A FRAILTY INTERVENTION THERAPY TEAM (FITT) PILOT LED BY HEALTH AND SOCIAL CARE PROFESSIONALS (HSCPS) IN AN ACUTE TEACHING HOSPITAL

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¹Mater Misericordiae University Hospital

Introduction: In line with worldwide statistics, Ireland's aging population is growing rapidly. The number of people in Ireland over the age of 65 is set to increase to 1.4 million by 2046. Due to advances in modern medicine, mortality rates have decreased and people are living longer with chronic health conditions, leading to frailty. Negative health outcomes such as malnutrition and development of pneumonia are associated with the presence of dysphagia in this cohort of patients. The aim of FITT (March to May 2017) was to identify frail older people (> 75 years) admitted to MMUH and to develop an assessment and early intervention service at the 'front door', to enable a HSCP consensus to ensure best possible care for the patient.

Materials and Methods: FITT consisted of HSCPs including SLT, Dietetics, Physiotherapy, Occupational Therapy, and Medical Social Work. A FITT Common Screening Tool (CST) was developed by HSCPs, to trigger prompt referrals to other team members.

Results:

- 107 patients were accepted by FITT during this pilot, 74 F and 33 M, mean age 85 years.

- 70% of patients assessed and treated by FITT required the input of 3 or more HSCPs, with 30% requiring all 5 disciplines.
- 52% of patients were referred to SLT after completion of CST.
- There was an average of 2 SLT interventions per patient during the admission.
- Response time on average was 0.76 of a working day.
- 43% required fluid or diet modification.
- 18% required instrumental assessment.
- 36% required onward referral to colleagues in community settings.
- 100% of patients received health promotion regarding swallowing difficulties and avoidance of same.
- SLT gained a truly holistic understanding of the needs of a person living with frailty, by working closely with an interdisciplinary team.

Conclusions: SLT is an essential team member when it comes to 'front door' identification of the frail elderly, by providing intensive early assessment and intervention, and health promotion.

Health & Social Care Partnership University Frail Older Persons Intervention and Therapy Team (FITT)



What does the FITT team do?

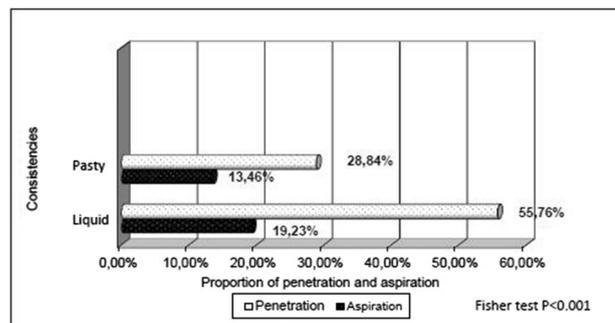
- The goals of the FITT team are to:
1. Identify frail older people (>75 years) in the Emergency Department
 2. Initiate HSCP Comprehensive Geriatric Assessment in the ED using a standardised assessment process.
 3. Develop an ethos of 'every hour counts' for the frail older person in ED
 4. Transfer suitable patients direct to the appropriate destination as soon as possible
 5. Develop a HSCP treatment and care plan in conjunction with the medical and nursing team
 6. Focus on expediting discharges

How can you refer to us?

To refer to FITT please bleep the Team Leader on #3029
We are available 9am-5pm
Monday-Friday

29 (55.76%). The pasty consistency was verified presence of aspiration in 7 (13.46%) individuals and laryngeal penetration in 15 (28.84%) of them. The occurrence of agreement between the evaluators found through the Kappa coefficient in the presence of dysphagia (0.45); aspiration (0.92); penetration (0.85).

Conclusion: The evaluated individuals presented aspiration and penetration by the consistencies evaluated with agreement among evaluators. A higher presence of penetration and aspiration in the liquid consistency was observed. Keywords: Elderly; Swallowing; Swallowing Disorders; Penetration; Aspiration.



Analysis	Kappa Value	P Value
Dysphagia	.451	.000
Aspiration	.922	.000
Penetration	.857	.000

ANALYSIS OF SWALLOWING IN ELDERLY BY VIDEOFLUROSCOPY

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Introduction: Swallowing aims to transport the bolus from the mouth through stomach effectively. It is a complex and dynamic action essential for nutrition and hydration. The elderly show changes in the swallowing process which alone does not cause dysphagia but adjusts the structures to perform a safe swallowing. The purpose of this study was to verify the agreement between evaluators by videofluoroscopic swallowing exam (VFSE) for the presence of penetration and tracheal aspiration the liquid and paste in elderly patients with dysphagia.

Materials and Methods: It is a descriptive retrospective study approved by the Ethical Committees in Research (362.326 and 2013/008) through the analysis of images bank with the correlation of two evaluators. They analyzed 52 VFSE with parity between sexes average age 76 performed during a year in a Hospital located in south of Brazil. The analysis of images was judged in two appraisals for the presence of dysphagia and quality of airway protection with liquid and paste consistencies.

Results: There was presence of dysphagia in 45 (83%) individuals' who underwent VFSE. Towards the liquid consistency was found presence of aspiration in 10 (19.23%) individuals and penetration in

INFLUENCE OF COMMUNITY ACTIVITIES ON ORAL AND SWALLOWING FUNCTIONS IN COMMUNITY-DWELLING ELDERLY ADULTS

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Introduction: Previous studies reported that the oral and swallowing functions are associated with the physical fitness and frailty of community-dwelling elderly adults. The influence of community activities on the oral and swallowing functions was investigated aiming at utilizing the findings for life guidance on how to cope with frailty affecting oral functions in the elderly.

Methods: The subjects were 113 community-dwelling elderly adults (mean age: 75.7 ± 7.3 years old). To measure the oral and swallowing functions the lip pressure maximum tongue pressure (MTP) repetitive saliva swallowing test and oral diadochokinesis were measured. For the evaluation of community activities the Elderly Status Assessment Set (E-SAS) was used in which the scores of Life-Space Assessment (LSA) Falls Efficacy Timed Up & Go Test walking distance without rest and interaction with people were calculated. In addition the grip strength of the bilateral hands was measured. For statistical analysis multiple regression analysis was used with the oral and swallowing functions as dependent variables. Each item of

community activities and grip strength were regarded as independent variables. The score of the Kihon checklist (Japan Geriatrics Society) representing frailty and age were subjected to forced entry as a confounding factor to adjust the model.

Results: On multiple regression analysis with forced entry of the confounding factor LSA ($\beta = 0.590$; $p = 0.000$) and grip strength ($\beta = 0.235$; $p = 0.002$) were extracted as factors influencing MTP (adjusted $R^2 = 0.482$). Other factors influencing the oral and swallowing functions were extracted but the coefficient of determination was very small in all factors.

Conclusions: Tongue pressure has been reported to be associated with physical fitness. It was clarified that expansion of the range of living indirectly influenced physical fitness suggesting that it contributes to improving the oral and swallowing function.

SWALLOWING IMPAIRMENTS INCREASE EMOTIONAL BURDEN IN SPOUSAL CAREGIVERS OF OLDER ADULTS

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Introduction: As we age we experience increasing limitations in our ability to perform activities of daily living and we may subsequently rely on family caregivers to support us. Unfortunately caregiver burden is often a consequence of this increasing reliance. For caregivers of individuals with swallowing difficulties this impact may be even more profound. The purpose of this study was to determine if the presence of swallowing difficulties in community-dwelling older adults increases spousal burden.

Materials and Methods: Data from 422 care recipient-spouse dyads were extracted from the American National Health and Aging Trends Study. Care recipients (249 male) were community-dwelling adults aged 65–98 (mean 77 ± 7.5 years) living with their spouses (250 female) aged 42–95 (mean 74 ± 9.1 years). Care recipients were asked if they had any difficulties chewing or swallowing. Spouses were asked about emotional physical and/or financial burden associated with caregiving and were asked to rate the level(s) of associated burden. They were also asked general questions about caregiving and their own health.

Results: Spouses of care recipients reporting swallowing difficulties had significantly more emotional burden as compared to spouses of care recipients without swallowing difficulties ($p < 0.05$). They also reported having less time to themselves ($p < 0.001$) and feeling more depressed ($p < 0.001$). There were no significant differences in financial or physical burden between the two groups. There was a weak negative correlation between spouse age and level of emotional burden ($r = 0.17$).

Conclusions: Emotional burden is increased in spousal caregivers of community-dwelling older adults reporting swallowing difficulties. Future research should focus on the sources of this emotional burden in order to determine intervention targets. Reducing caregiver burden will increase overall quality of life resulting in more optimal care for our patients with swallowing difficulties.

RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND TEXTURE-RELATED DIETARY RESTRICTION IN PATIENTS WITH CEREBRAL PALSY

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Introduction: Food and liquid consistency modification has been used for treatment of dysphagia. However this approach may negatively affect food ingestion and compromise patient’s nutritional status. The objective in this investigation was to evaluate the relationship between nutritional status and food restriction in cerebral palsy patients living in an institution for disabled people.

Methods: Fifty-six cerebral palsy patients aged 25–71 years participated in the study. Nutritional status was assessed by body mass index and classified according to the WHO recommendations for adults and to Lipschitz (1994) for the elderly. Weight was measured using a digital scale and height was estimated from knee height by the formula proposed by Chumlea et al. (1994). Swallowing impairment was clinically evaluated using the same foods consumed by participants at their first meal of the day. Swallowing and oral intake were classified according to the Dysphagia Risk Evaluation Protocol (Padovani et al. 2007) and the International Dysphagia Diet Standardization Initiative–Functional Diet Scale (IDDSI-FDS) (Steele et al. 2018) respectively. Statistical analysis was performed by the Fisher’s exact test.

Results: Ten patients had normal swallowing 29 mild-to-moderate dysphagia 15 moderate-to-severe dysphagia and 2 had severe dysphagia. Relationship between nutritional status and International Dysphagia Diet Standardization Initiative–Functional Diet Scale (IDDSI-FDS).

Conclusion: Although the results did not reach statistical significance they may suggest that consistency/texture-related dietary restrictions may compromise patient’ nutritional status.

IDDSI-FDS	Nutritional Status							
	Underweight		Normalweight		Overweight/Obese		Total	
	N	%	N	%	N	%	N	%
1	1	9	1	3	0	0	2	3
2	4	36.5	4	13	2	15	10	18
3	0	0	0	0	0	0	0	0
4	1	9	3	9	0	0	4	7 0.06
5	0	0	5	16	0	0	5	9
6	4	36.5	16	50	4	31	24	43
7	1	9	2	6	3	23	6	11
8	0	0	1	3	4	31	5	9
Total	11	100	32	100	13	100	56	100

REDUCED TONGUE PRESSURE AND ENDURANCE IN FUNCTIONALLY IMPAIRED OLDER ADULTS

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¹The University of Hong Kong

Background: Reduced tongue pressure is associated with dysphagia in older adults. Recent research indicates that sarcopenia may be one of the explanatory factors in this association. Sarcopenia can result in impaired functional status which is often observed in older adults in

aged care facilities. This study retrospectively examined a group of older adults receiving services from aged care facilities for links between tongue pressure and functional status.

Methods: Maximum tongue pressure and endurance were measured using the Iowa Oral Performance Instrument. Dysphagia was assessed by speech-language pathologists with trial swallows of different textures. Information was collected from individual case files from aged care facilities regarding background medical history. Functional impairment was defined as an individual being unable to independently complete activities of daily living (ADL) as indicated by the aged care facility.

Results: IOPI readings for 188 individuals aged between 65 and 101 (mean age = 85.6, SD = 7.4) 42 of whom were male were analysed. Maximum tongue pressure (MTP) and endurance decreased with each decade of increase in age; and were lower than norms reported in the literature. In the overall sample there were significant differences in MTP and endurance between functional and impaired individuals and dysphagic and nondysphagic individuals. 117 were dependent for ADL (62.2%) out of which 51 were dysphagic (43.6%). In the functional group only endurance was significantly different between dysphagic and nondysphagic individuals ($p = 0.043$). In the impaired group no differences were found for MTP or endurance between dysphagic and nondysphagic individuals.

Conclusion: In functionally impaired older adults with likely sarcopenia reduced tongue pressure and endurance may not be distinctive of dysphagia. This suggests that tongue strength and endurance should not be sole indicators of sarcopenic dysphagia in frail individuals.

Poster Sessions
Friday, 28 September
17:30–18:00

Session 08. Poster session 8A: Screening and Clinical Assessment 2

VALIDATION AND RELIABILITY TESTING OF A DYSPHAGIA TRAINED NURSE ASSESSMENT IN ACUTE STROKE

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¹University of Nottingham

Introduction: In the UK Speech and Language Therapists (SLTs) are the main profession involved in managing dysphagia. However given the high incidence of dysphagia in conditions such as stroke and an increase in prevalence in the aging population other professionals are becoming more involved in its management. The Interprofessional Dysphagia Framework lays out how other professionals can develop competencies beyond screening for dysphagia to make swallowing recommendations based on a protocol-guided assessment. Some services have developed their own protocols but it is unclear whether they have acceptable sensitivity and specificity. The Dysphagia Trained Nurse assessment (DTNax) developed by Derbyshire SLTs is one such tool.

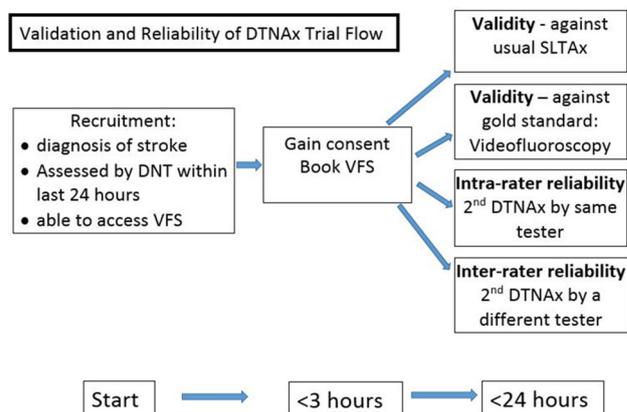
Objective: To test the criterion-related validity and reliability of the DTNax for its use in acute stroke.

Eligibility: Inclusion: New ischaemic or haemorrhagic stroke DTNax within 24 h age ≥ 18 . Exclusion: previous dysphagia not medically fit unable to access videofluoroscopy.

Methods: 50 eligible consecutively admitted participants will be recruited from the Acute Stroke Unit at Derby Teaching Hospitals NHS Foundation Trust. Participants will undergo a series of swallowing assessments within 24 h; Videofluoroscopy (VFS) SLT clinical bedside assessment and a DTNax by the same or a different

nurse. All assessors will be blinded to previous test results. VFS will be analysed using Penetration Aspiration Scale (PAS) and Modified Barium Swallow Impairment Profile (MBSImP). DTNs will be interviewed to gather qualitative information about their role training and the DTNax.

Outcomes: The primary outcome is to validate the DTNax against gold standard VFS in the acute stroke setting. Secondary outcomes are to validate the DTNax against the standard SLT assessment and to assess inter-rater reliability intra-rater reliability and the experiences of the dysphagia trained nurses.



ASSESSING SWALLOWING-RESPIRATORY SOUNDS COMPARED WITH FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING (FEES)

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¹Gothenburg University. ²NU-Hospital Group

Background: Cervical auscultation (CA) is an adjunct to the clinical swallow examination. Early studies questioned the validity of CA however most assessed only swallow sounds excluding the importance of respiration. This study assessed the accuracy of CA ratings compared with FEES using longer swallow sounds including pre-post swallow respiration.

Methods: Nine speech pathologists with 2–15 years dysphagia experience and formal CA training assessed (blinded) 42 swallow-respiratory sounds (seven duplicates [20%] for intra-rater reliability). Swallow sounds including both dysphagic and non-dysphagic swallows were recorded with Littmann e2300 stethoscope whilst simultaneously being assessed via FEES. Swallow recordings included (a) pre and post swallow respirations and (b) 17 thin fluids 10 nectar-thick (IDDSI-2) and 15 fruit-paste (IDDSI-4). Swallow sounds were rated using two binary questions: (1) dysphagia (2) safe (yes/no); and a third dysphagia severity rating (based on Aus-TOMs). Intra-rater reliability was calculated with percent agreement and Cohen's kappa (categorical data). Intra and inter-rater reliability for ordinal data (dysphagia severity) was calculated using Interclass Correlation Coefficient (ICC). Agreement with FEES was calculated using sensitivity specificity and area under the Receiver Operating Characteristic (aROC) curve.

Results: Intra-rater reliability across the questions ranged from 81 to 94% exact agreement ($k = 0.59$ – 0.78 ; ICC = 0.82). Inter-rater

reliability for dysphagia severity (ICC) ranged from 0.88 to 0.94 across the different consistencies. Sensitivity for CA to accurately detect Dysphagia = 97% and Safe = 82%. Accuracy (aROC) were 0.61 0.68 respectively.

Conclusion: CA using longer swallow-sounds including respiration pre and post swallow improves the accuracy of CA as compared with previous literature. This is congruent with growing evidence for the importance of swallow-respiration coordination.

PREVALENCE OF DYSPHAGIA IN PATIENTS WITH GASTROESOPHAGEAL REFLUX SYMPTOMS

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Introduction: Gastroesophageal reflux symptoms are highly prevalent; the most common ones are heartburn and acid regurgitation and dysphagia is also reported by these patients. We evaluated the prevalence of dysphagia in patients with heartburn and acid regurgitation.

Methods: We studied 123 patients (70% women) aged from 19 to 67 years complaining of heartburn and acid regurgitation without esophageal stenosis history of esophageal surgery or other diseases treated with proton-pump inhibitors. Dysphagia was identified using the Eating Assessment Tool (EAT-10) (1) translated and validated in Brazil. EAT-10 has a high sensitivity and specificity in detecting dysphagia and is composed of a ten-question questionnaire with a 0–4 rating scales each. The sum of these ten items ≥ 3 was defined as perceived dysphagia. EAT-10 results were compared with those of 417 (59% women) healthy volunteers of the same population aged from 18 to 70 years.

Results: Esophagitis was present in 21 patients (17%) (ten grade A nine grade B one grade C and one grade D according to Los Angeles classification) and two patients had Barrett's esophagus. Seventy-six (62%) patients had EAT-10 scores ≥ 3 and 56 patients (45%) had scores ≥ 5 . In patients with and without esophagitis 70% and 60% had EAT-10 score ≥ 3 respectively. Among healthy volunteers 29 (7%) had a score ≥ 3 and 2 (0.5%) had scores ≥ 5 indicating a considerable prevalence of perceived dysphagia in patients with heartburn and acid regurgitation.

Conclusion: In our population the prevalence of perceived dysphagia was 62% in patients with heartburn and acid regurgitation symptoms.

TUC IN: INCORPORATING THE TEST OF MASTICATION AND SWALLOWING SOLIDS INTO OUR CLINICAL DYSPHAGIA ASSESSMENT

C. Gill¹, R. McConnell¹

¹HSE

Introduction: The Test of Mastication and Swallowing Solids (TOMASS) is a quantitative assessment of solid bolus ingestion. To date clinical assessment of the oro-pharyngeal swallow function has largely relied on qualitative and subjective findings. In Primary Care access to objective dysphagia assessment can vary from no access to regular scheduled clinics. Presently our clients have no access to videofluoroscopy. To improve the quality of our service the TOMASS was incorporated into our routine clinical dysphagia assessment. This

measure can provide useful data which has been shown to be sensitive for detecting changes in performance based on age and gender (Huckabee et al. 2018). The aim of this study is to present preliminary data gathered since the introduction of the TOMASS and to evaluate if the data can positively contribute to clinical judgement.

Methods: A retrospective evaluation will be completed on 6 months data. The TOMASS was incorporated into our clinical dysphagia protocol commencing March 2018. The data collected will include the number of; bites masticatory cycles swallows and time. Demographic data; age gender and primary medical diagnosis will also be captured. Inclusion criteria: clients referred to primary care for dysphagia assessment clients deemed clinically safe for trial of solid bolus. The data will be analysed quantitatively using descriptive and inferential statistics.

Results: It is anticipated that over 6 months data will be collected on ~ 100 clients. Results will be presented using descriptive and inferential statistics. Results will be compared to available normative data (Huckabee et al. 2018).

Conclusion: The TOMASS is a new adjunct to clinical dysphagia assessment. International studies have found it to be beneficial to assess the oral phase of the swallow particularly to provide evidence of change over time. It is hoped that our findings will highlight similar benefits for dysphagia assessment in our primary care area.

SWALLOW SCREENING IN ACUTE STROKE: AN AUDIT OF CURRENT PRACTICE AND IMPLEMENTATION OF NURSE-LED SCREENING

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Background: The National Clinical Programme for Stroke recommends all acute stroke patients access swallow screening within 4 h of admission to hospital. Swallow screening in the Mater Misericordiae University Hospital is currently completed by a Speech and Language Therapist (SLT) or Clinical Nurse Specialist (CNS) using the Massachusetts General Hospital Swallow Screening Tool (MGH-SST). Prolonged time from admission to swallow screening is common for patients admitted outside working hours of SLT and CNS. This can result in prolonged NPO status which negatively impacts medication administration nutrition and hydration and patient comfort. Lack of access to standardised swallow screening out of hours leads to inconsistencies in management of oral intake in acute stroke patients. Staff nurses play a vital role in dysphagia care post-stroke and are optimally placed to deliver swallow screening on a 24-h basis.

Materials and Methods: Retrospective chart audit was completed to investigate time from admission to swallow screening for all acute stroke patients admitted from September–November 2017. Swallow screen training for staff nurses on the Acute Stroke Unit was introduced with 50% of staff nurses trained to date. Following training of all staff nurses prospective audit will be completed to determine time from admission to swallow screen for all acute stroke patients admitted from June–August 2018. Data from both audits will be compared.

Results: Preliminary results suggest that time from admission to swallow screening exceeds 4 h for many patients admitted with acute stroke. Results of the prospective audit will be analysed to determine whether training staff nurses in swallow screening is associated with decreased time from admission to swallow screening.

Conclusions: Training staff nurses to deliver swallow screening has the potential to improve early access to swallow screening as recommended by the National Clinical Programme for Stroke.

IS THERE A REAL EFFECTIVENESS IN INTRODUCING A NON-INSTRUMENTAL BED-SIDE SCREEN IN STROKE UNITS?

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¹Medical Student. ²SLP Hopital Erasme. ³ENT Hopital Erasme.

⁴Neurologist Hopital Erasme

Introduction: Dysphagia is one of the most common issues after stroke. In some cases it can lead to aspiration pneumonia which can have devastating consequences. Early intervention allows early detection of dysphagia and reduces the incidence of death. The number of stroke patients admitted exceeds the ability to have an individual thorough workup. This requires a tool that can target the high-risk patients. Many screenings have been validated in stroke patients but rarely have they been implemented and re-tested on a real stroke population. We chose the validated Barnes Jewish Hospital Stroke Dysphagia Screen (BJH-SDS) to assess whether the implementation of a formal screening would ease the identification of dysphagia and lower the risk of pneumonia.

Materials and Methods. 1029 stroke patients were admitted to the Erasmus Hospital Stroke Unit and their files assessed retrospectively. They were divided into two groups: screened by the BJH-SDS or screened in a conventional way.

Results: Firstly the screening allowed us to divide our patients into 2 groups: at “risk for dysphagia” and “no risk for dysphagia”. In the “no risk for dysphagia” group when screened by the BJH-SDS the prevalence of pneumonia and mortality were significantly less. The length of stay was shorter in the BJH-SDS screened group. Secondly the population sent to a dysphagia work-up done either by the SLP or by the ENT doctor was selected and analyzed. In the BJH-SDS group patients were sent significantly faster for a more complete assessment and there were significantly less cases of pneumonia.

Conclusions: We confirm that implementing a formal protocol can increase the adherence to screen for dysphagia and significantly reduce pneumonia and other complications. The BJH-SDS proved to be a tool with high value to reject a risk for dysphagia and thus aspiration pneumonia. These findings could allow for the hospital to lower dramatically the length of stay and the costs.

ASSOCIATION BETWEEN A NURSE PERFORMED DYSPHAGIA SCREENING PROTOCOL IN ACUTE STROKE INPATIENTS AND HEALTH RELATED PATIENT OUTCOMES

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²Department of Neurology Kaplan Medical Center. ³Department of Communication Sciences Ono Academic College; University of Haifa; Reuth Medical Center

Introduction: Dysphagia screening has been proposed to improve stroke patient outcome. The aim of the study was to examine whether a nurse-performed dysphagia screening protocol for acute stroke patients predicts health-related patient outcomes.

Materials and Methods: The dysphagia screen involved 5 consecutive stages: Pre-screen state (4 points) thickened liquids (4 pts) soft solids (4 pts) hard solids (4 pts) and thin liquids (4 pts). Transition to

the next stage required successful completion of the previous one. Dysphagia severity was categorised as severe (0–8 pts) moderate (9–14 pts) mild (15–19 pts) and no dysphagia (20 pts). Interventions included texture modification or alternative feeding according to the results. A retrospective examination of 628 consecutive acute stroke patients admitted to the neurological department was conducted. 41.2% ($n = 259$) underwent dysphagia screening out of which 80 patients were divided into 4 homogeneous groups based on their dysphagia severity. Groups were matched for age sex co-morbidities stroke severity stroke territory TPA and pre-stroke function. Incidence of pneumonia length of stay 1-year readmission discharge facility and 1-year mortality were compared.

Results: 1-year readmission rate was significantly higher in patients with dysphagia ($p = 0.036$). There was borderline significance in other outcomes tested: 5% incidence of pneumonia ($n = 4$) all of which occurred in patients with moderate or severe dysphagia $p = 0.097$. Length of stay was longer for patients with dysphagia $p = 0.066$. Most patients who died within 1 year (6/7) had moderate or severe dysphagia however this finding was not significant.

Conclusions: Dysphagia severity in acute stroke patients is associated with worse health-related outcomes. Although intervention was performed as indicated by the screen outcomes worse health-related outcomes were associated with dysphagia severity thus this type of intervention may not be sufficient.

Session 08. Poster session 8B: Instrumental Assessment 2–VFS

THE IMPORTANCE OF VIDEOFLUOROSCOPY EVALUATION IN ELDERLY PATIENT WITH COMMUNITY PNEUMONIA CASE STUDY

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¹CSA

Introduction: The swallowing is a vital function which when it suffers some change can cause several problems for the individual. In the aging process changes in the elderly’s diet are observed such as: modification of masticatory movement ingestion of a smaller volume of food slow manipulation of food bolus food bolus stasis in valleculas delayed esophageal emptying and presence of tertiary contractions.

Methodology: A retrospective descriptive and qualitative case study.

Purpose: was to compare the findings of the dysphagia eating Assessment Tool (EAT-10) with the findings of video fluoroscopy of swallowing of an elderly patient 93 years old with no complaint of dysphagia at the time of hospital admission with a diagnosis of community-acquired pneumonia.

Results: The EAT-10 instrument was used to identify the risk and symptoms of dysphagia and the videofluoroscopic evaluation of swallowing which is considered the gold standard in the evaluation of swallowing disorders it was used to confirm data collected during screening. During the screening with EAT10 Tool the patient not presented complaints of dysphagia. In the videofluoroscopic evaluation the patient presented increased oral transit time reduced oral ejection force and the presence of posterior escape with silent tracheal aspiration during and after swallowing of liquid nectar honey and pudding consistencies in which the patient showed mild to sensible dysphagia severity. In this case it was recommended via alternative feeding.

Conclusion: Videofluoroscopic evaluation is very important for dysphagia diagnostic in elderly patient with community pneumonia without dysphagia symptom.

CORRELATION BETWEEN VIDEOFLUOROSCOPIC SWALLOW STUDY AND LARYNGOLOGICAL CLINICAL EVALUATION IN PATIENTS WITH COUGH

M. Balou¹, G.R. Dion², D. Brates³, M. Amin¹

¹NYU School of Medicine. ²Brooke Army Medical Center. ³New York University

Introduction: Videofluoroscopic swallow studies (VFSS) are commonly requested by otolaryngologists to evaluate swallow function in patients with cough but no data exists on the utility of VFSS in this population. We aim to determine which history clinical exam and laryngoscopy findings correlate with abnormal VFSS findings in patients with cough.

Materials and Methods: Ten items from flexible videolaryngoscopy were recorded including: motion abnormalities pooling of secretions pharyngeal asymmetry and glottal insufficiency. VFSS findings recorded included penetration aspiration delayed initiation and presence of residue after swallow. Nonparametric statistical analysis was performed to determine correlations between history and clinical exam observation and VFSS findings. A total of 405 patients with a chief complaint of cough were referred to speech language pathology. Of those 107 had a VFSS and 93 had an esophagram. Forty-five patients had a VFSS after referral and were included in the analysis.

Results: Age ($p = 0.35$) glottal insufficiency ($p = 0.33$) pooling of secretions ($p = 0.10$) any videolaryngoscopy abnormality ($p = 0.07$) cardiopulmonary history ($p = 0.29$) and other variables did not correlate VFSS abnormalities in patients with cough. Only gender ($p = 0.02$) was a predictor of an abnormal VFSS (86% males and 57% females).

Conclusions: This study found that videolaryngoscopy and clinical exam were not predictive of VFSS abnormalities in patients with cough.

		VFSS Normal	VFSS Abnormal	Total # Patients
Overall		14	31	45
Gender	M	19	3	22
	F	11	12	23
CVA	Yes	0	2	2
	No	13	29	42
Pharyngo-esophageal disease	Yes	2	7	9
	No	11	22	33
GERD	Yes	9	21	30
	No	5	10	15
Cardio-pulmonary disease	Yes	9	24	33
	No	5	6	11
Dysphagia Complaint	Yes	7	14	21
	No	7	17	24
Dysphonia Complaint	Yes	10	20	30
	No	4	10	14
Cough Duration	<=1 Yr	6	7	13
	>1 Yr	7	19	26
Laryngoscopy Abnormality	Yes	7	25	32
	No	7	6	13
URI or Pnuemonia in past 3 months	Yes	4	7	11
	No	9	21	30

ACCURACY AND CONFIDENCE IN ADULT VIDEOFLUOROSCOPY ANALYSIS

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¹Tallaght University Hospital

Introduction: Many SLTs complete once off training in the analysis of videofluoroscopy (VFSS) exams. Research suggests training is effective in improving the accuracy of VFSS analysis. Despite this the interpretation of VFSS exams remains subjective and there are no best practice recommendations to guide maintenance of competency. This study aims to examine accuracy and confidence in VFSS analysis in VFSS trained SLTs.

Materials and Methods: Participants included 24 SLTs who had previously attended a postgrad accredited course in adult VFSS analysis. SLTs independently analysed 6 VFSS clips of individual bolus swallows. SLTs reported on the following outcomes; presence of swallow reflex delay quantity of residue post swallow adequacy of anterior hyoid movement and hyo-laryngeal elevation airway penetration/aspiration and confidence in rating each outcome. Ratings from 3 expert SLTs were considered to be the correct answer. Expert SLTs had > 9 years VFSS experience and who analyse at least 1 exam p/month. Statistical analyses of ratings were completed.

Results: VFSS analysis experience ranged from 0.5 to 16 years ($M = 4.77$, $SD = 4.75$). Participants were most accurate in rating the quantity of residue in the pyriforms ($M = 78\%$) and least accurate in rating the level to which the swallow reflex was delayed ($M = 44\%$). Participants were most confident when rating quantity of residue in the valleculae ($M = 7.9/10$, $SD = 1.2$) and least confident when rating anterior hyoid movement ($M = 4.7/10$, $SD = 1.7$). There were significant positive correlations between SLT experience and confidence in rating hyolaryngeal elevation ($r_s = 0.516$, 95% BCa, CI [0.087–0.779], $p = 0.017$) and anterior hyoid movement ($r_s = 0.536$, 95% BCa, CI [0.065–0.819], $p = 0.012$).

Conclusion: This study indicates the need for ongoing training and formal evidence based guidelines outlining requirements to maintain competency in VFSS analysis. Targeted training of outcomes achieving low accuracy rates from initial analyses is underway by authors.

ESTABLISHING A REGIONAL PAEDIATRIC VIDEOFLUOROSCOPIC SWALLOW STUDY (VFSS) CLINIC VIA TELEHEALTH TO IMPROVE OUTCOMES FOR CHILDREN WITH ORO-PHARYNGEAL DYSPHAGIA

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Introduction: The Videofluoroscopic Swallow Study(VFSS) is often required to augment the clinical feeding and swallowing evaluation for comprehensive assessment of paediatric oropharyngeal dysphagia. Children living in regional areas do not have ready access to VFSS and must travel to tertiary centres with the associated costs of travelling with a medically complex child. A barrier to providing Paediatric VFSS in regional areas is a lack of accessible training for Speech Language Pathologists (SLP's). This study describes a paediatric VFSS training and mentoring program utilising a remote specialist SLP attending the VFSS clinic via real-time synchronous telehealth. It also evaluated parent and SLP acceptability.

Materials and Methods: 2 regional-based SLPs attended a 2 day paediatric VFSS workshop delivered by the specialist SLP at their regional hospital. Following the workshop the regional SLPs conducted paediatric VFSS with a visiting paediatric radiologist in attendance and the specialist SLP synchronously attending the clinic via telehealth (166 km away). A live display feed from the Siemens Artis Zee MP Videofluoroscopy unit was fed into the mobile TeleHealth Unit via a DVI Splitter Amplifier and cables. 20 children and families were included. Questionnaires for the families Specialist SLP and Regional SLPs gathered information on the cost/benefit ratio of using Telehealth to train local SLPs in paediatric VFSS.

Results: 100% of families stated they preferred to have the VFSS locally rather than travelling to a tertiary centre. Local SLPs reported that having real-time support in VFSS analysis interpretation for families and determining immediate mealtime recommendations were the biggest benefits of having a mentor available via Telehealth.

Conclusion: Telehealth is a useful tool in training and supervising SLPs in Regional areas in the analysis of Paediatric VFSS to provide families with increased access to locally based expert clinical care.

THE USE OF COMBINED SIMULTANEOUS VIDEOFLUOROSCOPY WITH HIGH-RESOLUTION IMPEDANCE MANOMETRY: OBSERVATIONS FROM 475 PATIENTS WITH OROPHARYNGEAL DYSPHAGIA

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Introduction: Combined simultaneous videofluoroscopy with high-resolution impedance manometry is clinically used in our center to objectively characterize swallow function. The aim of this study was to describe a large cohort of dysphagic patients referred to the University Hospital Leuven between January 2015 to December 2017 for combined videomanometric assessment.

Methods: For this retrospective study patients charts (including pneumonia and mortality) as well as radiological and HRiM recordings were reviewed. The swallow risk index (SRI) was linked to relevant clinical patient data.

Results: 475 patients were referred to the adult videomanometry clinic of our tertiary referral center (258 M mean 63 ± SD 15 years 18–98 years). They were either ambulant (59%) or hospitalized (41%). Their underlying pathology was: iatrogenic (23%) neurological (20%) gastrointestinal (13%) structural (8%) globus (7%) psychogenic (1%) psychomotor retardation (0.40%) infection (0.40%) others (1%) and unknown (23%). VFSS showed no penetration/aspiration in 48% penetration in 12% and aspiration in 40%. There was no statistical difference regarding the prevalence of penetration based on underlying pathology however there was a difference for aspiration (Table). All patients have an increased SRI with increased aspiration risk ($p = 0.000$). Patients who passed away had a higher SRI compare to alive patients ($p = 0.001$). Patients with a known pneumonia had a higher SRI compare to patients without pneumonia ($p = 0.01$).

Conclusion: We describe a heterogeneous group of patients with dysphagia who underwent combined videomanometry. For some

pathologies the coherence between SRI and VFSS results is higher. Therefore it is important to continue conducting studies in all populations at risk of dysphagia. Combined videomanometry has a real added value that can be relevant to implement in the clinic while remaining vigilant to the types of pathologies.

	VFSS: No P/A (n=130)	VFSS: Penetration (n=34)	VFSS: Aspiration (n=109)	SRI: No P/A	SRI: Penetration	SRI: Aspiration	p-value
Iatrogenic (n=86)	n=32	n=10	n=44	6[4-10.5]	8[1-28]	31[19.5-54]	.000*
Neurological (n=83)	n=34	n=12	n=37	8.5[4.7-16]	6[3.2-12.2]	20[14-34]	.000*
Gastrointestinal (n=67)	n=45	n=8	n=14	6[3-11.5]	16.5[4.7-31.5]	9.5[5-22]	.037*
Structural (n=37)	n=19	n=4	n=14	7[4-19]	10[2.5-13.7]	13[6.7-19.5]	.407

SRI	Structural	Iatrogenic	Gastrointestinal	Neurological	p-value
No Penetration/Aspiration	7 [4-19]	6 [4-10.5]	6 [3-11.5]	8.5 [4.7-16]	.310
Penetration	10 [2.5-13.7]	8 [1-28]	16.5 [4.7-31.5]	6 [3.2-12.2]	.623
Aspiration	13 [6.7-19.5]	31 [19.5-54]	9.5 [5-22]	20 [14-34]	.001*

A STANDARDIZED TEST MEDIUM TO DETECT BOLUS-RELATED MODULATION OF THE PHARYNGEAL SWALLOW DURING HIGH-RESOLUTION PHARYNGEAL MANOMETRY

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Background: The pharyngeal swallow response to volume and consistency challenges can be characterized by high-resolution pharyngeal manometry with impedance (HRPM). As the conductivity of bolus media influences the impedance signal stable conductivity across a range of consistencies is essential for meaningful comparisons. In this study we report HRPM findings in controls using a novel bolus medium conforming to the International Dysphagia Diet Standardization Initiative (IDDSI Levels 1–4).

Methods: 10 healthy subjects (4 m 6f; age range 18–29 years, mean 24 ± 3) underwent HRPM (ManoScan™ System and catheter). Thin (IDDSI Level 0) and extremely thick (IDDSI Level 4) consistencies of the novel bolus medium were tested (SBMkit™ supplied by Trisco Foods Pty Ltd Australia). Swallow Gateway analysis (swallowgateway.com) was used to analyze HRPM recordings and determine swallow function metrics UES maximum admittance (UES Max Ad.) UES integrated relaxation pressure (UES IRP) hypo-pharyngeal contractile integral (HCI) and post-deglutitive UES contractile integral (UESCI). Effects of bolus conditions were determined by Friedman's ANOVA by ranks with adjustment for multiple comparisons.

Results: Medians [interquartile ranges] for swallow function metrics are shown in the Table. The impedance inferred UES opening extent (UES Max. Ad) was significantly increased with larger SBM bolus volume and was unchanged using the thicker SBM bolus consistency. Pressure-only measures derived did not show significant bolus effects.

Conclusion: Use of a standardized bolus medium enables HRPM with pressure-flow analysis under stable bolus conductivity conditions. A measure of UES opening extent was best able to reveal bolus-related influences on the healthy pharyngeal swallow. This metric may identify difficulties with bolus accommodation and modulation amongst pharyngeal dysphagia patients.

Metric	5ml Thin (IDDSI 0)	10ml Thin (IDDSI 0)	20ml Thin (IDDSI 0)	10ml Ext.Thick (IDDSI 4)	ANOVA (F, p-value)
UES Max.Ad. (ms)	3.4 [3.0-3.8]	4.3 [3.8-5.3]	↑5.4* [4.9-6.5]	5.3 [5.0-5.5]	22.920, p<0.0001
UES IRP (mmHg)	2.8 [-2.4-4.7]	2.3 [-1.3-5.7]	5.0 [2.6-7.9]	5.3 [2.2-8.8]	9.720, p 0.021
HCl (mmHg.s.cm)	48 [38-94]	55 [44-80]	66 [37-100]	63 [41-89]	1.200, NS
UESCI (mmHg.s.cm)	767 [571-899]	767 [545-898]	787 [640-976]	781 [611-878]	0.480, NS

METHOD OF DRINKING AND RISK OF ASPIRATION ASSESSED BY VIDEOFLUOROSCOPY: A PILOT STUDY

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Introduction: Patients are often given spouted beakers and straws to drink from but Speech and Language Therapists (SLTs) recommend patients drink from an open cup because it is easier to control liquid volume and flow. Straws and spouts may increase the risk of aspiration however there are no data to show this.

Hypotheses: 1. Drinking from a spout or straw increases risk of aspiration compared to an open cup
2. Patients prefer the method of drinking with which they are least likely to aspirate

Materials and Methods: Participants were given 30 ml of fluid via straw spouted beaker and open cup in random order under videofluoroscopy (VF) and rated by SLTs using Rosenbek et al's (1996) penetration-aspiration scale (PAS). Participants were asked about preferences of drinking method. Recruitment data was gathered. Ethical approval was obtained from UK Health Research Authority.

Results: To date 13 referrals have been made to the VF service. 46% (n = 6) were not eligible 5 due to being unsafe to swallow fluids and 1 unable to self-feed. Of the eligible patients 6 consented and 1 refused due to concerns about developing cancer due to additional radiation. Table 1 shows PAS scores. All three participants preferred drinking from an open cup. Three participants await VF appointments.

Table 1. Penetration-aspiration scale (PAS) scores

Participant Number	Open Cup	Straw	Spouted Beaker
1	4	2	2
2	2	2	2
3	2	1	2

PAS: 1=Material doesn't enter airway; 2=Material enters airway remains above vocal cords is ejected; 4=Material enters airway contacts cords is ejected.

Discussion: We aim to recruit 25 participants this should be achieved by autumn 2018 but recruitment has been slower than anticipated. It is interesting that one patient was concerned about x-ray exposure so declined participation. Further data will be presented at the conference.

DYSPHAGIA LUSORIA: CASE PRESENTATION

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Introduction: Dysphagia lusoria is an impairment of swallowing due to esophageal compression by an aberrant right subclavian artery or in rare cases an aberrant left subclavian artery with right-sided aortic arch. Although being the most frequent variation of the aortic arch occurring in 05–25% of the individuals it is rarely symptomatic.

Materials and Methods: Presentation of a rare case of symptomatic dysphagia lusoria including the clinical presentation diagnostic exams and treatment. A literature review of dysphagia lusoria is also presented.

Results: A 53-years-old woman presented to the Department of Otorhinolaryngology of Egas Moniz Hospital because of a foreign body sensation on the pharynx and dysphagia to solids. She had previous diagnosis of a hiatal hernia and dyslipidemia and her regular medication included a proton pump inhibitor. The physical examination revealed a chronic laryngitis refractory to medical treatment. No pathological findings were obtained in a 24 h pH-metry and esophageal manometry. The video fluoroscopic swallowing (VFS) exam demonstrated a defect in posterior lumen-filling in the upper part of the esophagus lateralized to the left. The neck computed tomography revealed an aberrant right subclavian artery (arteria lusoria) with a retrotracheal and retroesophageal course that matches the VFS findings confirming the diagnosis of dysphagia lusoria. Maintenance of proton pump inhibitor medication and dietary modification were the treatment of choice which obtained satisfactory results.

Conclusions: Dysphagia lusoria is an unusual condition caused by the compression of the esophagus by the arteria lusoria. Despite being the most common abnormality of aortic arch most patients with arteria lusoria are asymptomatic. Conservative measures including dietary modification and drugs are the first line of treatment. Surgery is indicated when an aneurysm of the arteria lusoria is identified or in cases of poor treatment results.

Session 08. Poster session 8C: Dysphagia in Stroke 1

CORRELATION BETWEEN BOLUS LOCATION AND INITIATION OF THE PHARYNGEAL RESPONSE TIME IN STROKE

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Introduction: There is variability intra subject in the pharyngeal response time (PRT) and the bolus location (BL) at swallow onset in stroke individuals however the relationship between them are very important to understanding our rehabilitation goals. The aim of this study was to correlate the initiation of the PRT and BL at swallow onset in individuals with dysphagia after stroke.

Materials and Methods: Were analyzed 73 videofluoroscopic swallow studies (VFSS) of post cortical ischemic stroke individuals. The VFSS were analyzed in the puree and thin liquid consistencies in 5 ml. The temporal quantitative analysis used specific software and two judges. The mean PRT was divided in shorter and longer than 250 ms. The inter-rater reliability used Intra-class Correlation Coefficient (ICC) with 95% confidence interval and found excellent reliability for both food consistencies (puree: ICC = 0.99; thin liquid: ICC = 1.00). The BL was described based on anatomical points of the

oropharynx (Martin-Harris et al. 2007; Saitoh et al. 2007). It was used the Spearman test to correlate the variables.

Results: There was no correlation between the PRT and BL in puree consistency for the PRT shorter than 250 ms ($r = 91\%$; $p = 0779$) and in thin liquid consistency for the PRT shorter ($r = 323\%$; $p = 0596$) or longer than 250 ms ($r = 218\%$; $p = 0400$). However the results showed that there was correlation between PRT longer than 250 ms with BL in puree consistency ($r = 558\%$; $p > 0001$).

Conclusions: There was correlation between PRT and BL in puree consistency when the PRT was longer than 250 ms.

EVALUATION OF SWALLOWING AS AN INTEGRAL PART OF THE STROKE CARE PROTOCOL

T.C. Alves¹, A.L.C. Vecina¹, N.A.S. Vieira¹, R.C.A. Miranda¹, R.T. Arevalo¹, A.P.A. Oliveira¹, R.M.Massaudo¹, A.M.H. Vaccari¹, G.S. Silva¹

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Introduction: Pneumonia is an important complication of stroke causing an increase in mortality. International Guidelines suggest that swallowing should be performed for these patients prior to oral administration. The use of this procedure has been related to a reduction in the risk of aspiration pneumonia and better management of these patients. This research aimed to describe the results of the introduction of evaluation of swallowing performed by the speech therapist in patients with acute stroke.

Materials and Methods: This was a retrospective study carried out at Albert Einstein Hospital São Paulo Brazil in which the medical records of 544 patients with a mean age of 71 years who had a stroke from January 2015 to December 2016 were analyzed. Of these 206 (37%) presented The National Institutes of Health Stroke Scale (NIHSS) > 1 and were identified as having criteria for evaluation of swallowing.

Results: Of the total sample of 544 patients hospitalized for stroke 206 (37%) were eligible for evaluation of swallowing and of these 190 (92%) were evaluated. Of the samples that were evaluated 99 (52%) presented signs and symptoms suggestive of oropharyngeal dysphagia and did not present pneumonia during the hospitalization period.

Conclusions: The introduction of a systematic evaluation of swallowing by the speech therapist in the acute phase of stroke seems to be effective in reducing aspiration pneumonia in patients with dysphagia.

FUNCTIONAL EVOLUTION OF ORAL INTAKE IN HOSPITALIZED PATIENTS WITH ACUTE STROKE

T.C. Alves¹, A.L.C. Vecina¹, N.A.S. Vieira¹, R.C.A. Miranda¹, R.T. Arevalo¹, A.P.A. Oliveira¹, R.M.Massaudo¹, A.M.H. Vaccari¹, G.S. Silva¹

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Introduction: Oropharyngeal dysphagia is a common manifestation in patients with stroke affecting between 30% and 42% of cases in the acute phase with spontaneous improvement in about 50% of these cases with reestablishment of functional swallowing. The prevalence

of oropharyngeal dysphagia in the first month after stroke has been described to be between 2 and 21% of the cases. This research aimed to verify the functional evolution of oral intake measured through FOIS in patients hospitalized with acute stroke.

Materials and Methods: This was a retrospective study carried out at Albert Einstein Hospital São Paulo Brazil in which the medical records of 88 patients 44 men (50%) with a mean age of 75 years were analyzed at 48 h of the stroke and at the time of hospital discharge during the year 2016.

Results: Of the total sample 39% of the patients had an initial FOIS less than 6 12 (31%) presented improvement and 1 (2%) presented worsening of the FOIS scale in the first 72 h of the ischemic event. At the time of hospital discharge 26 (66%) of the patients presented improvement of at least one point on the FOIS scale. In this research all patients with acute stroke have a worse performance on the FOIS scale in the first 72 h of hospital admission as compared to the findings at hospital discharge.

Conclusions: There was a functional evolution in oral intake in patients with acute stroke in 72 h and at the moment of hospital discharge.

SWALLOW SCREENING STROKE PATIENTS WITHIN 4 HOURS-BARRIERS AND FACILITATORS

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Introduction: Recent British and Irish Stroke Care Guidelines recommend that all patients admitted with stroke have a swallow screening test performed within 4 h of admission and before any oral intake. Irish rates $< \text{SUP} > 3 < \text{SUP} >$ of swallow screening in stroke are low; 6% within 3 h and 36% within 24 h of admission. In 2011 a chart audit of swallow screening in stroke in Tallaght University Hospital Ireland found that 52.5% of stroke patients had a screen completed; 45% within 24 h of admission.

Materials and Methods: A prospective healthcare record audit was completed to identify our current compliance rate with swallow screening for stroke patients. Data was collected on 40 patients over four months. A focus group was also completed with key stakeholders involved in swallow screening to identify barriers and facilitators to achieving the 4-h standard.

Results: Audit results indicated that 85% of patients had a screen documented; 48.4% within 4 h 90.9% within 24 h of admission. All screens were completed by nursing staff in the Acute Stroke Unit (ASU) which was a facilitator. 48.5% of stroke patients were admitted to ASU within 4 h of admission. Focus group discussion identified the following barriers to screening within 4 h; time when acute stroke medical management decisions may take priority and transfer to ASU > 4 h after hospital admission. Expanding training to include Emergency Department (ED) nursing staff was identified as a possible target.

Conclusions: Tallaght University Hospital Stroke Service has improved its compliance with swallow screening for stroke patients notably with screening within 24 h of admission and compares favourably with Irish rates. However less than 50% of patients are screened within 4 h of admission. Nursing staff in ED will be approached to establish feasibility of screening in ED. It is also proposed that screening within 4 h of admission is not feasible for all acute stroke patient.

DYSPHAGIA POST STROKE FOLLOWING HEART TRANSPLANT IN AN 11 YEAR OLD FEMALE: REGAINING FEEDING AND SWALLOWING SKILLS

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Introduction: Cardiac transplantation is a rare medical intervention in paediatrics. Dysphagia can result from multiple neurological respiratory and laryngeal pathologies. This case study describes a female who had orthotopic heart transplant. One month post-transplant she had an acute intracerebral left frontal lobe bleed with intraventricular extension and posterior reversible encephalopathy syndrome (PRES). Tracheostomy required due to multiple failed extubations. She had bilateral vocal cord paresis and was non-verbal. Videofluoroscopy (VFSS) revealed aspiration across all consistencies associated with poor hyolaryngeal excursion swallow reflex delay residue build up in pharynx. She was nil oral on transfer to our centre.

Methodology: A period of intensive multidisciplinary intervention commenced to address oral and pharyngeal sensorimotor deficits. Treatments reported in adult literature were implemented: sensory stimulation of oral cavity and pharynx hyolaryngeal elevation and oral strengthening tasks. Therapeutic swallows with a range of textures were advised to re-establish sensorimotor pathways for swallowing. Parents did therapy daily with SLT input 2–3 times per week.

Results: FEES 2 weeks post therapy indicated good secretion management and improvement in vocal cord adduction. Refused food on this occasion. VFSS 2 weeks later indicated improved trigger of pharyngeal swallow hyolaryngeal excursion improved bolus propulsion and clearance from pharynx. Oral feeding progressed beyond therapeutic trials. 9 weeks post therapy full normal oral diet resumed. NG tube in situ for some cardiac medications only. : Discussion This complex case had multiple medical elements. Treatment focused on supporting oral and pharyngeal sensorimotor pathways based on principles of motor learning theory. The outcome was positive with resumption of full oral feeding. These approaches are often used in adults but not reported in children.

COMMUNICATIONS STRATEGIES AND ADHERENCE TO DIETARY ADAPTATIONS IN PATIENTS WITH NEUROLOGICAL DYSPHAGIA: DEVELOPMENT AND VALIDATION OF AN EDUCATIONAL BOOKLET

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Introduction: Patients with Neurogenic Dysphagia (ND) need to modify dietary habits to prevent malnutrition and pulmonary complications. To achieve such changes in ambulatory settings professionals must provide information and support to patients caregivers and family. Communication strategies have shown to enhance adherence to therapeutic procedures and recommendations. Tailored information and eliciting doubts can furthermore be supported by accessible and clear written information. Previous studies established the positive impact of educational booklets in patient's knowledge confidence and compliance. To the best of our knowledge there is no

available information document in Portuguese designed for patients with ND.

Objective: To develop and validate an educational booklet to facilitate changes in dietary routines in patients with dysphagia.

Methods: A prototype was generated by the authors based on a literature review. The first draft of the booklet was critically reviewed by a multidisciplinary panel of experts (four speech therapists and four experts in clinical communication). The survey included questions regarding content language organization layout graphic design and artworks. Suggested modifications were performed and the second version was presented to a focus group of patients and caregivers ($n = 6$). Their comments and recommendations were analysed and integrated in the final version.

Findings: The booklet include sections addressing signs and symptoms of dysphagia individualized options of food consistency and preparation causes and complications of ND and how and when to contact health professionals. An appealing layout with illustrations facilitates the understanding of written information.

Discussion: The use of booklets complements verbal patient-health professional interactions in several medical diseases. In patients with ND is expected to facilitate the understanding and recall of information and to respond to patients and family needs.

THE FEASIBILITY OF IOPI IN ACUTE DYSPHAGIC STROKE PATIENTS: CASE REVIEWS

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Introduction: Dysphagia (swallowing difficulties) occurs in 25–53% of patients post stroke (Smithard 2001). Treatment of dysphagia is crucial as it may reduce medical complications such as pneumonia dehydration malnutrition aspiration and death (Perry 2001). A relatively new treatment of dysphagia which was recently CE marked for the use in Europe is IOPI. IOPI is a standardised portable device that quantifies tongue muscle strength. It provides biofeedback to the patient to aid understanding. It permits individual treatment targets for resistance training and endurance. Most of the evidence seems to be based on intensity of treatment (NICE RCP Moon 2018). Most studies have been on chronic dysphagic patients. It is unknown whether or not acute dysphagic stroke patients can actually tolerate this intensity. This is the reason for this case review.

Methods: This is a pragmatic review of acute stroke patients with oral and pharyngeal dysphagia post stroke which were offered IOPI. IOPI was offered daily with the aim of 5 sessions per week. All patients have had a clinical assessment of their swallow. The number of repetitions optimum target and endurance of treatment have been recorded. Additional outcome measures included functional oral intake (FOIS) and clinical improvement in swallowing and speech.

Results: 10 acute stroke patients are currently being audited. Information on stroke subtype time post stroke to treatment pre and post treatment Kpa and FOIS will be reported. Intensity of treatment tolerated will be provided.

Conclusions: Our aim as the Stroke Speech and language therapy team is to provide the best evidenced based management for the treatment of dysphagic patients. IOPI was purchased in 2017 and thus a new therapy tool in the Belfast Trust. The aim is to measure the benefit of IOPI to acute patients ensuring the right patients receive the right therapy at the right time in line with RCP stroke guidelines and good clinical governance.

SHORT-TERM EFFECTS FOLLOWING COMBINED ISOMETRIC MOTOR TRAINING AND SENSORY STIMULATION ON DYSPHAGIC STROKE PATIENTS

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Introduction: Dysphagia post stroke may result in severe consequences such as malnutrition and dehydration due to sensorimotor impairments resulting in pharyngeal residue and delayed swallow. Increasing sensory stimuli and motor training programmes could result in improvements. Chin tuck against resistance (CTAR) has been reported as a potential treatment targeting pharyngeal phase dysphagia while thermal tactile stimulation (TTS) at the faucial pillars has been used clinically; however evidence for both is lacking. This study investigated the short-term effects on dysphagia severity and swallow efficacy of the application of a 2-week combined CTAR and TTS training programme on subacute dysphagic stroke patients.

Methodology: Eligible stroke patients ($n = 15$ 10 men 11 with subcortical lesions mean (\pm SD) age 63 ± 5.4 days post-stroke 10 ± 3.7) underwent 2 weeks therapy regimen. Fiberoptic endoscopic evaluation of swallowing (FEES) was conducted at baseline and 2 weeks post measuring standing pharyngeal secretions spillage penetration-aspiration pharyngeal swallow onset time and residue. Dysphagia severity (Dysphagia Severity Rating Scale) and Functional Oral intake scale (FOIS) were also scored.

Results: Significant changes were observed on FOIS and DSRS after the treatment ($p = 0.043$ and $p < 0.001$ respectively). Statistically significant changes were observed in residue (measured with Yale residue scale) and penetration/aspiration scores ($p < 0.05$). Non-parametric tests (Spearman Spearman-rank correlation correction Holm-Bonferroni) were used in order to measure the strength of association between the main variables and the direction of the relationship.

Conclusion: This study demonstrated that sensorimotor treatment approach in the form of combined CTAR and TTS is effective in improving the pharyngeal swallow reducing pharyngeal residue and improving the swallowing function efficacy in post-stroke dysphagic patients.

Session 08. Poster session 8D: Paediatric Dysphagia 2

SPECIFIC PROGRAM OF REHABILITATION OROMOTOR IN PATIENTS CARRIERS OF EXTERNAL FEEDING DEVICES. IMPROVING THE QUALITY OF LIFE AND REDUCTION OF HEALTH EXPENDITURE

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Introduction: Oropharyngeal dysphagia (OD) with significant compromise in safety or efficacy can make it necessary to use external feeding devices (EFD) with increase in health cost and worsening of quality of life. Our objective is to describe how the specific rehabilitation program works.

Methods: Retrospective descriptive study of patients in the oromotor rehabilitation program who are carriers of EFD from January 2014 to December 2016. Clinical variables are collected: main diagnosis indication of EFD nutritional support period of rehabilitation costs derived from nutritional support before and after the program.

Results: A total 26 patients was collected average age of 2.5 years at the beginning of the program. Main diagnosis: genetic syndromes with neurological involvement 62%. All patients were carriers of EFD 88.4% with nasogastric tube and 11.6% with gastrostomy tube. At the beginning of the rehabilitation program 85% received exclusive food by EFD and 15% nonnutritive oral stimulation. Sixty-five percent performed the rehabilitation program exclusively in outpatient visits usually once or twice a week and 35% required a program of 5 days of hospitalization for clinical complexity. Average rehabilitation time was 2.5 months (range 0.5–15 months). The cost linked to the patients before to start the program was €75558 (enteral nutrition 65% and EFD 35%) and after the rehabilitation period the costs was reduced to €46309 This result produced a reduction in the cost of nutritional support 38% (€29248) an average €1124 in each patient per year and it is 0.98% of annual cost derived from nutritional support in our center.

Conclusions: The use of external feeding devices is frequent pediatric hospitals. Both the appropriate indication and its withdrawal are important according to the clinical situation of each patient. The implementation of a specific program of oromotor rehabilitation is important to obtain a reducing in the health cost.

THE SWALLOWING FUNCTION AND ITS EFFECTS IN AMBULATORY CHILDREN WITH DUCHENNE MUSCULAR DYSTROPHY AND CEREBRAL PALSY: A PILOT STUDY

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Introduction: Swallowing functions are affected from many components such as neurological coordination and muscle strength. This study was aim to investigate the swallowing function and its effects in children with Duchenne Muscular Dystrophy (DMD) and Cerebral Palsy (CP).

Materials and Methods: A total of 20 ambulatory children including 10 children with DMD and 10 children with CP at Level I II and III according to Gross Motor Function Classification System. After observational evaluation of facial and oral structure swallowing function was determined with 3 oz water test and Pediatric Eating Assessment Tool-10 (PEDI-EAT-10). When children are asked to eat a standard biscuit meal chewing tongue thrust and dribbling problems are assessed with Karaduman Chewing Performance Scale (KCPS) Tongue Thrust Rating Scale (TTRS) and Dribbling Rating Scale (DRS) consecutively. Quality of life was measured by the Swallowing Quality of Life (SWAL-QOL) questionnaire.

Results: The mean age of children with DMD and CP was 590 ± 061 and 320 ± 125 years successively. In terms of demographic characteristics and observational evaluations the groups were homogenous. There is no difference between children with DMD and CP regard to swallowing function chewing tongue thrust dribbling function and quality of life ($p > 0.05$).

Conclusions: This study show that children's functional status is influential on swallowing function without recognizing the pathophysiology of the disease. There is a need for studies involving more children at different functional levels

ARE PHARMACOLOGICAL INTERVENTIONS EFFECTIVE FOR DROOLING IN CHILDREN WITH CEREBRAL PALSY? A SYSTEMATIC REVIEW OF EVIDENCE

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Introduction: Although a wide range of different pharmacological interventions have been developed to minimize drooling in children with cerebral palsy (CP) clinicians lack direction on the evidence for these interventions. The aim of this study is to investigate the safety efficacy and effectiveness of pharmacological treatments for drooling in children with CP.

Materials and Methods: A systematic review was conducted including all randomized and/or controlled clinical trials. Electronic databases (Pubmed, Cochrane Central Register of Controlled Trials Medline, EMBASE, CINAHL, ERIC, PsycINFO, Web of Science Core, AMED, Scopus) academic journals and grey literature sources were searched from inception to December 2017. Two independent reviewers screened titles and abstracts and reached agreement on inclusion/exclusion of studies for further review. The methodological quality of included studies was evaluated using the Cochrane Risk of Bias tool. No language limits were applied.

Results: The initial research revealed 1668 results. Three studies met the inclusion criteria and according to the Cochrane Risk of Bias tool the methodological quality was low with high risk of bias. A variety of mild to severe adverse effects was also reported in all included studies.

Conclusions: Using GRADE the quality of the evidence for pharmacological interventions for drooling in CP is low. Research is limited by poor outcome measures and well-designed clinical trials are needed. Pharmacological interventions must be considered in the context of all other interventions used to control drooling in children with CP. Adverse effects must be evaluated and reported. We provide directions for further research.

BREASTFEEDING: RELATIONSHIP BETWEEN CLINICAL EVALUATION AND CERVICAL AUSCULTATION IN PREMATURE INFANTS

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Introduction: Breastfeeding is the most natural and safe way to feed a premature new-born. The observation and clinical evaluation of breastfeeding can be done through the breastfeeding observation protocol (BFP) idealized by the World Health Organization together with the United Nations Children’s Fund. Cervical auscultation (CA) is a non-invasive method which consists of listening to the sounds during of pharyngeal phase of swallowing. The aim of the study was to associate the data found in the clinical evaluation with the sounds captured by cervical auscultation during breastfeeding in premature new-born.

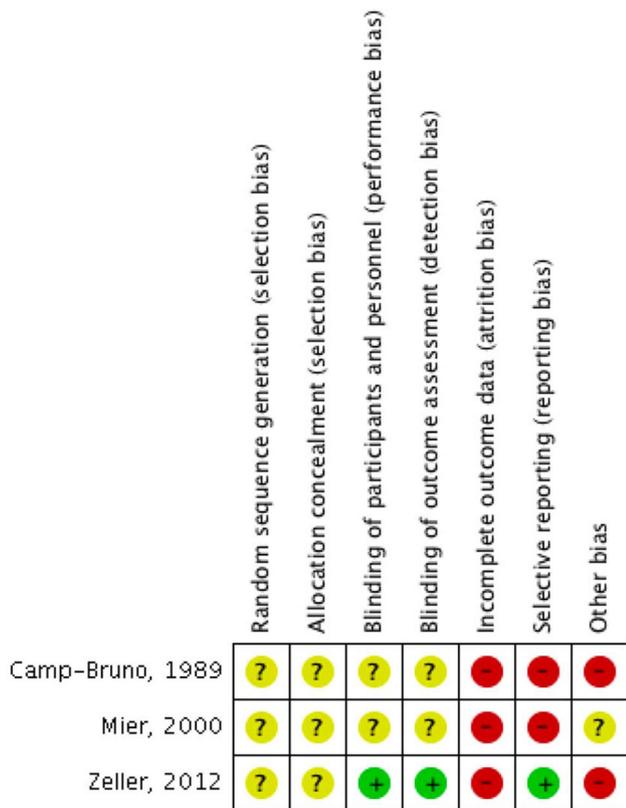
Materials and Methods: A cross sectional observational study approved by ECR (1.808.731). After the mother agreed to participated in the study information from the new-born were collected through the electronic medical record. The breastfeeding time was evaluated through BFP and at the same time CA was performed by an electronic stethoscope (Littmann Electronic Model 3200). The sounds were analysed using DeglutiSom® software generating intensity peak frequency duration number of swallows and visual data. The collected data were analysed in the SPSS program version 21.0. The adopted level of significance was 5%.

Results: It was found an association between a large gestational age and duration of swallow; a decrease in the intensity with more breastfeeding days had started. There was no significant association between clinical evaluation and acoustic parameters performed through CA during breastfeeding.

Conclusions: Even though no significant associations were found regarding the parameters of CA and the CBP it is important to carry out new studies that bring objective data to be added to these evaluations.

Keywords: Breastfeeding; Premature; Evaluation; Auscultation

Variables	Position	Breastfeeding Observation Protocol			
		Responses	Establishment of affective ties	Anatomy	Suction
Peak frequency (Hz)	rs=-0.173 (p=0.390)	rs=-0.139 (p=0.490)	rs=-0.009 (p=0.965)	rs=-0.187 (p=0.351)	rs=-0.164 (p=0.414)
Intensity (dB)	rs=-0.127 (p=0.527)	rs=0.215 (p=0.281)	rs=0.030 (p=0.881)	rs=-0.139 (p=0.490)	rs=0.307 (p=0.119)
Number of Swallowing?s	rs=0.356 (p=0.068)	rs=0.247 (p=0.214)	rs=0.199 (p=0.319)	rs=-0.089 (p=0.659)	rs=0.112 (p=0.577)
Swallowing duration (s)	rs=-0.200 (p=0.317)	rs=-0.158 (p=0.431)	rs=-0.208 (p=0.299)	rs=-0.115 (p=0.568)	rs=-0.057 (p=0.777)



EVALUATION METHOD OF SALIVA ASPIRATION USING GREEN DYE IN SIMD PATIENTS

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Purpose: Prevention of aspiration pneumonia is one of the most important issues in severe motor and intellectual disability (SMID) patients such as those with cerebral palsy. Therefore it is necessary to evaluate aspiration causing pneumonia and manage it appropriately for example by the restriction of food textures and changes in

the rate of oral feeding. However we often experience cases with a discrepancy between the presence of prandial aspiration and the development of pneumonia; therefore as another factor we focused on saliva aspiration. Since saliva is colorless and transparent in many cases it is difficult to accurately determine the presence or absence of saliva aspiration. In order to establish a simple and effective method we investigated an evaluation method for saliva aspiration using a small amount of green dyed water. In this pilot study we compared the history of pneumonia between aspirators and non-aspirators.

Materials and Methods: Thirty-eight SMID patients participated in the study (mean age 49.8 ± 12.0 years). Evaluation was carried out as follows. First 0.5 to 1.0 ml of green dyed water was placed on the floor of the patient's mouth. After 3 min the presence or absence of aspiration of the green dye was evaluated by FEES; prandial aspiration was also evaluated. Based on these results we examined the relationship between the presence or absence of aspiration and the history of pneumonia within 3 months of the evaluation.

Results: There was no association between prandial aspiration and history of pneumonia whereas there was a significant association between aspiration of green dye and history of pneumonia ($p < 0.01$).

Conclusion: The results suggested that in SMID patients (1) a risk assessment of pneumonia may be difficult in the presence or absence of prandial aspiration only and (2) the evaluation method using green dye may be an indicator of the risk of developing pneumonia.

RELATIONSHIP BETWEEN HAND FUNCTION AND CHEWING AND SWALLOWING FUNCTION IN CHILDREN WITH CEREBRAL PALSY

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Purpose: The aim of this study was to investigate the relationship between hand function and chewing and swallowing function in children with cerebral palsy (CP).

Methods: Children with CP aged between 5 and 12 years and referred due to swallowing dysfunction were included. Demographic information including gender age height and weight was recorded. The function of hand which was used in daily life activities was assessed by using the Jebson–Taylor Hand Function Test (JTHFT) and duration of the activities was recorded in seconds (s). Chewing performance level was scored between 0 and 4 according to Karaduman Chewing Performance Scale (KCPS). The 3-Ounce Water Swallow Test (3-ounce) was performed as clinical swallowing evaluation and recorded as 'Passed' or 'Failed'.

Results: Sixteen children (6 female, 10 male) with a mean height of 26.21 ± 7.87 kg and mean weight of 136.0 ± 26.4 cm were included. A moderate statistically significant correlation between total JTHFT duration and KCPS scores was found ($p = 0.02$; $r = 0.55$). There was no statistically significant difference in terms of JTHFT durations according to results of the 3-ounce ($p = 0.06$). The mean JTHFT time of children passed from the 3-ounce was 94.27 ± 59.44 s while the mean JTHFT time of children failed from the 3-ounce was 130.02 ± 55.3 s.

Conclusion: According to our study there is a relationship between upper extremity function and chewing performance level in children with CP. The performance of hand function of children without swallowing dysfunction was better than children with swallowing dysfunction even if it is not statistically significant.

DEVELOPMENT OF AN ALERT LIST FOR FEEDING AND SWALLOWING PROBLEMS IN INFANTS WITH SPINAL MUSCULAR ATROPHY TYPE I

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Introduction: Spinal Muscular Atrophy (SMA) is a hereditary progressive muscle disease with infantile or childhood onset and a broad range of severity. SMA type I is the most severe form characterized by onset before the age of 6 months and a life expectancy of 6–13 months. The recent introduction of the antisense oligonucleotide (ASO) Nusinersen improves survival and motor development but does not cure SMA (1). Supportive treatment such as the monitoring and support of feeding and swallowing to optimise the safety and comfort of these children remain very important. As there is currently no instrument to monitor feeding and swallowing in SMA type I we developed and evaluated the usefulness and feasibility of an alert list for professionals.

Methods and Results: The list consists of 16 yes/no questions about fatigue with oral feeding unsafe swallowing reflux respiratory infections weak voice when crying and weak cough. The list was filled in by parents during a hospital visit or during a telephone call with one of the authors. Ten infants with SMA type I (median age 39 days, range 3–218 at inclusion) were included from September 2016 to March 2018. The following symptoms were frequently observed or reported at the time it was decided to start tube feeding: coughing when feeding wheezing sound (of mucus) during or after feeding nursing sessions of 10–15 min with frequent feedings sweating associated with feeding respiratory rate > 60 /min before/during/after feeding.

Conclusion: Parents of infants with SMA I frequently report symptoms that indicate feeding problems including short and frequent feeding sessions due to fatigue. The alert list allows screening of feeding problems on regular basis and facilitates decisions that promote a safe and comfortable feeding situation including the start of tube feeding. We are currently investigating validity of the list in more detail.

Session 08. Poster session 8E: Treatment 2

AN APP: A TOOL IN REHABILITATION OF DYSPHAGIA

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Introduction: The financial resources in the healthcare system are limited. Many patients want a high flexibility in relation to where and when they train. This provides the basis to develop a training app as an alternative to existing training programs for people with dysphagia.

Materials and Methods: The app is built in a joint venture between the Department of Physiotherapy and Occupational Therapy and The Centre of Clinical Research North Denmark Regional Hospital and the IT department in the North Denmark Regional. Experienced dysphagia therapists choose the exercises and the app is tested by a group of 20 patients.

Results: The app includes 17 exercises all illustrated with a video and speak. A reverse camera function that makes it possible for the user to control the exercises are performed like in the video. A therapist or the user can choose relevant exercises and program how many repetitions per time and per day-if wanted a reminder function is activated. The number of performed exercises will be stored. Weight can be registered. The app will be free and be available for android and iOS and in Danish and English.

Conclusions: The app will be presented at the ESSD2018.

CLASSIFICATION OF TEXTURE-MODIFIED DRINKS: AN EXPERIMENTAL AND COMPUTATIONAL FLUID DYNAMICS INVESTIGATION

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At the 2017 World Dysphagia Forum the ESSD president presented a proposal for classification of texture-modified liquids using shear rheology. A syringe-based test of flow was published by IDDSI but how does this measurement relate to rheology? And what are the flow rates inside the syringe?

Methods:

1 Starch- and gum-based thickened liquids were created to represent the full range of dysphagia management products from water to solid.

2 A lab. rheometer characterised these at shear rates from 0.1 to 1000/s plus yield stress measurement.

3 The IDDSI flow test was performed. In order to acquire more-detailed information about the flow profile a motion-tracking system was employed (Fig. 1).

4 A computerised fluid dynamics (CFD) model of the gravity-driven syringe flow was created using the fluid's rheological data and measured flow rates to investigate the shear rates within the syringe (Fig. 2).

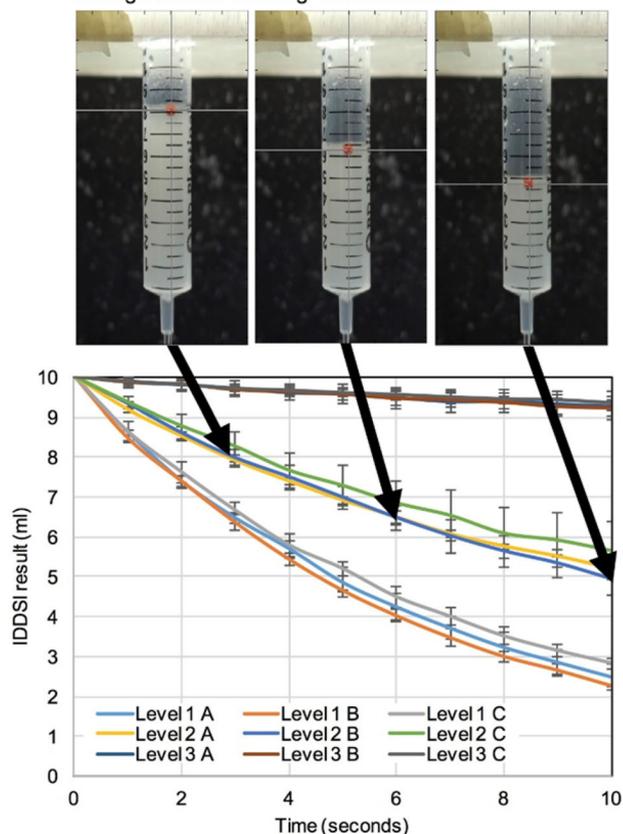
Results: Rheology: the liquids were shear-thinning: at 50/s the apparent viscosity ranged 61–274 mPa s (gum) while at 300/s they had lower apparent viscosity of 15–58 (gum). Starch liquids showed less of a change from 52 to 396 mPa s at 50/s to 25 to 142 mPa s at 300/s.

IDDSI test: Water resulted in a measure of 0 ml and the scale of increasing thickness up to 10 ml covered the full range from naturally thick (UK) and Grade 1 (Ireland) to no-flow spoon-thick pudding consistencies (Stage 3/Grade 4).

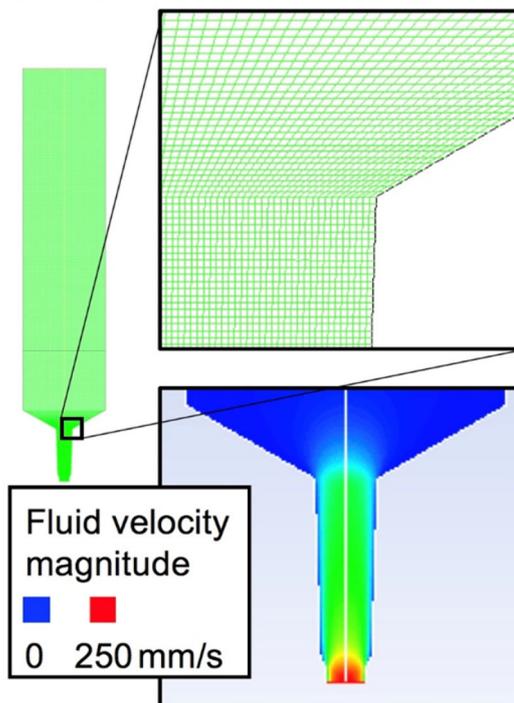
CFD: CFD models were able to replicate experimental flow results in all cases of liquids. CFD revealed the shear rates within the syringe barrel were low: 0–5/s whereas the shear rates within the nozzle reached > 1000/s. For the thicker fluids cohesiveness instead of shear viscosity became a prominent determinant of drop-formation and hence flow.

Conclusions: The IDDSI flow test is a composite measure of a fluid's resistance to flow over a wide range of shear rates from 0 to > 1000/s. The result also depends on the fluid's cohesiveness for thick liquids.

Experimental measurement of IDDSI flow test through motion-tracking video software



Computational Fluid Dynamics (CFD) Simulation of Syringe



DYSPHAGIA & MODIFIED DRINKS: EXAMINING PATIENT PREFERENCE OF COMMERCIALY AVAILABLE THICKENING POWDERS

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¹HSE

Introduction: Dysphagia can negatively affect quality of life nutritional status and respiratory status of individuals. A common intervention for dysphagia is the use of thickening powder in drinks to improve swallow safety (Castellanos, Butler, Gluch, and Burke 2004). Despite the intended health benefits of thickened drinks patients may decline to follow thickener recommendations due to dislike of the look taste or texture of thickened drinks. The aim of the current investigation was to determine whether there was a significant difference between individual preference for different commercial thickener brands available in the Irish market.

Methods: Participants were randomly recruited from a Primary Care mixed aetiology dysphagia caseload. The study included five persons with a diagnosis of oropharyngeal dysphagia and five persons with no known history of dysphagia. This study investigated the taste preference for drinks using three commercial thickener brands; including two starch based and three xanthan gum based thickeners. All participants were blinded to the thickener brand and trialed the thickened drinks in a random order. Drinks were rated on a scale from most preferable to least preferable.

Results: Results demonstrated a statistically significant difference between the personal preference across the five thickeners trialed. Difference between thickener of choice also varied across the type of drink thickened (i.e. water cold fruit juice beverages milk hot drinks and carbonated beverages). Every participant rated at least one of the thickener drinks as having an acceptable taste with the cold fruit juice beverages milk hot drinks and carbonated drinks. A minority of participants rated any thickener as having an acceptable taste in water.

Conclusions: With recent changes in available thickeners exploring individual preferences is critical when selecting a thickener product to optimise compliance with clinical recommendations.

A REVIEW OF SPEECH AND LANGUAGE THERAPY PROFESSIONAL ASSOCIATION GUIDELINES REGARDING THE BOLUS MODIFICATION TECHNIQUES OF THICKENED LIQUIDS AND TEXTURE MODIFICATION FOR ADULTS WITH ORO-PHARYNGEAL DYSPH

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Introduction: Clinical practice guidelines (CPGs) are statements of best practice developed to guide clinical decision making and improve patient outcomes. Bolus modification is a highly prescribed compensatory strategy in dysphagia practice with mixed

empirical evidence to support its efficacy. This study evaluates the quality of SLT professional guidelines that recommend the bolus modification strategies of thickened liquids (TL) and texture modification (TM) and appraises the evidence underpinning those recommendations.

Methods: As professional guidelines are typically developed and made available through the associations that create them SLT professional organisations worldwide were contacted to retrieve CPGs. Contact details were retrieved from the International Association of Logopaedics and Phoniatrics (IALP) website. 40 national and 5 provincial associations were contacted by email and a request made to forward CPGs that set the standard of care for dysphagia practice. Quality appraisal was conducted using the AGREE-II. Recommendations relating to the provision of thickened liquids and food texture modification were extracted and the supporting evidence was appraised using the Oxford Centre for Evidence Based Medicine Levels of Evidence.

Results: Seven CPG's that were that were sent by national ($n = 5$) and provincial ($n = 2$) associations were included for review and coded as Australia Canada 1 Canada 2 Ireland South Africa UK and USA. 86% of the guidelines were moderate-high quality overall but the average score for Rigor of Development was low (38%). While all included CPGs reported both TM and TL as compensatory interventions for dysphagia management none made strong recommendations regarding these techniques. Only 29% of the CPGs reported the source of the evidence used to support the recommendations.

Conclusion: Though CPG quality was rated as moderate-high overall low scores for developmental rigour suggest improvements are required in this domain.

THE USE OF THICKENED FLUIDS IN DYSPHAGIC PATIENTS IN GREECE: AN INTERNET-BASED SURVEY OF SLT PRACTICE

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Introduction: Currently there is a lack of national descriptors of diets for dysphagic population and clinical guidelines regarding the assessment use and training of patients and stakeholders on modified diets in Greece. This study surveyed the practice patterns amongst Greek Speech Language Pathologists/Therapists (SLP/SLTs) prescribing thickened fluids for patients with dysphagia.

Methodology: A 33-item internet-based survey and questionnaire evaluating the use of thickened fluids was disseminated via Survey Monkey to SLP/SLTs across Greece. Only the responses by those working with dysphagic patients were analysed.

Results: Most responders had bachelor education (63%) while half were working on dysphagia less than 2–5 years and mostly working in rehabilitation settings or private practices (81%).

Results showed that clinicians base the decision about modified diet on bedside assessment (BDA 85%) Fiberoptic Endoscopic examination of Swallowing (FEES 65%) or Videofluoroscopy (VFS36%). Coughing and delayed reflex are the main symptoms to decide on modifying diet while most choose yogurt consistency (23%) and thickened fluids (70%). Re-assessment of swallowing ability is performed on all follow-up sessions by 43% of the clinicians. According to clinicians patients tolerate thickening fluids better the longer they use them while half of them alter viscosity according to patients' preferences. While most clinicians use modified diet in conjunction with other treatments (81%) they believe that thickening fluids is crucial for dysphagia management (80%). Yet 50% replied that no formal training is performed to guide preparations.

Conclusions: Interestingly there is homogeneity amongst clinical scope of practice while most clinicians base their decisions mostly on patients' symptoms during BDA. Results demonstrate the need for a formal viscosity classification system as well as training material on modifying diets for dysphagic patients.

WHOSE CARES ABOUT MOUTH CARE? AN INTER-DISCIPLINARY QUALITY IMPROVEMENT INITIATIVE IN A LARGE ACUTE TEACHING HOSPITAL

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Introduction: As per the World Health Organisation (2012) "Oral health is essential to general health and quality of life". This is a growing area of clinical interest with the introduction of Mouth Care Champions in the NHS (2015) and the SOCLE II RCT in Scotland. Mouth care has been shown to play an important role in the prevention of aspiration pneumonia (Van Der Maarel-Wierink et al. 2013). Thorough review of national and international literature highlighted that there are limited published evidence based formal assessment protocols and treatment plans available for the acute care setting.

A quality improvement initiative was undertaken in a large acute teaching hospital using the Institute for Healthcare Improvement's (IHI) "Plan-Do-Check-Act" framework with the aim of completing a clinical audit of current mouth care practices and establishing an interdisciplinary working group to develop a mouth care assessment and treatment resource.

Materials and Methods:

- (1) Hospital-wide audit of mouth care practices (*n* = 111) using random sampling. Audit analysis completed using Sphinx software.
- (2) Formation of interdisciplinary working group led by SLT
- (3) Development of Mouth Care Assessment and Treatment Algorithm
- (4) Introduction of Mouth Care Algorithm to Clinical Staff.

Audit of Mouthcare

Thank you for taking the time to answer this survey on mouth care in our organisation. Please mark the circle clearly.

To which profession do you belong?

Healthcare assistant Nursing Physiotherapy
 Occupational therapy Speech and language therapy Medicine
 Dietetics Student nurse Student doctor
 Student allied health professional Other

What percentage of your current patient caseload are dependent for mouthcare?

Less than 10% 25-50% 51-75% 75-99% 100%

Do you use a formal assessment tool when completing mouthcare? **Would you find a simple flowchart to guide your assessment and management in mouthcare useful?**

Yes No Sometimes Yes No

Have you received training in how to provide mouthcare?

Formal training Informal training No training

Would you like to receive training in how to provide mouthcare?

Yes No

How would you like training on mouthcare to be provided?

Online training Hands-on practical training Leaflet
 Other No training

Do you use pink swabs when you are completing mouthcare? **Have you ever experienced breakdown of the pink swab when providing mouthcare? E.g. detachment of foam from swab.**

Yes No Yes No

Who do you believe is PRIMARILY responsible for the provision of mouthcare? **Who would you rate as the NEXT MOST responsible for the provision of mouthcare?**

Healthcare assistant Nursing Healthcare assistant Nursing
 Physiotherapy Speech and language therapy Physiotherapy Speech and language therapy
 Medical team Dietetics Medical team Dietetics
 Clinical nurse specialist Palliative care Clinical nurse specialist Palliative care
 Dentist Dentist

What do you think are the main barriers to your provision of adequate mouthcare? (Tick all that apply).

Time constraints Lack of staffing
 Lack of appropriate supplies Lack of knowledge/training
 Lack of confidence Lack of assessment tool
 This is not part of my role Other (please specify)

Please rate how highly you prioritise the provision of mouthcare when caring for your patients? (5 = Highest priority, 1 = Lowest priority).

1 2 3 4 5

Please rate how confident you feel in the provision of mouthcare for your patients (5 = Very confident, 1 = Not confident).

1 2 3 4 5

ST. VINCENT'S UNIVERSITY HOSPITAL

Mouth Care Algorithm

Evaluate the patient's mouth care risk by matching the description that best describes your observations of the patient's oral hygiene and level of dependency.

Low Risk: The patient can complete standard mouth care independently of nursing staff and has no mouth care red flags.

Medium Risk: The patient cannot or requires prompting by nursing staff to complete standard mouth care but has no mouth care red flags.

High Risk: The patient is dependent on nursing staff for mouth care and has a mouth care red flag, is NPO or is on high flow O₂ or NIV.

Standard Mouth Care Procedure:

1. Brush teeth at least twice daily using toothbrush and toothpaste. Please ask patient or NOK to bring in a toothbrush or to purchase one in the hospital shop.
2. Lip lubricant to be used as needed.
3. Clean dentures using a toothbrush and toothpaste and rinse well before re-fitting. Clean dentures after every meal. Remove dentures at night, clean and soak in a suitable cleansing solution in a labelled container.
4. Consider use of Bioextra Spray in case of dry mucous membranes (high flow O₂, NPO etc).
5. Encourage adequate hydration.

Medium Risk: Nursing staff to complete standard mouth care for dependent patients or prompt able patients to complete standard mouth care independently.

Watch out for the following Mouth Care Red Flags:
 Standard mouth care 4 hourly (mouth care pack and suction toothbrush as needed)
 Contact medical team to review and prescribe suitable treatment:

 Candida Nystatin 1 – 4mls QDS PO OR Fluconazole 50 – 100mg OD PO	 Coating and Xerostomia Bioextra Spray PRN AND Humidification	 Inflammation or Mucositis Diffiam Mouthwash 15mls 4 hourly PRN OR Lidocaine Mouthwash (for severe cases) 15mls QDS	 Ulcers and Blisters Medigel Apply to affected area PRN
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Results:

- (1) Clinical audit results highlighted inconsistencies in mouth care practices and identified key stakeholders enabling formation of interdisciplinary working group
- (2) Mouth Care Algorithm successfully developed and approved for clinical use at hospital level
- (3) Education successfully completed enabling induction of Mouth Care Algorithm into practice

Conclusion: QII identified key stakeholders and practice limitations in mouth care provision in a large teaching hospital and resulted in the successful implementation of a Mouth Care Algorithm to maximize patient care. This represents an initial step in developing consistent high quality clinical practice in the area of Mouth Care.

THERAPEUTIC EFFECTS AND α -AMYLASE RESISTANCE OF A NEW MIXED STARCH AND XANTHAN GUM THICKENER IN FOUR DIFFERENT PHENOTYPES OF PATIENTS WITH OROPHARYNGEAL DYSPHAGIA

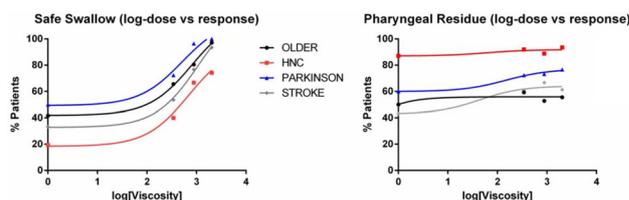
O. Ortega¹, C. Gallegos², O. Arreola¹, A. Martín¹, V.W. Nascimento¹, D. Álvarez-Berdugo¹, N. Tomsen¹, M. Bolívar-Prados¹, L. Fillol-Bruguera¹, E. Brito de la Fuente², P. Clavé¹

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Introduction: Oropharyngeal dysphagia (OD) is a prevalent condition among patient phenotypes (older neurological post head/neck cancer –HNC–) and leads to severe complications. There is evidence that thickening fluids reduces aspirations; however thickener clinical efficacy can be affected by salivary α -amylase and vary according to OD patient phenotype. Our aim was to assess the therapeutic effect and α -amylase resistance of a new mixed gum/starch thickener (Fresubin Clear Thickener® [FCT] FreseniusKabi) on 4 phenotypes of OD patients.

Patients and Methods: We studied 128 patients with OD: (G1) 36 older; (G2) 31 HNC; (G3) 30 Parkinson; and (G4) 31 stroke. The therapeutic effect of FCT was assessed during videofluoroscopy with the Penetration-Aspiration Scale (PAS) for 5 and 20 mL boluses at 4 levels of viscosity (thin liquid < 50 mPa s nectar 342.2 \pm 83.0 mPa s honey 880.4 \pm 65.4 mPa s; spoon-thick 2031.4 \pm 211.5 mPa s. All viscosities measured at 50 s⁻¹). The effect of α -amylase was assessed by a rotational viscometer after 30 s oral incubation of 15 mL bolus in each patient.

Results: (a) Demographic characteristics are shown in Table 1. Severity of OD was maximal in HNC (80.6% unsafe swallows at liquid 93.6% with pharyngeal residue at spoon-thick $p = 0.03$; PAS = 5.4 \pm 2.9; $p = 0.038$). (b) Therapeutic effect: FCT had a strong viscosity-dependent therapeutic effect on safety of swallow in all groups with a maximal effect at spoon-thick and did not increase pharyngeal residue at any viscosity (Fig. 1). (c) Mechanism of action: FCT did not affect timing of swallow response or bolus velocity across the tested viscosities (LVC [317.1 to 388.1 ms]). (d) The viscosity of the thickener was not reduced by salivary α -amylase in any of the phenotypes (% reduction [– 19.2 to



	OLDER	HNC	PARKINSON	STROKE	P-value
N	36	31	30	31	
Age	82.96 \pm 7.45	68.29 \pm 7.72 ^{****}	72.34 \pm 10.52 ^{****}	79.42 \pm 7.55 ^{****††††}	<0.0001
Sex (♀) (%)	66.67 (24)	32.26 (10) ^{**}	20.00 (6) ^{**}	35.48 (11) ^{**}	0.0008
Barthel	78.33 \pm 25.13	96.50 \pm 9.33 [†]	77.33 \pm 24.56 [†]	74.83 \pm 29.11 ^{††}	0.0007
Optimum (100) (%)	40 (14)	67.34 (21) [†]	23.33 (7) ^{***}	43.33 (13)	
Sub-optimum (<100) (%)	61.11 (22)	32.26 (10)	76.67 (23)	56.67 (17)	0.005
MNA-sf	10.97 \pm 2.29	11.50 \pm 1.95	11.72 \pm 2.59 [†]	10.62 \pm 2.81 ^{**}	0.326
Well-nourished (%)	47.22 (17)	48.57 (17)	60.00 (18)	36.67 (11)	
At risk (%)	44.44 (16)	37.14 (13)	33.33 (10)	56.67 (17)	0.610
Malnourished (%)	8.33 (3)	2.86 (1)	6.67 (2)	6.67 (2)	
BMI (Kg/m ²)	27.594 \pm 5.11	23.97 \pm 3.85 [*]	27.50 \pm 4.57	27.78 \pm 3.93	0.002
Handgrip Force (Kg)	16.33 \pm 6.94	22.78 \pm 10.60	25.38 \pm 9.26 ^{**}	17.77 \pm 7.24 [†]	0.0009
Health status self-perception (0-100)	63.57 \pm 19.65	70.83 \pm 20.00	56.25 \pm 20.50 [†]	58.67 \pm 28.97	0.055
Higher PAS score	4.08 \pm 2.31	5.36 \pm 2.89	3.80 \pm 2.17 ^{**}	4.55 \pm 2.26	0.038

MNA: mini-nutritional assessment; BMI: body mass index; PAS: penetration-aspiration scale; HNC: head and neck cancer. Intragroup comparisons: * vs. OLDER; † vs. HNC; †† vs. PARKINSON. †††† symbol indicates p-value <0.05; †† symbol indicates p-value <0.01; † symbol indicates p-value <0.001; ††† symbol indicates p-value <0.0001.

Table 1. Demographic and clinical characteristics of the study population

Conclusions: Increasing bolus viscosity with FCT has a strong viscosity-dependent therapeutic effect by improving safety of swallow without increasing pharyngeal residue. The therapeutic effect of FCT depends on the phenotype of patient and is not affected by salivary α -amylase.

DOES THE CARBONATED WATER DECREASE ORAL TRANSIT TIME?

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Introduction: Patients with dysphagia can have an increased swallowing reaction time. The ingestion of carbonated water can enhance the somatosensory perception inherent in chemical stimulation improving swallowing. The propose of this investigation was to verified if the carbonated water can be helpful in fine liquid dysphagia rehabilitation since that to the best of our knowledge in Portugal there are no studies carried out in the sense of perceiving the effects of carbonated water in the improvement of the biomechanics of swallowing.

Materials and Methods: A cross-sectional study was carried out in order to observe the effects of the carbonate water on 19 patients (MNage = 73.05 years; SD = 16.95) with neurogenic dysphagia. The study was conducted in two different continuing care units of medium-term and rehabilitation and all patients had dysphagia for fine liquids. Volume of 15 ml of fine liquid and 15 ml of carbonated water was used for the same patients. The parameters related to the time of oral transit were recorded and registered. Relative to the values

obtained given the lack of a normal distribution results of both samples were analyzed with Wilcoxon Signed-Ranks Test.

Results: All patients significantly decreased the oral transit time in the intake of carbonate water compared to the thin liquid. Type of water had a significant impact in swallowing time ($Z = -3.823$; $p < 0.001$). The mean time of oral transit for fine liquid was 4.906 SD 5.744 and for carbonated water was 2.194 SD 1.694. The results were observed in both institutions.

Conclusion: These findings support the previous investigations that carbonated water may reduce oral transit time by assisting the swallowing process in patients with dysphagia for fine liquids.

Session 08. Poster session 8F: Professional Roles in Dysphagia Management 2

THE DEVELOPMENT OF A NOVEL ONLINE DYSPHAGIA MODULE TO IMPROVE NURSE TRAINING

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Introduction: Effective management of dysphagia improves outcome. Therefore it is vital that staff supporting patients with feeding are trained in how to manage dysphagia safely. However resource pressures and staff turn-over make it difficult to access staff for training. In our Trust this was presenting a risk to patients. The new International Dysphagia Diet Standardisation Initiative (IDDSI) also created training needs due to the change in approach to modifying fluids and diet.

Methods: The number of nurses completing induction training in dysphagia over 6 months in an Acute NHS Trust was collected. An online module drawing on segmentation principles was designed to increase accessibility. An evaluation survey was built into collect feedback and the module was piloted via clinical educators. The module is described together with the learning approach and trainee feedback so far.

Results: Before the new package 13.4% of 388 nurses completed Dysphagia Induction Training in 6 months. In response an online module was developed with the aim of raising awareness of the nursing role in dysphagia management including the IDDSI framework and the Trust Swallow Screen. The module is responsive allowing access on mobile devices. Concepts are explained with videos text and interactions then formative assessments occur through interactive activities where feedback is released. The module ends with an assessment and scores are tracked. Twenty nurses completed the pilot; positive feedback was obtained accessibility and flexibility were valued and it was reported that the module takes 20 min to complete.

Conclusions: Access to nurses for dysphagia training in our Trust was poor. An online approach greatly improves accessibility and should improve patient care. The module allows for comprehensive learning that can be completed flexibly and monitored. The next stage is to release the module Trust-wide for the IDDSI changeover and to further analyse feedback and outcomes.

CHEMICAL INGESTION INJURY & DYSPHAGIA: COMPLEX SLT MANAGEMENT

C. Langan¹

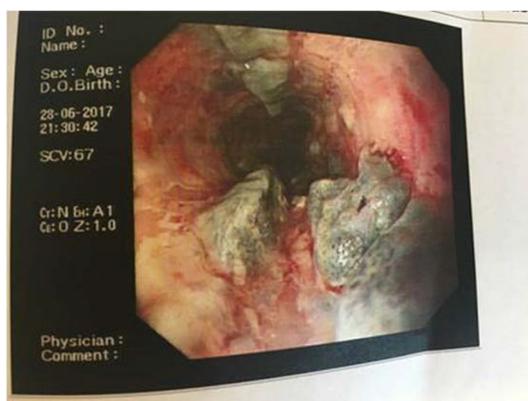
¹St Vincent's University Hospital

Introduction: Initial presentation post chemical ingestion injury includes oro-pharyngeal pain dysphagia and stridor (Bird et al 2017) It is of critical importance that the Speech & Language Therapist (SLT) working in acute care is aware of the complex nature of these patient presentations and SLT management approach whilst also having a broad understanding of the gold standard clinical approach including airway assessment grading of injury and medical therapy. Oesophageal injury more commonly occurs and has been widely reported however there is a paucity of evidence for the role of SLT in these patients (Rumbach et al 2016). Awareness of chemical used and sequelae of same early identification of airway involvement and timing of dysphagia assessment is key in this patient cohort.

Methodology: Retrospective analysis of two complex cases post accidental and intentional chemical ingestion of hydrogen peroxide and glyphosphate.

Results: Chemical ingestion injury resulted in:

- (1) Initial severe pharyngeal dysphagia presentation with marked structural and sensory deficits in both patients including grade 3 burns and mucositis ulceration and space occupying oedema of pharyngeal and laryngeal structures pooling of salivary secretions and subsequent aspiration on same as assessed jointly by Ear Nose and Throat Surgeon (ENT) and SLT;
- (2) Gastroenterology involvement grading level of oesophageal injury with oesophagogastroduodenoscopy (OGD) using Zagar classification of mucosa to grade burns and recommendation of steroids and high dose proton pump inhibitor (PPI) and placement of naso-gastric tube (NGT) (image of case 1 included);
- (3) SLT recommendation for compensatory dysphagia strategies once suitable for oral trials including sip-hold-swallow and effortful swallow techniques pain relief and intake of colder temperatures to soothe burns and odynophagia; oral intake recommenced on day 2 post injury in case 1 and day 22 in case 2.
- (4) Complications occurred in one patient due to toxicity with PEA arrest liver injury and delirium.



Conclusion: Dysphagia presentation and recovery post chemical ingestion requires early focused SLT input joint input with ENT and liaison with Gastroenterology to provide appropriate management and individualized rehabilitation plans. The development of a treatment algorithm is being established to promote uniformity of care for these patients to promote positive clinical outcomes.

EVALUATION AND INTERVENTION PROCEDURES IN ADULT USERS WITH OROPHARYNGEAL DYSPHAGIA USED BY SPEECH THERAPISTS OF ÑUBLE CHILE. A MIXED STUDY

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¹Universidad del Bío-Bío

Background: The etiology of oropharyngeal dysphagia is multifactorial and its presence can lead to serious clinical complications. Unlike other countries Chile does not have a guide that specifies the approach to dysphagia leaving the choice of instruments and strategies used in evaluation and intervention procedures to the speech therapist criteria.

Objective: To describe the evaluation and intervention procedures in adults with oropharyngeal dysphagia used by speech pathologists in the Ñuble region Chile.

Methodology: Mixed study with descriptive (transversal) design and phenomenological type. A questionnaire was applied and an interview was conducted with 9 phonoaudiologists who work with adult users with oropharyngeal dysphagia in hospitals and CESFAM. For the quantitative phase a descriptive statistic was carried out. For the qualitative phase a hermeneutic analysis was carried out by means of live coding and then axial coding at two levels: codes and family formation.

Results: In evaluation 77.6% of phonoaudiologists do not perform screening and adapt protocols to perform clinical evaluation only two of the participants use standardized methods indicating as a reason the lack of time they have for public service. 100% make derivation for instrumental evaluation however 33.3% can participate of this. In intervention all speech therapists perform compensatory and reactivation strategies but only one participant performs electrostimulation. 66.7% of those interviewed work together with another professional but not applying an interdisciplinary work in the approach to dysphagia so they must make independent referrals to the professional in charge of covering the needs of the user.

Conclusion: The economic/material human and time resources together with the clinical experience of the professional influence the choice of evaluation and intervention procedures that phonoaudiologists perform in adult users with oropharyngeal dysphagia.

EVALUATION OF A PILOT PROGRAMME FOR TRAINING NURSING STAFF IN ADMINISTERING THE R.O.S.E. INFANT ORAL FEEDING SCREENING TOOL

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Background: Early identification and management of oral feeding difficulties in medically fragile infants is key in preventing/reducing respiratory morbidity growth faltering and longer term aversive oral feeding. The R.O.S.E. Infant Oral Feeding Screening Tool was developed by the SLT department in conjunction with Nurse Practice Development OLCHC and Trinity College Dublin to facilitate evidence-based management of infant oral feeding difficulties in an acute paediatric setting. The face content and ecological validity of the R.O.S.E. have previously been established and nurse training needs identified. This study evaluates a pilot programme developed to train nurses in administering the R.O.S.E.

Methods: The SLT Department developed and piloted a short 20 min training session covering: identification of risk physiological

indicators of Readiness to feed Oral skills measures of Swallow safety and feeding Efficiency. Three trainings were carried out in June 2017. Nurses practised using the R.O.S.E. by evaluating 3 case vignettes. Following training nurses completed an evaluation form regarding ROSE format and several training session variables.

Result: Of 25 participants 92% liked the R.O.S.E. format. 96% were happy with the amount of information provided. 52% were happy with length of training. 44% felt it was too short. 20% felt very confident to use the R.O.S.E. and 80% felt reasonably confident.

Discussion: Similar to previous research the R.O.S.E screening tool format was acceptable to nursing staff and its value in nursing practice recognised. This study suggests a short 20 min training may be adequate to ensure the nurses feel reasonably confident to use the R.O.S.E. However a large proportion of nurses felt the training was too short and only 20% felt very confident to administer the R.O.S.E. Mechanisms for assuring onward competency in administration need further development.

DYSPHAGIA IN INDIA COMPARING THE NECESSITY AND THE FACILITIES

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Introduction: INDIA is a highly populated country today (4/05/2018) the population is 1351693346 and it increases every second. Incidence and prevalence rate of Dysphagia in INDIA is unknown. Population noted in U.S. is 327661372 according to ASHA the incidence and prevalence rate in America is 1 in 17 people so INDIA would definitely show high incidence and prevalence rate compared to U.S. The number of multi speciality hospitals available are high but the qualified professional in Dysphagia are very poor. This mismatch of poor professional facilities and high treatment necessity might increase mortality. This paper would help bring awareness on necessity of increase in facilities in INDIA.

Objective: To Analyse the present number of experienced professionals available in INDIA and compare to the need of dysphagia what is the present survival rate of patients?

Materials and Methods: Data collected using the limited resources on the number of multi speciality Hospitals Gastroenterologists ENT and Speech therapists available in developed cities. Out of the above mentioned professionals who can assess and treat dysphagia are filtered and made a chart showing the number of facilities available and the necessity in our population. Since there is no data available on dysphagia patients we had to collect the data of patients suffering from Neurological Disorders (PD) and carcinoma and calculate the approximate rate of dysphagia patients. Other disorders related to dysphagia also has no data available.(unable to upload images).

Discussion: On average the Number of Hospital are 20 ENT, 3 Gastroenterologist, 2 Speech Therapist 0–1. Number of PD patients are 3 lakhs cancer patients are 7 lakhs/year whereas cancer patients death rate is 556460.

Conclusion: Mismatch of necessities and facilities could be improved with more workshops and dysphagia course in Medical Universities or Hospitals. Developed countries could help us achieve this goal.

CAREGIVERS' AND HEALTH PROFESSIONALS' PERCEPTIONS ABOUT FOOD PROCEDURES IN DYSPHAGIA: HOW DO THEY COMMUNICATE?

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Introduction: Dysphagia is a change in swallowing characterized by difficulties in moving the food from the mouth to the stomach. Without specific food procedures these difficulties can lead to severe complications ranging from malnutrition pulmonary complications to death in the most severe cases. Good communication between professionals and caregivers about these food procedures might contribute to improve caregivers' adherence to the suggested intervention techniques avoiding these complications. The literature on dysphagia indicates failures of communication between professionals and patients/caregivers about the necessity of these changes. This study aims to inspect the role of communication in caregivers' adherence to food procedures by identifying the experiences of health professionals and of caregivers about this communication.

Materials and Methods: Semi-structured interviews were applied to caregivers of patients with neurogenic dysphagia in in-patient care and to their healthcare professionals. A content analysis was applied to the interviews.

Results: Six themes were identified: Information provided to the patient Information provided to/received by the caregivers Information among team members Caregivers' reactions Incorrect caregivers' procedures and Conflict management.

Conclusions: Our results show areas in which communication about food procedures between caregivers and healthcare professionals can improve. They underscore the importance of professionals communicating about the type of diet and its risks using basic language and of implementing a two-way conversation with caregivers to address concerns regarding food procedures.

WHAT LEVEL ARE YOU ON? LET'S GO WITH THE FLOW: TESTING AND QUANTIFYING THE CONSISTENCY OF THICKENED ORAL NUTRITIONAL SUPPLEMENTS (ONS) USING THE IDDSI FRAMEWORK

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Introduction: According to HIQA (2016) malnutrition affects over 1 in 4 patients admitted to Irish hospitals. Patients identified by Speech & Language Therapists (SLTs) as presenting with dysphagia are at an increased risk of same given frequent symptoms of reduced appetite slow eating and weight loss (Mingsong et al. 2017). Thus oral nutritional supplements (ONS) are commonly prescribed by dietitians to assist patients in meeting nutrition/hydration requirements. It is important that these two professionals liaise across healthcare settings to ensure the consistency of prescribed ONSs mirror safe swallow recommendations. At present no standardised ONS thickening guidelines exist. The International Dysphagia Diet Standardisation Initiative (IDDSI) presents a framework defined terminology and means to objectively evaluate the consistency of texture modified foods and thickened liquids which promote standardisation across international healthcare settings.

Methodology: An SLT and Dietetic representative from each Dublin Academic Teaching Hospital took part in a testing session. 24 commonly prescribed ONSs across these sites were tested prior to and post the addition of varying amounts of a commercial thickening agent using the IDDSI flow test to evaluate all levels of flow.

Results: Please see attached tables.

Conclusions: This quality improvement initiative is proactive and timely in promoting safer cross-site continuity of patient care and improved inter-professional communication. Given the amount of thickener required to reach the IDDSI levels may exceed what is reasonably expected the introduction of pre-thickened ONSs in accordance with described levels may provide a time-saving and cost-efficient solution to improve patient compliance and reduce risk. Exploration of patient perceptions along with further testing of pre-thickened ONSs videofluoroscopy guidelines and liquid medications corresponding to IDDSI levels at different standing times is indicated.

Oral Nutritional Supplements (ONS)	Baseline Consistency	Level 1 Slightly Thick	Level 2 Mildly Thick	Level 3 Moderately Thick	Level 4 Extremely Thick
Fortisip Compact	Level 1	0	1	3	6
Fortisip compact protein	Level 2	N/A	0	2	3
Fortisip compact fibre	Level 2	N/A	0	2	4
Fortisip extra	Level 1	0	2	3	7
Fortisip 2kcal	Level 1	0	2	4	-
Fortisipce	Level 1	0	Not suitable for thickening due to nutritional density		
Fresubin 2kcal shot	Level 1	0	4	6	-
Fresubin 5kcal shot*	Level 2	N/A	2	N/A	N/A
Fresubin Protein Energy*	Level 0	-	Fresubin Thickened stage 1		Fresubin Thickened stage 2
Fresubin Thickened stage 1	Level 2	N/A	0	-	8
Fresubin Thickened stage 2	Level 3	N/A	N/A	0	-

Oral Nutritional Supplements (ONS)	Baseline Consistency	Level 1 Slightly Thick	Level 2 Mildly Thick	Level 3 Moderately Thick	Level 4 Extremely Thick
Dibien	Level 1	0	4	6	10
Scandinshake (add to milk)*	Level 0	6	-	8	-
Calogen	Level 0	Not suitable for thickening due to nutritional density			
Liquigen	Level 0	Not suitable for thickening due to nutritional density			
Nutrilis Complete Stage 1	Level 3	N/A	N/A	0	5
Ranilon	Level 1	0	1	2	4
Nepro	Level 1	0	3	5	7
Altrashot	Level 2	N/A	0	N/A	N/A
Ershake	Level 1	0	5	8	10
Cubitan	Level 0	2	4	Not suitable for further thickening	
Ensure Plus Juice	Level 1	0	Not suitable for thickening due to nutritional density		
Ensure TwoCal	Level 1	0	2	3	-
Ensure Compact	Level 2	N/A	0	3	-

MODIFYING LIQUID CONSISTENCY IN NEUROLOGIC PATIENTS AMONG SKILLED NURSING STUFF

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Introduction: Recent studies in managing swallowing disorders have been focused on international standardization of terminology for texture-modifying diets for patients with dysphagia. Currently a wide variety of terms and definitions are used to describe suitable liquid

consistency for patients with dysphagia. International Dysphagia Diet Standardization Initiative (IDDSI) was developed to improve patient safety and quality of care through determination of definitions measurable food and liquid characteristics and provide consistency in professional communication. The aim of this research was to overview the current situation of terminology used among nurses in University Rehabilitation Institute Republic of Slovenia working with patients with neurologic dysphagia and their skills to provide suitable liquid thickness for individual patient.

Materials and Methods: The study was conducted in 5 departments of University Rehabilitation Institute Republic of Slovenia. 34 randomly selected nurses (out of 87 employed) completed a brief 10-question questionnaire designed for this study researching knowledge among nurses using liquid thickeners. The data was analysed using parameters of descriptive statistics.

Results: (1) The majority of nurses (912%) did not receive any guided training using liquid thickeners but gained skills through work experience. (2) The most commonly used terms of different liquid consistency are: mildly moderately extremely thick or honey pancake batter pudding and puree. (3) The majority of nurses (735%) prepare advised liquid consistency with gradual adding of thickener others (265%) use the instructions written on a liquid thickener container.

Conclusions: (1) The results of our research showed a great need for IDDSI guidelines application in our institute along with additional training for nursing staff. (2) In future direct skills of using liquid thickeners in comparison to IDDSI guidelines among nurses should be tested.

Session 08. Poster session 8G: Neurodegenerative Diseases 1–Neuromuscular and ALS

THE INFLUENCE OF A PEG-/PRG-TUBE ON THE QUALITY OF LIFE (QOL) WITH RESPECT TO DYSPHAGIA- RELATED ACTIVITIES AND PARTICIPATION IN AMYOTROPHIC LATERAL SCLEROSIS (ALS)

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Introduction and Aims: The placement of a PEG tube can affect the quality of life of clients with a severe dysphagia due to ALS. This study looked at the influence of this placement on the quality of life with respect to dysphagia-related activities and participation in clients with ALS. Four clients with a bulbar form of ALS were included during the study.

Materials and Methods: The Amyotrophic Lateral Sclerosis Severity Scale: Swallowing (ALSS-SW) the Australian Therapy Outcome Measures (AUS-TOM) the Functional Oral Intake Scale (FOIS) the maximum-water-swallow-test the Oral Secretion Scale (OSS) de Dutch translation of the Swallowing Quality of Life (SWAL-QoL-NL) and five Visual Analogue Scales (VAS) were taken from all participants during the speech therapy treatment. The measurements took place 2–4 weeks before and 2–4 weeks after the PEG placement.

Results and Case Reports: Three of the four participants scored higher on the total score of the SWAL-QoL on the measurement after placing a PEG-tube. The most (striking) higher scores on the measurements after the PEG placement are on the domains: meal duration symptoms fear mental health and fatigue. On the VAS-scales fatigue anxiety and time all four participants score on the measurement after the PEG placement lower and thus better than on the measurement for the PEG placement.

CAREGIVERS ARE FROM MARS PATIENTS ARE FROM VENUS – PERCEPTIONS OF DYSPHAGIA IN MOTOR NEURONE DISEASE/AMYOTROPHIC LATERAL SCLEROSIS

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Introduction: Motor Neurone Disease (MND/ALS) is a rare progressive neurodegenerative illness of unknown etiology for which there is no cure. Dysphagia often occurs as a consequence of MND and has a severe impact on persons affected from a medical social and psychological perspective. The negative impact of dysphagia on the caregivers have been already reported. However no study to date appeared to compare dysphagia-related experiences of PwMND and their family caregivers.

Methods: Multiple qualitative individual interviews ($n = 59$) with 10 PwMND & 10 caregivers from Ireland. Data analysis Stage 1: Interpretative Phenomenological Analysis - individual for each participant. Stage 2: comparative thematic analysis of PwMND versus caregivers' data. Inclusion criteria for Caregivers: normal cognition involvement in dysphagia management at home. Inclusion criteria for PwMND: normal cognition communication at sentence level (verbal or not) diagnosis of dysphagia self-reporting dysphagia.

Results: There is a discrepancy between PwMND and their caregivers' perception of dysphagia and perception of associated risk. The caregivers recognise signs of dysphagia sooner than PwMND. Although dysphagia has strong emotional impact on both groups it appeared affect the caregivers earlier than PwMND. Dysphagia coping strategies were different for the PwMND and for the caregivers. The perceptions of optimal timing for non-oral feeding were also different for PwMND and their caregivers. Considering non-oral feeding was an extremely traumatic time for some participants especially if getting contraindicate advice from professionals. Non-oral feeding was viewed as 'life saver intervention' by the caregivers but not most PwMND.

Conclusions: Dysphagia can affect PwMND differently to their caregivers which appears to affect how the two groups manage dysphagia in their ever-day life. In addition it potentially influences the delivery of professional services for dysphagia.

THE RELATION BETWEEN ASPIRATION AND OROPHARYNGEAL COMPONENTS OF SWALLOWING IN AMYOTROPHIC LATERAL SCLEROSIS (ALS)

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Swallowing impairment may occur in most individuals with ALS. Bronchoaspiration is one of the main causes of death in this disease.

Objective: To examine the relation between aspiration and oral and pharyngeal components of swallowing in patients with ALS.

Methods: 19 participants diagnosed with ALS followed in outpatient clinic at HC-Unicamp the patients were underwent to a clinical swallowing evaluation (indirect and direct) and modified barium swallowing evaluation. In addition all participants must have signed the consent form. It was collected data medical records the data of ALS diagnosis and a severity classification of disease. Data Analysis: The swallowing assessment protocol (MBSImP) proposed by Martin-Harris was used to evaluate two of oral phase components (lip closure and bolus transport/lingual motion) and two of pharyngeal phase

components (pharyngeal stripping wave and pharyngeal contraction). Spearman Test's statistical analysis was performed with significance level $p < 0.05$ and the coefficient value “ r ” varies from 0 to 1.

Results: Mean age 60.5 yo 63.2% of participants were male and 6 years of mean disease time. 63.2% of the subjects showed aspiration. The evaluation of the oral phase revealed oral escape in the interlabial region with no progression to the anterior lip task in 46.1% of the subjects slow/weak movement during bolus transport in 68.4%. Pharyngeal phase components 57.9% of the patients showed decreased the wave of the pharyngeal contraction. In addition the results showed positive and moderate correlation between the presence of aspiration and pharyngeal wave alteration ($r = 0.618$; $p = 0.005$).

Conclusions: The presence of aspiration was correlated with changes in the pharyngeal function. Thus the clinician should to consider also strategies and/or maneuvers that improve the pharyngeal function as an additional treatment to prevent bronchoaspiration in ALS patients.

DYSPHAGIA DIAGNOSIS WITH QUESTIONNAIRE TONGUE STRENGTH AND ENDURANCE MEASUREMENT AND FEES IN PATIENTS WITH NEUROMUSCULAR DISEASES

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Introduction: Dysphagia is common in people with neuromuscular diseases (NMDs). Prevention early identification and treatment of predictable and potentially modifiable complications are based on anticipatory assessment.

Materials and Methods: A cohort of 98 patients diagnosed with NMDs including 64 patients suffering from muscular dystrophies was studied prospectively. The age ranged from 7 to 64 years. All patients were on oral feeding. The patients and parents were asked to report perceived dysphagia and completed a validated dysphagia questionnaire. Tongue strength and endurance were measured with the Iowa Oral Performance Instrument (IOPI). Participants identified as dysphagic were submitted to Flexible Endoscopic Evaluation of Swallowing (FEES). Questionnaire scores were correlated to Maximum Isometric Tongue Pressure (MITP) and Tongue Endurance Respiratory measures and FEES findings.

Results: The main complain was solid food dysphagia. 28.6% of NMD and 28.1% of MD patients were categorized as dysphagic by the questionnaire. MITP and Tongue Endurance were significantly reduced to the dysphagic cohort (mean values 32.26 kPa and 7.85 s respectively). Dysphagic adults had significantly lower FVC %pred compared to non dysphagic (mean values 45.43 and 73.2 respectively $p < 0.001$). Dysphagic children had a Z-score FVC from -5.14 to -1.2 (group mean: -2.28) compared to non dysphagic who had a Z-score FVC from -4.83 to 4.93 (group mean: -1.39). The main FEES findings were pharyngeal residue spillage of liquids before the swallow supraglottal penetration and rarely aspiration of liquids.

Conclusions: Standardised functional assessments for dysphagia should be based on measures with predictive capabilities and established minimum clinically important differences. Patients with NMDs present reduced MITP and Tongue Endurance which correlate to reduced respiratory measures. Instrumental testing indication could be based on these findings.

BIOMECHANICS OF PIECEMEAL DEGLUTITION IN NEURODEGENERATIVE DYSPHAGIA: A PRESSURE FLOW ANALYSIS STUDY

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Introduction: Piecemeal deglutition (PD) is a phenomenon that occurs to reduce bolus size dividing the bolus into two or more parts and swallowing them successively. Until now studies using high resolution impedance manometry (HRiM) mainly use isolated swallows as the analysis of complex PD remains still unclear. The aim of this study was to describe pharyngeal and upper esophageal sphincter (UES) physiology in patients with neurogenic dysphagia during PD using pharyngeal pressure flow analysis (PFA).

Materials and Methods: 10 neurodegenerative dysphagic patients (5F, 68 ± 12 years) were included. For comparison 10 healthy controls (7F, 64 ± 7 years) were recruited. Pharyngeal HRiM was performed using a 36P16Z-catheter with thin liquid (IDDSI Level 0) in 2 bolus volumes (5 and 10 ml). All swallows were analyzed using PFA to characterize pharyngeal and UES motility and bolus flow. PD was identified based on simultaneous increase in hypopharyngeal and UES admittance and pressure. The swallow with the highest impedance peak was marked as dominant PD. The dominant swallow from the PD was then characterized based on its location in the PD sequence.

Results: Compared to isolated 10 ml-swallows from healthy controls dominant 10 ml-PD swallows presented with significantly reduced UES opening extent ($p < 0.001$) aberrant flow timing ($p < 0.05$) and significantly increased UES integrated relaxation pressure ($p < 0.05$). Dominant PD from 10 ml-swallows was located first in 65% middle in 22% and last in 13% of PD sequences. 80% of patients that presented with PD on 10 ml-swallows had PD on 5 ml.

Conclusion: The biomechanics of PD in neurodegenerative dysphagia patients differs from isolated swallows in healthy controls. To our knowledge this is the first study investigating PD in patients with neurodegenerative dysphagia using PFA. Further understanding of the deglutitive biomechanics of PD is crucial to guide rehabilitation; hence more prospective large cohort studies are needed.

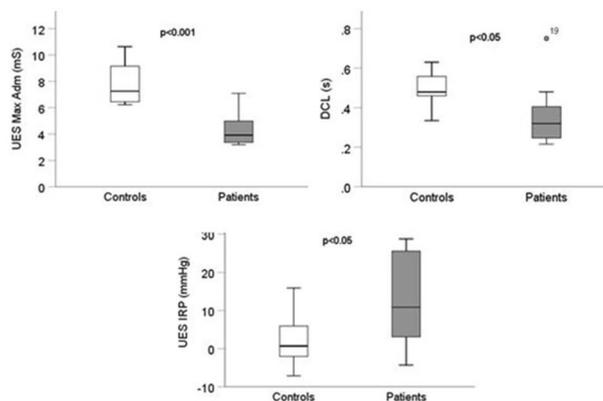


Figure 1 PFA metrics of 10-ml swallows (IDDSI level 0) from isolated swallows of healthy controls versus dominant PD swallows from neurodegenerative patients. P-values from non-parametric Mann-Whitney-U test are reported.

LONGITUDINAL CHANGE OF TONGUE THICKNESS AND TONGUE PRESSURE IN NEUROMUSCULAR DISORDERS

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Introduction: This study aims to demonstrate the longitudinal change of tongue thickness (TT) and tongue pressure (TP) in patients with neuromuscular disorders amyotrophic lateral sclerosis (ALS) myotonic dystrophy type 1 (DM1) and Duchenne muscular dystrophy (DMD).

Methods: In total 21 ALS, 18 DM1, and 12 DMD patients (mean age 66.9 years; 47.8 years; and 21.8 years; respectively) were recruited. They underwent multiple measurements of TT and TP at intervals of more than half a year. TT was measured using ultrasonography and defined as the distance from the raphe of the mylohyoid muscle to tongue dorsum. TP was determined using an oral probe whose small balloon was compressed onto the palate with the tongue.

Results: The mean follow-up periods were 23.4 ± 15.5 months in the ALS group 41.1 ± 17.0 months in the DM1 group and 52.8 ± 18.5 months in the DMD group. The mean first values of TT and TP were 43.6 ± 5.7 mm and 19.8 ± 9.4 kPa in the ALS group 46.9 ± 8.5 mm and 12.1 ± 5.9 kPa in the DM1 group and 56.6 ± 7.1 mm and 19.4 ± 9.0 kPa in the DMD group. There was no significant difference in the mean TT reduction per month among the groups 0.30 ± 0.55 mm in the ALS group; 0.026 ± 0.31 mm in the DM1 group; and 0.078 ± 0.17 mm in the DMD group. The ALS group showed significantly greater reduction in the mean TP reduction per month 0.67 ± 0.91 kPa than the other groups 0.020 ± 0.10 kPa in the DM1 group ($p < 0.01$); and 0.066 ± 0.05 kPa in the DMD group ($p < 0.05$). A significant difference between the first and last measured TTs was found in the ALS group ($p < 0.05$). Significant differences between the first and last measured TPs were found in the ALS and DMD groups ($p < 0.01$, $p < 0.01$, respectively).

Conclusions: The results suggested rapid reductions of TT and TP in the ALS group and of TP in the DMD group for several years. The DM1 group had a lower TP but showed no significant reduction in TT and TP in the short term.

RELATIONSHIP BETWEEN SWALLOWING QUALITY OF LIFE QUESTIONNAIRE AND INTERNATIONAL CLASSIFICATION SYSTEM OF FUNCTIONING DISABILITY AND HEALTH IN PATIENTS WITH NEUROGENIC SWALLOWING DISORDERS

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Introduction: The aim of this study was to determine the relationship between the Swallowing Quality of Life Questionnaire (T-SWAL-QOL) and International Classification System of Functioning Disability and Health (ICF) in patients with neurogenic swallowing disorders.

Materials and Methods: Expert opinion by using linking rules was used to evaluate relationship of the T-SWAL-QOL with ICF. Expert opinions were made in Delfie method. In the first round 3 health professionals had a joint meeting on the linking rules. One expert became moderator and two were responsible for linkings. Two experts linked each item of the T-SWAL-QOL to one or more appropriate items of the ICF independently according to the linking rules during 2 weeks. In

second round these linkings were merged. Consensus was determined with the moderator in the third round. Appropriate question for defined ICF items (T-SWAL-QOL-ICF) were created with expert opinion. Patients completed both T-SWAL-QOL and T-SWAL-QOL-ICF.

Results: Thirty neurological patients with a mean age was 48 ± 12.7 years were included. For the T-SWAL-QOL 75 linkings were defined with 35 different ICF categories. A percentage of 61 of the linkings were found to be body functions 30% were activity and participation 4% were environmental factors and 4% were undefinable. The mean total T-SWAL-QOL score was 151.66 ± 37.75 and the mean T-SWAL-QOL-ICF was 70.23 ± 42.65 . A negative excellent correlation was detected between T-SWAL-QOL and T-SWAL-QOL-ICF ($r = 0.895$; $p < 0.05$).

Conclusions: In this study the areas evaluated by the T-SWAL-QOL were redefined in accordance with ICF. Defining the structural characteristics and taxonomy of the questionnaires with standard and systematic approaches such as ICF will be useful for researchers in terms of survey selection in studies.

RELATIONSHIP BETWEEN TURKISH EATING ASSESSMENT TOOL AND INTERNATIONAL CLASSIFICATION SYSTEM OF FUNCTIONING DISABILITY AND HEALTH IN PATIENTS WITH NEUROGENIC SWALLOWING DISORDERS

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Introduction: We aimed to assess the relationship between the Turkish Eating Assessment Tool (T-EAT-10) and International Classification System of Functioning Disability and Health (ICF) in patients with neurogenic swallowing disorders.

Materials and Methods: Expert opinion by using linking rules was used to evaluate relationship of the T-EAT-10 with ICF. Expert opinions were made in Delfie method. In the first round 3 health professionals had a joint meeting on the linking rules. One expert became moderator and two were responsible for linkings. Two experts linked each item of the T-EAT-10 to one or more appropriate items of the ICF independently according to the linking rules. In second round these linkings were merged. In final round consensus was determined with the moderator. Appropriate questions for determined ICF items (T-EAT-10-ICF) were created with expert opinion and asked to patients. Patients also completed the T-EAT-10. **Results:** Thirty patients with a mean age of 48 ± 12.7 years were included of which 53% were male. Twenty-one linkings were determined with 10 different ICF categories for the T-EAT-10. The percentage of 66 of the linkings was body functions 28% were activity and participation 4% were environmental factors and 4% were undefinable. The mean T-EAT-10 was 15.33 ± 11.49 while the mean T-EAT-10-ICF score was 24.33 ± 15.8 . A positive excellent correlation was found between T-EAT-10 and T-EAT-10-ICF ($r = 0.879$; $p < 0.05$).

Conclusions: In recent years determination the structural characteristics and taxonomy of the questionnaires with standard and systematic approaches such as ICF becomes important. In this study the areas evaluated by the T-EAT-10 were redefined in accordance with ICF. The T-EAT-10 highly correlated with the counterparts of the ICF. The definition of the T-EAT-10 according to ICF could also help clinicians and researchers when to select and use this tool.

Session 08. Poster session 8H: Dysphagia after HNC Treatment 1

DIAGNOSIS AND TREATMENT OF OROPHARYNGEAL DYSPHAGIA AFTER TOTAL LARYNGECTOMY WITH OR WITHOUT PHARYNGEAL RECONSTRUCTION: A SYSTEMATIC REVIEW

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Introduction: Total laryngectomy (TLE) is a surgical procedure commonly used in the treatment of advanced stage laryngeal and hypopharyngeal cancer. It involves resection of the entire larynx and separation of the respiratory and digestive tracts. A neopharynx is created by placing a permanent tracheostomy and by closing the surgical defect of the pharynx either directly or if necessary with different types of pedicled or free flaps. This systematic review qualitatively summarizes the current literature on diagnosis and treatment of oropharyngeal dysphagia (OD) after TLE. The aim of preparing an evidence-based overview was to support clinical decision making and guide the development of treatment strategies.

Materials and Methods: Electronic databases Pubmed Embase and the Cochrane Library were used. Two independent reviewers carried out the literature search and assessed the methodological quality of the included studies using a critical appraisal tool. The ABC rating scale developed by Siwek et al. was used to determine the level of evidence. Level A refers to high-quality randomized controlled trials level B to well-designed nonrandomized clinical trials and level C to expert opinion consensus or case series. As there was no validated tool to assess the quality of both diagnostic and therapeutic studies a list of quality assessment criteria derived from Cochrane was created. Published articles on diagnosis and treatment for OD after TLE with or without pharyngectomy in adults were included. Peer-reviewed articles published from January 1995 through November 2017 written in the English German Portuguese Spanish French or Dutch language were reviewed. Articles were excluded if swallowing outcomes were not presented in the results. Studies solely on esophageal dysphagia were excluded too. Interrater agreement for definitive inclusion based on full-text was calculated using Cohen's kappa coefficient. A flow diagram of the study selection was reported according to PRISMA.

Results: Interrater agreement on inclusion based on full-text was $\kappa = 0.74$ indicating substantial agreement. Forty-four articles met the inclusion criteria. Of these 35 studies were on diagnosis four on therapy and five on both diagnosis and treatment of OD following TLE. Study aims swallowing-assessment methods and main findings of the included studies were summarized and presented. A meta-analysis comparing swallowing assessment tools or surgical techniques (TLE; TLE with partial pharyngectomy and flap reconstruction; total pharyngolaryngectomy with flap jejunum reconstruction or gastric pull-up; etc.) was planned but not carried out as the studies were not of sufficient quality to warrant doing so. None of the studies was rated level A. Thirty-two studies were rated level B and 12 studies level C. The absence of a clear definition in almost all studies and a wide variety of swallowing outcome measures can explain the wide range of OD prevalence among the included studies. Reproducibility may be compromised in several studies because no detailed information on the swallowing assessment protocol or therapy program was provided.

Conclusions: The reviewers found heterogeneous outcomes and serious methodological limitations which prevented them from pooling data to identify trends that would assist in designing best clinical practice protocols for OD following TLE. Further research

should focus on several remaining gaps in our knowledge on diagnosis and treatment interventions for OD following TLE.

ANALYSIS OF VIDEOFLUOROSCOPIC VARIABLES AFFECTING SWALLOWING SAFETY AND EFFICIENCY IN OPHL PATIENTS

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Introduction: In long-term occasional aspiration ranges from 12.9 to 67% after Open Partial Horizontal Laryngectomy (OPHL). Rate of aspiration pneumonia can reach the 21.7%. Main causes of swallowing impairment vary from a defective glottic closure to a reduced upper esophageal sphincter (PES) opening. No studies have compared videofluoroscopic variables between OPHL patients with and without dysphagia. The study aim to examine factors affecting safety and efficiency of swallowing in OPHL type IIa patients by analysing videofluoroscopic parameters.

Methods: Nineteen patients with an OPHL type IIa over 6 months from surgery were evaluated through a videofluoroscopic swallowing study (25 frame/sec) using 10 ml of liquid pureed and solid bolus. The parameters analyzed were: total pharyngeal transit time (TPT) lateral PES opening (POL) PES opening duration hyoidomandibular distance at rest and during swallowing (HMR and HMS) hyoidovertebral distance during swallowing initiation of the pharyngeal swallow epiglottic movement laryngeal closure (LC) tongue base retraction (TBR). Efficiency and safety of swallowing were assessed through the Dynamic Imaging Grade of Swallowing Toxicity scale. Patients were divided based on the safety score (≥ 2 vs < 2) and on the efficiency score (≥ 2 vs < 2) and compared through the Mann-Whitney *U* test.

Results: 36.84% and 31.57% of the sample scored ≥ 2 at the safety scale and at the efficiency scale respectively. Efficiency and LC parameter distribution showed significant differences in relation to the safety score. Patients with an impaired efficiency were found to have a higher TPT ($p = 0.009$) and a shorter HMS ($p = 0.005$) POL ($p = 0.012$) and TBR ($p = 0.017$).

Conclusion: Moderate degree of pharyngeal retention and defective laryngeal closure represent two possible causes of aspiration in this sample. Pharyngeal retention is associated with pharyngeal transit time hyoid elevation amplitude of PES opening and tongue base retraction.

LONG-TERM OCCURRENCE SWALLOWING DIFFICULTIES AFTER HEAD AND NECK PARAGANGLIOMAS SURGERY

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Introduction: To characterize postoperative swallowing difficulties after Head and Neck Paragangliomas surgery in long-term after an operation.

Materials and Methods: The study consisted of 14 patients after head and neck paragangliomas surgery hospitalized between 2016 and 2018 in the ENT Department and in General and Endocrinological Surgery, Department of Warsaw Medical University. The assessment of swallowing function included: clinical swallowing exam (CSE) questionnaire evaluation: EAT-10 and DHI and instrumental assessment video fluoroscopic swallowing study (VFSS). 10 of all patients were included to this study (5 females, 5 males; mean age: 50.7).

Results: 80% of patients reported dysphagia 100% reported loss of weight 3 of patients have pneumonia after an operation 60% are using some strategy to swallow safely. In EAT-10 all patients scored more than 3 points (4–28 points) in the DHI patients received an average of 21.5 points. CSE showed: 50% have wet voice after swallow 30% did not have gag reflex 60% have lower response in gag reflex. 70% have paresis of CN IX 100%—CN X 90%—CN XII. In water swallowing test 90% of participant achieved positive score. 20% have problem with swallowing saliva. VFSS showed: 60% have an aspiration 40% silent aspiration of liquid 90% have penetration (puree liquid) 80% have residue in pyriform sinuses and/or vallecula.

Conclusions: In long-term care swallowing difficulties after HNC paragangliomas are present. 40% have a silent aspiration of liquid so they are at risk of pneumonia and loss weight. The research should be performed with larger group.

AN INVESTIGATION OF SWALLOW OUTCOMES FOLLOWING LARYNGECTOMY

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Introduction: Laryngectomy surgery involves removal of the larynx usually as a treatment for advanced laryngeal cancer. The anatomical separation of respiratory and swallowing systems post laryngectomy largely eliminates the possibility of aspiration in this patient group. Nonetheless laryngectomy patients often experience swallowing difficulty as a result of issues arising from surgery radiotherapy or chemotherapy. This study investigated the effect of laryngectomy on dysphagia oral intake and quality of life outcomes.

Materials and Methods: Participants were asked to self-report dysphagia by describing the changes in swallowing or diet following surgery. Oral intake level was established for each participant using the Functional Oral Intake Scale (FOIS). Quality of life was measured using the MD Anderson Dysphagia Inventory (MDADI).

Results: Data was collected from 50 laryngectomy participants. 78% self reported they had experienced swallow difficulty after laryngectomy. FOIS scores indicated no participant was dependent on enteral feeding but 78% experienced some restriction to oral intake. Median MDADI Global score was 80 (20–100) with reduced functioning across emotional functional and physical subscales.

Conclusions: This study indicates that despite the low risk of aspiration post laryngectomy patients experience swallowing difficulty on a range of outcome measures including self report.

POSTOPERATIVE DYSPHAGIA AFTER HEAD AND NECK CANCER SURGERY WITH FREE FLAP RECONSTRUCTION

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Purpose: Use of instrumental assessment in creating a therapeutic plan among patients after head and neck cancer surgery with free flap reconstruction.

Methods: Patients after head and neck cancer surgery with free flap reconstruction hospitalized in 2016 in the ENT Department of Warsaw Medical University were included in this study. Fourteen patients completed EAT-10 and DHI questionnaires. They underwent water swallowing screening test (5, 10, 20, and 90 ml) and fiberoptic endoscopic evaluation of swallowing (FEES) and/or videofluoroscopy (VFS).

Results: All patients reported dysphagia and loss of weight. In EAT questionnaire all patients scored more than 3 points (between 4 and 37 points) in DHI 393 points (between 27 and 49). In water swallowing test between 3 and 7 participant achieved negative score for 5 ml, 10 ml, 20 ml, and 90 ml of water. Other patients achieved positive score. Fiberoptic endoscopic evaluation of swallowing was analyzed for swallowing patterns and laryngeal pathology. FEES showed following abnormalities: aspiration (saliva liquid) penetration (puree liquid) premature swallowing (liquid puree) and multiswallowing (liquid puree solid food) retention (saliva puree liquid solid food). Videofluoroscopy showed on the first place problems with oral phase of swallowing: difficulty forming and propelling bolus tongue pumping movements oral cavity residue premature spillage and delayed oral onset. During the pharyngeal phase we observed: residue in valleculae and pyriform sinuses reduced laryngeal elevation penetration and aspiration multiple swallows. During examination few stages of food and compensatory maneuvers were checked.

Keywords: FEES VFS dysphagia head and neck cancer free flap reconstruction



AFFECTIVE SYMPTOMS AND SWALLOW-SPECIFIC QUALITY OF LIFE IN TOTAL LARYNGECTOMY PATIENTS

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Introduction: A total laryngectomy (TL) is a major surgical intervention in which the larynx is removed. Patients experience enormous changes in speech swallowing and respiratory function in a short period of time. These changes are physically and mentally demanding. The aim of this study is two-fold: (a) to determine the presence and severity of symptoms of anxiety and depression (affective symptoms) and the level of swallow-specific quality of life (QoL) in TL patients; (b) to investigate the relationship between affective symptoms and swallow-specific QoL. **Methods:** Twenty-nine TL patients in remission completed the Hospital Anxiety and Depression Scale (HADS) and the MD Anderson Dysphagia Inventory (MDADI) as part of a standardized swallowing examination in daily clinical practice. Descriptive statistics and linear regression were used to assess the prevalence of clinically relevant affective symptoms (HADS-A/D cut-off ≥ 8) and the association between affective symptoms and swallow-specific QoL.

Results: Clinically relevant symptoms of anxiety were seen in 8 (29%) and depression in 8 (29%) TL patients. Six (21%) patients presented both symptoms. Patients with relevant anxiety symptoms had a mean (SD) HADS anxiety score of 11.8 (3.3) versus 3.4 (2.2) in patients without symptoms while patients with relevant depression symptoms had a mean (SD) HADS depression score of 10.9 (2.6) versus 3.1 (2.1) in patients without symptoms. The mean (SD) MDADI total score of all patients was 73.0 (19.5). The linear regression results showed that one-point increase in HADS anxiety score was associated with a decrease of 2.7 points on the MDADI total score ($p < 0.0001$). For depression a one-point increase in HADS score was associated with a decrease of 2.8 points on the MDADI total score ($p = 0.001$).

Conclusion: Clinically relevant affective symptoms are present in a third of the TL patients. Increase in HADS scores is significantly associated with a decreased swallow-specific QoL.

and planned to undergo total maxillectomy was identified as study group and 10 of them were identified as control group. Demographic data bioelectrical impedance analysis results(5–50–100–200 kHz Bodystat Quadscan 4000; Isle of Man British Isles) MD Anderson Dysphagia inventory scores functional oral intake scale scores(FOIS) functional outcome swallowing scale scores(FOSS) and EAT-10 questionnaire scores were collected prospectively.

Results: The mean age of the study group was 56 ± 9.87 and 41.6% were women. The mean age of control group was 60 ± 15.63 and 50% were women. Demographic dates and symptoms (preoperative and postoperative) of study and control groups were shown in Table 1. Postoperatively FOIS scores were statistically significant lower in both groups while FOSS scores were statistically significant higher. Postoperative intracellular water (ICW) extracellular water (ECW) and total body water (TBW) were statistically significant higher in study group (Table 2).

Conclusions: With this study it has been shown that total maxillectomy and radiotherapy reduce dysphagia-related quality of life. Using of ‘xanthan gum based fluid thickener’ helps to maintain ICW, ECW, and TBW.

	Study Group(n,%)		Control Group(n,%)		Comparison of the groups
	Preoperative	Postoperative third month	Preoperative	Postoperative third month	
Age(year)	56.66±9.87		60.10±15.63		p> 0.05
Sex(women / men)	41.6% / 58.4%		50% / 50%		p> 0.05
Height(cm)	171.33±8.55		165.40±9.91		p< 0.05
Weight(kg)	80.26±16.59	76.87±12.52	73.44±10.64	65.82±7.97	p< 0.05
Body Mass Index(kg/ m ²)	27.21±4.32	26.12±3.27	26.99±4.45	24.21±3.61	p< 0.05
Xerostomia	1 (8.3%)	3(25%)	1 (10%)	2(20%)	p< 0.05
Dysphagia with liquid	2 (16.7%)	3(25%)	3 (30%)	3(30%)	p> 0.05
Dysphagia with semisolid food	2 (16.7%)	3(25%)	3 (30%)	3(30%)	p< 0.05
Dysphagia with solid food	2 (16.7%)	3(25%)	3 (30%)	4(40%)	p> 0.05
Sensation having lump in the throat	3 (25%)	3(25%)	2 (20%)	2(20%)	p> 0.05
Sensation of choking	3 (25%)	3(25%)	2 (20%)	2(20%)	p> 0.05
Dysphonia	0	3(25%)	1(10%)	2(20%)	p> 0.05
Need to clean the throat	4 (33.3%)	4 (33.3%)	3 (30%)	3(30%)	p> 0.05
Velopharyngeal insufficiency	0	1(8.3%)	1(10%)	2(20%)	p> 0.05
Multiple Swallowing	4 (33.3%)	4 (33.3%)	3 (30%)	3(30%)	p> 0.05

Table 1: Demographic data and symptoms (preoperative and postoperative) of study and control groups were shown. (“p”): comparison of two groups preoperatively and postoperatively)

THE EFFECT OF “XANTHAN GUM BASED FLUID THICKENER” ON HYDRATION SWALLOWING FUNCTIONS AND NUTRITIONAL STATUS IN TOTAL MAXILLECTOMY PATIENTS

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Introduction: Early diagnosis and treatment of maxillary cancers has become an important issue in recent years as it has increased survival and quality of life. However even after contributing to the survival of the patient after the treatment there are serious side effects which decrease the quality of life and increase the morbidity. Surgery radiation therapy or the combination of both constitute the treatment types for the maxillary cancers(234).Some functions such as swallowing speaking or chewing are affected depending on the type of operation. The incidence of aspiration increases particularly after fluid intake therefore the fluid intake is inadequate in patients with maxillary carcinomas. Avoiding fluid intake and eating cause dehydration and malnutrition in the patients in the postoperative period. Our aim in this study is to assess the role of xanthan gum based thickening agent on swallowing and hydration of maxillectomy patients on a randomized controlled fashion. **Materials and Methods:** This study was carried out at the Ege University. 12 of the 22 patients diagnosed with maxillary carcinoma

	Study Group (n, %)		p ¹	Control Group (n, %)		p ²	p ³
	Preoperative	Postoperative		Preoperative	Postoperative		
Mean MDADI scores	51.33±15.10	44.83±10.96	p<0.05	50.20±13.44	34.20±8.17	p<0.05	p<0.05
Mean EAT-10 scores	5.83±2.62	13.47±4.58	p<0.05	5.20±3.19	15.90±6.83	p<0.05	p<0.05
ICW	25.09±4.89	24.60±4.70	p<0.05	22.13±4.16	20.55±3.73	p<0.05	p<0.05
ECW	18.73±2.88	18.45±2.86	p<0.05	17.58±2.14	16.38±1.03	p<0.05	p<0.05
TBW	43.82±7.20	43.05±7.05	p<0.05	39.71±6.24	36.93±4.56	p<0.05	p<0.05
Impedance ratio(%) (200/5khz)	75.4±10.4	80.2±3.1	p<0.05	76.3±8.35	84.9±5.1	p<0.05	p<0.05

Table 2: Mean MDADI scores, EAT-10 scores, ICW, ECW, TBW and impedance ratio(%) were shown preoperative and postoperatively for both groups.

(p¹: comparison of preoperative and postoperative values of the study group)
(p²: comparison of preoperative and postoperative values of the control group)
(p³: comparison of postoperative values of the groups)

PRETREATMENT NUTRITIONAL STATUS AND BODY COMPOSITION IN DYSPHAGIC PATIENTS WITH HEAD AND NECK CANCER

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Introduction: Patients with head and neck cancer experience unintentional weight loss and negative body composition changes mainly muscle loss.

Materials and Methods: The sample comprised 32 patients (17 males and 15 females) mean age 53.05 ± 13.2 years hospitalized in Otolaryngology Ward. Patients were divided into two groups: Group 1 with dysphagia and group 2 without dysphagia. Exclusion criteria were: not-Caucasian ethnicity chemo- or radiotherapy spread of cancer chronic liver and kidney diseases epilepsy limb amputations metallic prosthesis pacemaker or implantable defibrillators. Assessment tools included the Subjective Global Assessment (SGA) Eating Assessment Tool-10 and Bioelectrical Impedance Analysis (BIA) for body composition. Body composition data were obtained at multi-frequency bioimpedance analyzer (BioScan 920-2 (Maltron Int. UK). All measurements were performed at admission of patients. Statistical analysis was performed with Statistica 10PL. The protocol of the study was approved by the Medical University Ethics Committee.

Results: Among 50% of patient with dysphagia $4.77 \pm 5\%$ unintentional weight loss within 3 months was observed also positive correlation with EAT-10 score was noticed ($r = 0.477$; $p < 0.018$). The SGA tool identified 70.8% patients as malnourished or at risk (SGA-B i C). However all body composition parameters (BCM, FM, FFM, MM, TBW) did not differ among patients classified according to presence of dysphagia. The difference in FFMI did not attain statistical significance in men and women (respectively FFMI 18.29 ± 4.6 vs 16.85 ± 4.1) the mean values of FFMI were within the range values.

Conclusions: This study demonstrated that dysphagic patients had a high prevalence risk of malnutrition before treatment and the most useful parameter for nutritional screening was weight loss within last 3 months. Further body composition changes should be observed along with treatment plan.

Session 08. Poster session 8J: Dysphagia in Critical Care 2-Interventions

ROLES OF DUTCH SPEECH-LANGUAGE THERAPISTS ON INTENSIVE CARE: ROOM FOR IMPROVEMENT?

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¹Radboudumc

Introduction: Generally speech-language therapists (SLTs) working in hospitals are involved in the treatment of tracheostomised patients on intensive care units (ICUs) but knowledge about their scope of practice is limited. The aim of this study was to investigate the dysphagia-related tracheostomy management of SLTs working on ICUs and to compare with international reports.

Methods: We approached speech-language pathology departments of all 92 hospitals in the Netherlands to complete an online questionnaire about their involvement on the ICUs. The results were compared with similar studies done in Australia (2007) and the UK (2014) and recent national guidelines.

Results: Sixty-two SLTs completed the questionnaire. Swallowing assessment is primarily done by bedside evaluation (95%) consistent with previous reports; 17% usually to always uses FEES more than in previous reports but less than anticipated in recent guidelines. Dysphagia management is usually or always done with a deflated cuff (92%) and swallowing therapy is mainly based on effortful swallow (84%) 'swallow-cough-swallow' (60%) coherent with other reports.

Ten percent of SLTs independently use any type of suctioning during their intervention. In 31% of the hospitals there is a multidisciplinary tracheostomy team of which half include an SLT (16%) and 16% of SLTs is usually to always involved in decision making processes regarding decannulation. However in recently published guidelines these roles are explicitly mentioned as being part of the scope of practice of SLTs.

Conclusion: There is apparent clinical consensus in dysphagia-related tracheostomy management among Dutch SLTs and clinical practice is overall similar to other countries. However Dutch SLTs seem to lag behind in the use of FEES applying suctioning techniques and being involved in multidisciplinary decision making processes including steps to decannulation. This suggests room for improvement in this field of advanced practice.

ARE INTENSIVE CARE PHYSICIANS AWARE OF DYSPHAGIA? THE MADICU SURVEY RESULTS

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Purpose: Dysphagia is a frequent and dangerous symptom in critically ill patients. The Management of Dysphagia on Intensive Care Units (MADICU) study aimed to assess the knowledge of ICU-physicians about critical illness-related dysphagia and to identify commonly used diagnostic and therapeutic modalities. Given the fact that critically ill dysphagic patients suffer more likely from neurologic diseases we explored differences in perception between neurointensive care unit (NICU) and intensive care unit (ICU) physicians.

Methods: A web-based survey inviting the members of the European Society of Intensive Care Medicine (ESCI) and the German Society of Neurointensive and Emergency Medicine (DGNI) was conducted in 2016.

Results: 528 respondents from 69 countries completed the survey. The vast majority (> 80%) perceived ICU-related dysphagia as a serious problem which leads to prolonged hospital stay worse outcome and increased treatment costs. Perceptions of complications risk factors and mortality effects as well as therapeutic strategies differed between NICU and ICU respondents. Instrumental assessment and involvement of ICU physicians as well as speech and language therapists in the evaluation of swallowing function was more frequently reported by NICU respondents.

Conclusion: ICU physicians are aware of critical illness-related dysphagia its risk factors and effects on morbidity and mortality. NICU physicians are more exposed to dysphagic patients which probably translates into a better access to advanced diagnostic tools.

SWALLOWING DYSFUNCTION IN THE NICU – SILENT ASPIRATION IS COMMON BUT THERAPEUTIC COMPENSATIONS CAN HELP

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Background: Modified barium swallow (MBS) studies are performed to evaluate swallow function and determine risk of aspiration (fluid/food entering the lower airway). Infants rely on fluid for both hydration and nutrition. If an infant displays airway penetration or aspiration on regular liquids during the study the feeding therapist may trial certain interventions during the procedure to see if they assist swallowing and airway protection. The most common interventions trialed during infant MBS procedures include modifying how the bolus is delivered—such as use of different feeding equipment (e.g. slower flowing bottle nipples) and positional changes (e.g. side-lying position versus reclined)—and/or making modifications to the bolus itself (i.e. thickened liquids).

Aims: We aimed to describe the proportion of NICU infants referred for MBS who are found to aspirate the proportion of those who aspirate who demonstrate silent aspiration (i.e. no cough in response to aspiration) as well as to investigate the effectiveness of common interventions trialed during MBS procedures.

Methods: This was a retrospective review of 3 years' worth of MBS studies from a large Level III NICU.

Results: Greater than 85% of NICU infants referred for MBS were found to aspirate. Approximately 95% of NICU infants who are found to aspirate on MBS demonstrated silent aspiration. Common subgroups of NICU infants who silently aspirate include those with chronic lung disease congenital heart defects hypoxic brain injury and congenital syndromes (e.g. trisomy 21). Interventions trialed were able to effectively mitigate aspiration risk in many infants allowing them to continue to feed by mouth with these therapeutic compensations in place.

Conclusion: Many NICU infants referred for MBS display silent aspiration but the use of therapy interventions such as slower flowing bottle nipples side-lying position and thickened liquids can allow many of these infants to feed safely.

IS THERE A ROLE FOR SLIGHTLY THICK LIQUID IN THE ADULT ACUTE CARE SETTING?

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Introduction: The International Dysphagia Diet Standardization Initiative (IDDSI) standardized the terminology and definitions used for diet recommendations globally. The addition of slightly thick liquids may provide a patient with dysphagia a new least restrictive liquid diet option. The goal of this study is to determine characteristics and clinical implications of patients who benefit from slightly thick in the acute inpatient population using videofluoroscopy.

Materials and Methods: Design: Prospective cohort study. Setting: Academic tertiary medical center. Patients: Consulted for SLP evaluation and recommended for a videofluoroscopic swallowing study (VFSS). Inclusion criteria: Adult patients English speakers able to provide consent. Procedure: Slightly thick liquid was mixed each day using a Varibar recommended recipe of 2:1 ratio of Varibar Nectar Thick to Thin Liquid to measure a consistent 3 ml using the IDDSI flow test with a 10 ml syringe. Following the MBSImP criteria patients were provided 5 cc 15 cc cup sip and 1 straw sip of thin liquid as well as slightly thick liquid.

Instruments: Penetration-Aspiration Scale (PAS) score completed by the SLP of record and independently by 2 SLPs masked to clinical and demographic data.

Results: Data collection is currently in progress. We have 18 completed participants with an anticipated enrollment of 100 participants. Preliminary data suggests there is a subset of oncology and neurology patients that may benefit from slightly thick liquids. 30% of patients

demonstrated no aspiration with slightly thick liquid consistency compared to 46% of patients who aspirated thin liquid consistency. Of those who aspirated thin liquids 66% eliminated aspiration with slightly thick liquids.

Conclusions: This study has potential positive implications for patients family clinicians and staff and will hopefully help justify implementation of slightly thick liquids at a large tertiary academic medical center.

CAN DELAY IMPROVEMENT OF “AIRWAY PROTECTION” BE IMPROVED BY SIMPLE TRAINING? EFFECT OF CHINPUSHPULL_MANEUVER

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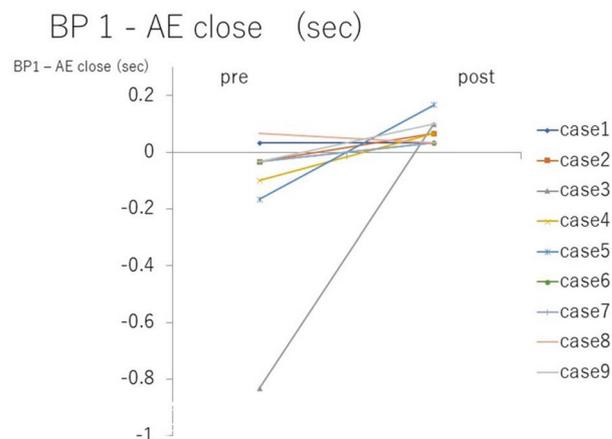
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Background: It is desirable that the swallowing rehabilitation procedure is effective in a short time and with few times. “Chinpushpull maneuver” is a suitable muscle training method to utilize isometric contraction rather than isotonic contraction of the muscles to enhance cervical muscle and improve flexibility. We reported in 2007 that we can improve the transit time of bolus by doing this method. This maneuver is executable in less than 1 min and it is a very easy way.

Purpose of Research: Perform VF inspection before and after Chinpushpull procedure and confirm the effect of Airway Protection.

Materials and Methods: Seven men and two women were compared. The age of this group was 70 to 81 years old. Six cases suffered from mild cerebral infarction and three received treatment for swallowing pneumonia. Both cases were judged as mild dysphagia. Swallowing was observed using Videofluoroscopy (VF) and animation was recorded on the VTR. I swallowed 1% barium of 4CC before and after chinpushupull procedure. We examined recorded moving images backwards. Items of Oropharyngeal transit time (OPT: BV1–B1 (s)) Hypopharyngeal transit time (HPT: BP2–BV2 (s)) and Timing of airway protection (BP1–AE close (s)) according to the UC–Was evaluated.

Result: By performing the Chinpushpull procedure the mean value (\pm SD) of each of the 9 parameters changed as follows. Prior to this procedure OPT (BV1–B1) averaged 0.470 ± 0.658 s. Immediately after performing this procedure it reached 0.375 ± 0.611 s. It was significantly shorter. HPT (BP2–BV2) was 1.069 ± 1.395 s on average before performing the procedure. It was shortened to 0.509 ± 0.623 s after performing this procedure. Timing of airway protection (BP1–AE close) was shortened significantly with average of 0.166 ± 0.258 to 0.035 ± 0.048 s on 9 out of 9 people.



Consideration: It is known that skeletal muscle improves mobility by increasing muscle mass and “hold relaxing.

STUDY ON VALIDITY AND EFFICACY OF KINESIOLOGY TAPING IN THE TREATMENT OF POST-COMATOSE PATIENTS

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Introduction: The aim of the study was to verify the efficacy of Kinesiology Taping (KT) applied to the head-neck district and to establish whether KT associated to speech therapy can improve the swallowing function of patients with neurogenic dysphagia after severe acquired brain injury (sABI) and to verify the effects of such approach on the muscular activity and functional swallowing during its use and if the effects decay after removal of the tape. KT is utilized as additional rehabilitation treatment in order to potentiate the residual muscular activity and the proprioceptive system of the structures involved in swallowing function. Nowadays in literature no scientific evidence is reported on the use of such approach in speech therapy field. The current study has been approved as pilot study by the Ethics Committee of Santa Lucia Foundation.

Materials and Methods: 10 individuals with sABI with a Glasgow Coma Scale (GCS) equal of less than 8 lasting at least 24 h have been enrolled. Six of them participated as experimental group (KT + speech therapy) and 4 as control group (Speech Therapy only). The duration of treatment was 8 weeks for both groups. The evaluations were performed at the beginning of the treatment (T1) at 4 (T2) and 8 weeks (T3) of treatment and finally at 4 weeks after the end of treatment (T4). Despite the small population of patients the data were analyzed by a parametric Student's *t* test.

Results and Conclusions: Preliminary results found that KT is able to improve the trigger delay of swallowing and stagnation with statistically significant improvement since the first application with respect to the control group. The positive effect of KT is more evident at T1 maintaining the efficacy also in the following evaluation times. The hypothesized mechanism of action include the increase of proprioception the improvement of muscular activity and the reduction of muscular hypotonia of the faringo-laryngeal musculature.

Session 08. Poster session 8K: Other 1

CHARACTERISTICS OF EATING-RELATED TRIGGERS AND PHARYNGEAL DYSPHAGIA FINDINGS IN PATIENTS WITH CHRONIC COUGH RELATED TO THE UPPER AIRWAY: A RETROSPECTIVE REVIEW

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Introduction: Patients with chronic cough/irritable larynx presentation are increasingly being referred to Speech & Language Therapy (SLT) for intervention. Chronic cough may negatively impact on physical psychological and social domains of health. Numerous triggers to cough reported by patients include smoke fumes sprays talking exercise and eating. Dry crumbly food is frequently cited in the literature as a trigger. However little is known about the specific food-related triggers in patients with chronic cough and/or the

presence of pharyngeal dysphagia in this population. This retrospective review of patients referred to SLT with a diagnosis of chronic cough/irritable larynx was carried out to explore patient reported cough triggers related to eating and swallow findings on instrumental assessment.

Methods: A retrospective review of patients ($n = 10$) referred to the SLT clinic (2017–2018) with chronic cough and/or irritable larynx will be carried out. Cough severity as measured with the Cough Severity Index (CSI) will be reviewed. Self-reported data describing eating-related cough triggers recorded with the Cough Characteristic Questionnaire will be analysed. Fiberoptic Endoscopic Evaluation of Swallowing (FEES) exam reports will be examined to determine the presence absence of pharyngeal dysphagia penetration-aspiration and pharyngeal residue.

Results: Demographical data cough severity history and characteristics and specific food items triggering coughing reported by patients together with AUS TOMS dysphagia impairment rating Penetration-Aspiration Scale (PAS) scores and residue rating from FEES exams will be reported.

Conclusion: Chronic cough/irritable larynx presentation is a complex phenomenon with numerous possible triggers Careful evaluation of potential triggers including eating-related ones contributes to increased understanding of underlying cause/s pathophysiology and potentially improved treatment approaches.

RELIABILITY AND VALIDITY OF THE IDDSI FLOW TEST AS A MEASURE OF LIQUID CONSISTENCY

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Background: The International Dysphagia Diet Standardization Initiative (IDDSI) flow test is simple and easy to use; however there is not independent published research to establish the reliability and validity of the IDDSI flow test. Therefore the purpose of this study is to establish the inter and intra rater reliability and concurrent validity of the novel syringe flow test proposed by the IDDSI for the categorization of thickened liquids for the management of dysphagia.

Methods: Eleven commercially available liquids (three regular two slightly thick three mildly thick and three moderately thick) were selected. Each liquid consistency was measured 10 times with the IDDSI flow test by each of the five independent raters on two separate occasions. Raters were blinded to the type of liquid being measured to the results of the other raters and to the results of the first measurement (on the second occasion). The IDDSI flow test was administered to the published protocol following training for reliable categorization of fluid with the IDDSI flow test. Statistical analysis was performed to establish inter and intra rater reliability as well as concurrent validity of the IDDSI flow test.

Results: A 2-way random effects analysis of variance intra-class correlation coefficient (ICC) was calculated to estimate the inter and intra-rater reliability of each of the five raters' measurements of liquid consistency. A high degree of reliability was found between and within the five raters. A Spearman's rank-order correlation analysis was calculated to determine the relationship between the manufacturer's categorization and categorization from the IDDSI flow test. There was a strong positive correlation between the two methods of liquid categorization $rs(108) = 0.963$ $p < 0.01$.

Conclusion: The IDDSI syringe flow test appears to be a reliable and valid clinical tool for the categorization of fluids into therapeutically relevant categories.

COMPARISONS BETWEEN MANUFACTURE'S GUIDELINE AND IDDSI-ORIENTED GUIDELINE: A RHEOLOGICAL STUDY ON THE PREPARATION OF THICKENED HONG KONG LOCAL BEVERAGES

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Introduction: In Hong Kong manufacturers of thickeners and speech therapists provide guidelines and prescriptions for consistency modification by adopting the National Dysphagia Diet standard (NDDTF and ADA 2002). They employ terminologies that are similar to the IDDSI framework when describing modification levels. The current study aimed to investigate the effect of different preparation guidelines on the viscosities of thickened drinks.

Methods: 23 subjects who were naïve to dysphagia and diet modification and were assigned to the manufacturer's guideline group (Group 1) and the IDDSI-orientated guideline group (Group 2). Subjects prepared thickened drinks using a commercially available starch-based thickener on three beverages (i.e. milk tea Chinese herbal tea and Chinese tea). They were instructed to follow either the guideline suggested by the manufacture (Group 1) or that suggested by Lao (2017) (Group 2) to thicken beverages to the mildly-thick and moderately-thick levels. Viscosities of the thickened liquids were measured with a dynamic shear rheometer.

Results: Viscosities of thickened drinks differ significantly when prepared according to the two guidelines ($p < 0.001$). Furthermore viscosity of milk tea is significantly different from that of Chinese herbal tea ($p = 0.036$) at the mildly-thick level. It is also significantly different from the viscosities of Chinese herbal tea ($p = 0.002$) and Chinese tea ($p < 0.001$) at the moderately-thick level.

Conclusions: The manufacturer's guideline and the IDDSI-oriented guideline may give rise to thickened drinks with different viscosities. Differences in viscosity among the three drink bases was noted despite being prepared to the same modification level. It is important to have a standardized definition for consistency modification. Patients and carers should also note that consistencies may be different from the intended ones when thickening liquids other than water.

LIQUIDS VISCOSITY: TERMINOLOGIES AND MEASUREMENT TESTS

A.S. Machado¹, R.S. De Souza¹, R.E. Eugenio¹, D.C. Endringer¹

¹Universidade Vila Velha

Introduction: In dysphagia intervention the need for changes in diet texture and viscosity is evident. The establishment of standardized terminology for thickened fluids reduces misinterpretation of prescriptions and promotes effective communication including professionals caregivers patients researchers and companies. The goal of this study was to verify the relationship between terminologies and tests proposed by National Dysphagia Diet (NDD) and Dysphagia Diet International Standardization Initiative (IDDSI).

Materials and Methods: Sample was prepared with mineral water at room temperature (pH 5.74, 25 °C) and seven commercial thickeners. Considering NDD terminology the intermediate level (honey: 351 -

1750 cP) was tested with Rotational Viscometer Quimis and compared to IDDSI flow test with syringe and chronometer.

Results: Samples ranged from 382.4 to 1297.6 cP categorized at honey level for NDD terminology. At flow test there was predominance of category 3 of IDDSI but also products at levels 1, 2, and 4. Data show a tendency of inverse relationship between cP and flow test once thickener B (1027.8 cP) reached level 1 and thickener E (382.4 cP) fitted level 4 characterized by the absence of liquid flow although obtained the lowest cP value of all samples (Table 1).

Conclusions: It was not possible to match the measure methodologies (viscometer and flow test) and terminologies (NDD and IDDSI) used whereas the values in centipoises of honey level were not always equivalent to the level of IDDSI. However there was a predominance of level 3 "moderately thick" with supposed correlation with honey.

Table 1 - Comparison NDD x IDDSI

Thickener	g/100 ml	Viscosity obtained (cP)	NDD level	IDDSI level
B	4.00	1027.8	Honey	1
D	4.40	1297.6	Honey	2
F	6.75	1037.9	Honey	3
C	2.35	774.6	Honey	3
G	2.40	635.8	Honey	3
A	6.00	610.8	Honey	3
E	6.00	382.4	Honey	4

COMMERCIAL THICKENERS LABELS AND VISCOSITY

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Introduction: Speech therapy for patients with dysphagia includes to provide oral feeding safety through changes in food texture and thickening fluid intake. The adjustment of viscosity can be done using homemade thickening with food products or commercial thickeners. Preparing the correct viscosity using these products is very important once liquids too thin or thick may interfere at swallowing process and increase the risk of aspiration or pharyngeal residues. The goal of this study was to verify the viscosity obtained using manufacturer instructions for commercial thickeners.

Materials and Methods: Sample was composed by seven commercial thickeners. All of them proposed 3 viscosity levels in label instruction. The intermediate level was tested with Rotational Viscometer Quimis in centipoises considering National Dysphagia Diet (NDD) terminology (honey: 351 -1750 cP). The seven thickeners passed through viscosity analysis after preparing samples following manufacturer instructions using mineral water at room temperature (pH 5.74 25 °C).

Results: Based on NDD liquid (1–50 cP) nectar (51–350 cP) honey (351–1750 cP) and pudding (> 1750 cP) it was found that thickeners used in this study reached varying viscosities levels (382.4 to 4288.3 cP). Desired honey level was found for five products (A B E F and G). Product D reached pudding level (4288.3 cP) and thickener C sample was solid using the amount prescribed. Reducing weight added to water both products reached honey level (Table 1). For the five products that originally got honey level it was found a large range of centipoises values from 382.4 to 1037.9 cP probably leading to different influences in patient swallowing.

Conclusions: Tests demonstrate the lack of correlation between the suggested by the manufacturer and the viscosity obtained. It is not possible to ensure that viscosity is equivalent between different manufacturers.

Thickener	Instructions (g/100ml)	Viscosity obtained (cP)	Weight adjustment (g/100ml)	Viscosity adjustment (cP)
A	6.00 g	610.8	-	-
B	4.00 g	1027.8	-	-
C	10.00 g	-	2.35 g	774.6
D	6.00 g	4288.3	4.40 g	1297.6
E	6.00 g	382.4	-	-
F	6.75 g	1037.9	-	-
G	2.40 g	635.8	-	-

FOOD CHARACTERISTICS AND DYSPHAGIA: WHAT DO NUTRITIONISTS SAY?

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Introduction: Dysphagia affects quality of life for increasing the risks of aspiration pulmonary alterations and nutritional deficiencies. Modification of diet can be necessary to reach efficient and safe feeding. For such behavior speech therapist modifies diet viscosity and texture for dysphagic patients considering food characteristics and its influence in swallowing. The nutritionist elaborates an adequate program of nutrition preventing dehydration and malnutrition. The goal of this study was to investigate the knowledge of nutritionists on food characteristics and its influence in swallowing disorders.

Materials and Methods: Descriptive quantitative study with sample for convenience enlisted through invitations sent to the Brazilian nutritionists who take care of or not dysphagic patients. Research carried through electronic questionnaire in SurveyMonkey@site with questions applied to the area of the research. Data was analyzed by descriptive statistics.

Results: Sample was composed by 519 nutritionists of 22 Brazilian states being 61.23% who works with dysphagia. The consistency considered safest to be offered was cream (61.43%) after that thickened liquid (33.57%) and fine liquid (5.00%) in accordance with literature. The ideal food temperature to offer was considered ambient temperature (52.01%) after that warm (30.40%) temperature does not interfere (12.09%) and cold (5.49%). Data diverge of researches that bring cold temperature as being safer to be offered by influencing positively in deglutition process.

Conclusions: The nutritionists answered correctly about the consistency indicating creamy viscosity. Concerning the correct temperature (cold) the nutritionists did not answered properly.

PARENTAL PERSPECTIVE OF FEEDING AND EATING BEHAVIOURS IN CHILDREN WITH AUTISM SPECTRUM DISORDER AND TYPICALLY DEVELOPING CHILDREN

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Introduction: Studies have indicated that children with a diagnosis of Autism Spectrum Disorder (ASD) can present with eating problems. As a result and to parents' concern mealtimes can be a testing experience.

Materials and Methods: 47 parents participated in the study; 20 parents of children with an ASD diagnosis and 27 parents of TD children. The Behavioural Paediatric Feeding Assessment Scale (Crist

and Napier-Phillips 2001) was used to explore the eating behaviours of both sample populations.

Results: Marked differences were found in feeding and eating behaviours in children with ASD when compared to TD children. 70% of children with ASD reported to experience overall difficulties at mealtimes with no parents of TD children reported to experience any aversive difficulties. 75% of parents reported atypical eating behaviours in their child with ASD. While 7.4% of parents of TD children reported to experience atypical behaviours. A staggering 95% of ASD children reported to experience food selectivity; while 33% of TD children reported the same. 90% of parents of children with ASD reported encountering aversive behaviours at mealtimes while 22% of parents of TD children reported the same. Subsequently 65% of parents of children with ASD reported difficulties in managing these behaviours with only 3.7% of parents of TD children reporting difficulties in managing behaviours.

Conclusion: Present study findings support past research in that it was clearly evident that children with ASD present with a higher reported occurrence of atypical feeding and eating behaviours than typically developing children. It was also found that parents experience difficulties managing these behaviours at mealtimes and therefore implement poor management strategies. Eating behaviours arise from complex multifaceted and interconnected factors; including physiological and behavioural-based problems. The study supports need for trans-disciplinary team action with holistic consideration of the client family environment and sensory needs.

EFFECT OF THE ORGANOLEPTIC PROPERTIES OF FOOD IN THE SWALLOWING OF HEALTHY ADULTS AND THOSE WITH DYSPHAGIA. BIBLIOGRAPHICAL REVIEW

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¹Universidad del Bío-Bío

Background: In recent years there has been an increasing interest in the investigation of the phenomenon of nutrition and the organoleptic properties of the food consumed by people most of the literature on the organoleptic properties of food considers cold temperature bitter taste and carbonation as favoring of swallowing both in healthy people and mainly in those with dysphagia. However it is important to consider how they have advanced knowledge with regard to the effects of other flavors temperatures consistencies and even if the color or aroma impact.

Objective: To describe according to available literature the effect of the organoleptic properties of the food in the swallowing of healthy adults and those with dysphagia.

Results: On the oral preparatory phase include a decrease in the number of chewing in small particles and high cohesiveness ease of chewing in texture hard dry fibrous and gels dispersed while the chewing time decreases with the salty taste and the gel protease which also reduces the training time of the bolus. In the oral stage is increasing the strength of the tongue and ease swallowing thanks to food with greater stickiness and viscosity respectively. It is noted decreased oral transit time because of the bitter taste and cold temperatures and the oral residue due to the increase in the viscosity of the food. This data is only tested in healthy subjects. In pharyngeal stage due to the carbonated drinks we can observe a decrease of the pharyngeal transit time penetrations and aspirations laryngeal the latter especially in patients with dysphagia. It increases the ease in the triggering of the swallowing reflex due to the mixture of bitter-umami and acid flavors.

Conclusion: The carbonation of liquids the cold temperature the increased viscosity and the stickiness of foods besides the tastes bitter sour and salty are the properties with greater impact on swallowing.

Poster Sessions

Saturday, 29 September
12:30–13:00

Session 13. Poster session 13A: Screening and Clinical Assessment 3

CROSS-SECTIONAL SWALLOWING STUDY IN PATIENTS WITH DISORDERS OF CONSCIOUSNESS

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Introduction: Currently scientific literature about oral-feeding swallowing and respiration in patients with disorders of consciousness (DOC) is scarce. The aims of this study is to document these elements in DOC patients and to investigate the relationship between these variables and patients' level of consciousness.

Methods: We collected and analyzed data regarding the oral-feeding respiratory status and the fiberoptic endoscopic evaluation of swallowing (FEES) of 119 chronic DOC patients (42 women; mean age 38 ± 12 years) that were in an unresponsive wakefulness syndrome (UWS $n = 41$) or in a minimally conscious state (MCS $n = 78$) 2 from a traumatic ($n = 63$) or a non-traumatic ($n = 56$) etiology.

Results: Twenty-eight (23%) were totally or partially fed orally (7% of the UWS and 32% of the MCS patients). Forty-eight patients (40%) had a tracheotomy at the time of the assessment (27 UWS 21 MCS). Compared to MCS patients UWS patients had more pharyngo-laryngeal secretions saliva aspiration and poor pharyngo-laryngeal sensibility but there was no difference in aspiration with liquid or thick textures.

Conclusion: Respiratory status oral-feeding and FEES seem to vary with the level of consciousness of DOC patients. This study emphasizes the importance of correctly assessing and managing deglutition in patients with DOC. Tactile oro-facial stimulation manual therapy taste stimulation and therapeutic feeding can be additional techniques to interact with these patients and improve their quality of life.

CLINICAL CLASSIFICATION OF SKILL VERSUS STRENGTH DEFICITS IN DYSPHAGIA SUBSEQUENT TO DIFFERENT AETIOLOGIES

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¹Rose Centre for Stroke Recovery and Research, University of Canterbury

Introduction: Behavioural rehabilitation approaches for dysphagia focus primarily on weakness as a presenting aetiology largely due to limitations in differential diagnosis of underlying pathophysiology. The aim of this exploratory study was to develop a novel test to differentiate between skill and strength deficits in swallowing.

Methods: Healthy controls ($n = 40$) and patients with dysphagia due to stroke ($n = 55$) and myopathy ($n = 19$) participated in a clinical assessment of skill and strength. Skill was measured as error in timing and force of submental muscle activation to place peak of surface electromyographic (sEMG) signal in an on-screen target during swallowing and jaw opening. Swallowing strength was measured as peak sEMG amplitude during effortful swallowing while isometric submental muscle force was measured with dynamometry during jaw opening.

Results: Hierarchical cluster analysis assigned participants to one of four subtypes. Cluster 1 contained primarily healthy controls and presented with good strength and skill compared to other clusters. A 2nd cluster was represented by myopathic and stroke patients and was characterised by decreased strength but relatively intact skill. Stroke patients were further assigned to a 3rd cluster (deficits in strength and jaw skill tasks) or 4th cluster (deficits in strength and swallowing skill tasks). Mean silhouette coefficient a measure of cluster quality from -1 (weak) to 1 (strong) was 0.17. Swallowing and jaw skill variables were most salient in predicting cluster assignment.

Conclusions: Different subtypes of dysphagia (weakness with or without skill impairment) can be identified as a result of central nervous system damage from stroke while weakness is the prominent feature of dysphagia caused by myopathy. This is a first step in developing a test to differentiate between strength and skill deficits. Such a test is prerequisite to prescribing specific intervention tailored to each patient's underlying pathophysiology.

OROPHARYNGEAL SWALLOWING PROFILES IN INDIVIDUALS WITH DIFFERENT DIAGNOSES

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Introduction: The aim was to evaluate swallowing function of adult patients with different diagnoses and define their oropharyngeal swallowing disorders.

Materials and Methods: A total of 314 patients admitted due to swallowing complaints between 2016 and 2017 were included retrospectively. The information regarding diagnosis referral department referral and recommended feeding type whether a videofluoroscopic swallowing study (VFSS) was performed was obtained from registration system of the university. The scores of the Eating-Assessment-Tool (EAT-10) was used to measure dysphagia symptom severity. If a VFSS was performed the scores of the Penetration and Aspiration Scale (PAS) was used to determine penetration-aspiration severity of patients.

Results: The mean age of patients was 57.74 ± 19.5 years of which 57.6% were male. The distribution of diagnosis was 39.1% neurological impairments 13.2% neuromuscular disorders 6.3% head and neck cancer 6.1% oesophageal diseases 5.1% cardiopulmonary 3.5% psychological cases and 21% others. 28.9% of the patients were referred from neurology 22% from otolaryngology 17% from geriatrics and 6.9% from gastroenterology departments. The mean EAT-10 was 16 ± 11.2 . The VFSS was performed in 92.9% of the patients. The mean PAS liquid score was 3.9 ± 3.1 pudding score was 2.3 ± 2.5 and

biscuit score was 1.2 ± 0.9 . Referral feeding type was 75.2% oral 5.3% liquid-restricted 19.5% non-oral while recommended feeding type was 41.4% oral 34.3% liquid-restricted and 24.3% non-oral.

Conclusions: Various diseases cause swallowing dysfunction. The appropriate feeding type is important to prevent serious complications of swallowing disorders. In our study the current feeding-type of patients was not appropriate during referral. Thus it is important to evaluate swallowing function in early period and determine appropriate feeding-type in individuals suffering from swallowing difficulties.

EVALUATION OF DIFFERENT FATIGUE-INDUCING PARADIGMS ON MAXIMUM ISOMETRIC PRESSURES (MIP) OF THE ANTERIOR TONGUE IN HEALTHY ADULTS AND ELDERLY

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Introduction: Tongue strength is critical for bolus propulsion. MIP is commonly the highest of 3 repetitions. Meal consumption however requires many more swallows; failure to repeatedly produce adequate pressures can result in dysphagia prolonged mealtimes and/or premature ending of meals. We aimed to study tongue fatigability and influencing parameters.

Methods: 40 healthy people with MIP within normative data were included: 20 adults (20–60 yo) and 20 elderly (70 +). All testing and measurements used the IOPI. 6 fatigue paradigms (FP)(2 × at 60 80 or 100% of baseline (BL) MIP) were done in randomized order with intervals of 48–72 h. Reps were 3 s of specified tongue pressure production (confirmed by visual feedback) followed by 3 s of rest; MIP measurements were repeated every 5 reps. FP was aborted at discomfort session duration exceeding 60 min (equaling a max of 470 reps and 94 MIPs) or when MIPs during FP were < 30% of BL MIP. Recovery (R) MIPs were performed 5 and 15 min after ending FP.

Results:

- (1) median/maximum MIPs across all FP were 65 and 80 respectively
- (2) no significant decay in MIP was noted between BL and R for any FP
- (3) increased BL MIP over 6 subsequent FP indicated a training effect
- (4) Kaplan-Meier (KM) analysis in similar FP showed no significant differences
- (5) KM showed no difference in performance between adults and elderly
- (6) KM indicated no difference in performance in function of % BL MIP

Conclusions: Different FP failed to induce significant fatigue within the time constraints. These data can serve to develop a potential assessment for tongue fatigue in dysphagic patients.

RELIABILITY OF THE CITRIC ACID COUGH REFLEX TEST (CRT) IN HEALTHY ADULTS

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¹UC Rose Centre for Stroke Recovery and Research

Introduction: The citric acid CRT evaluates the sensory integrity of the cough reflex. Previous studies have examined reliability of citric acid CRT. However results are not easily applied to clinical and research practices due to the use of log transformed cough thresholds and lack of standardized methods. Furthermore reliability of suppressed cough thresholds (SCT) over days is not known. This study reports variation in natural cough thresholds (NCT) and SCT when CRT is repeated across three alternate days.

Methods: Sixteen healthy participants inhaled three 1.2 s doses of increasing doubling concentrations of citric acid (0.05–3.2 mol/l) on each of 3 days. Doses were inhaled until C2 cough thresholds (2 consecutive coughs within 3 s) or the highest dose of citric acid was reached. Linear mixed effects models were used to estimate (1) the change in cough threshold (CT) per day and (2) the variability in CT across days (reported as standard deviations) for both NCT and SCT.

Results: The estimated change in CT and the variability in CT across days are shown in Table 1. An increase in both SCT (0.32 doubling concentrations per day (95% CI [0.04–0.59], $p = 0.037$) and NCT (0.43 doubling concentrations per day (95% CI [0.16–0.71], $p = 0.005$) was found. Variability for SCT was 0.77 doubling concentrations (95% CI [0.55–0.98]) and NCT was 0.78 doubling concentrations (95% CI [0.58–0.96]).

Conclusions: NCT and SCT increase across days signifying possible habituation to citric acid. Variation within participants may relate to alterations in breathing patterns or day-to-day changes in the condition of the aero digestive tract. Quantifying change as doubling concentrations facilitates integration of this data into future clinical and research studies. This is crucial to the emergence of citric acid CRT as a viable outcome measure in cough sensory research.

Table 1: Estimated day effects for CT and across day variation in CT

	Estimated change in CT per day (doubling concentrations)	SD across day (doubling concentrations)
NCT	0.43 (0.16, 0.71)*	0.78 (0.58, 0.96)
SCT	0.32 (0.04, 0.59)*	0.77 (0.55, 0.98)

$p < 0.05$

RELIABILITY OF URGE-TO-COUGH (UTC) IN RESPONSE TO CITRIC ACID IN HEALTHY ADULTS

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¹The Rose Centre for Stroke Recovery and Research, University of Canterbury

Introduction: UTC ratings provide a measure of sensory perception elicited by tussigenic agents. Reliability of UTC ratings in response to citric acid is not known. This study evaluates the reliability of UTC in response to citric acid across 3 alternate days.

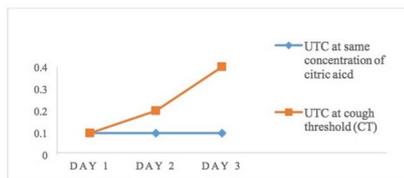
Methods: Sixteen healthy participants inhaled three 1.2 s doses of increasing doubling concentrations of citric acid (0.05–3.2 mol/l) on each of 3 days. Doses were inhaled until C2 cough thresholds (2 consecutive coughs within 3 s) or the highest dose of citric acid was reached. UTC was measured after each inhalation using a modified Borg scale from 1 (no need to cough)–10 (maximum urge to cough). UTC was analysed under two conditions to assess reliability of sensory perception (1) at participants' cough thresholds (CT) which may differ across 3 days and (2) when citric acid concentrations were the same across 3 days (See Fig. 1). The effect of CT on UTC ratings was also examined in condition 2. Analyses were completed using linear mixed effects models for natural cough thresholds (NCT) and for

suppressed cough thresholds (SCT). An a priori *p* value of 0.01 was chosen.

Results: There was no significant effect of day on UTC at participants' cough threshold or at the same concentrations of citric acid for NCT or SCT (*p* > 0.01). No significant effect of CT was found for NCT. However there was an effect of CT on UTC ratings for SCT decreasing the UTC by 1.09 (99% CI [- 1.08–0.24] *p* < 0.01).

Conclusions: These data suggest UTC ratings across 3 days for NCT and SCT are reliable. Interestingly for SCT participant's CT played a role in their sensory perception of citric acid—less sensitive participants (i.e. higher CTs) had lower UTC ratings. These results are important for the emergence of UTC as a viable outcome measure in cough sensory research.

Fig 1: Example of UTC analysis under two conditions: 1) when the citric acid concentration was the same across 3 days (this was set at participants' lowest cough threshold), and, 2) at participants' CT, which differed across 3 days



Session 13. Poster session 13B: Instrumental Assessment 3–Other

USE OF SPIROMETRY TO EVALUATE BREATHING-SWALLOWING COORDINATION

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Introduction: Current methods of measuring breathing-swallowing coordination (BSC) include nasal thermistry and respiratory inductance plethysmography. However these measures are prone to artifact and limited to detection of the presence and direction of airflow. Spirometry can measure swallow apnea duration (SAD) and the respiratory phase pattern (RPP) with fewer artifacts and could additionally measure air volume and flow during the RPP. The goal of this study is to examine feasibility and utility of using spirometry to measure BSC. We hypothesize that it will be feasible to measure BSC via spirometry and that this method of measurement will expand clinical characterization of BSC.

Table 1

	Volume (L)	Flow RMS (L/s)	Volume % of average TV
Pre-swallow Apnea RPP	0.16 (0.14)	0.16 (0.06)	0.20 (0.16)
Post-swallow Apnea RPP	0.32 (0.63)	0.21 (0.10)	0.43 (0.36)

Materials and Methods: Ten healthy participants (6F 4 M; ages 20–43 mean 30) wore a head-mounted nasal mask (Philips Wisp)

connected to pneumotachograph (Hans Rudolph 3813) and spirometer (ADIstruments Inc.) to collect airflow data during swallowing (Figure 1). Participants were instructed to keep lips sealed except to place a straw between the lips. Participants were observed with 3 single sips (10 ml) of water. Tidal breathing was measured for 3–5 cycles per swallow. Data were analyzed with LabChart 8.

Results: Measurement of BSC was quick and easily tolerated by participants. Consistent with prior literature average swallow apnea duration (SAD) was 0.91 s (SD = 0.63) during single water sips and an expiratory/inspiratory RPP was observed for 83% of swallows. Additional measures of volume and flow of air inspired and/or expired before and after the SAD were easily measured as very small in relation to tidal volumes (Table 1). The volume of air inspired or expired during the RPP was also normalized to participant's average tidal volume and expressed as a percentage of average TV in Table 1.

Conclusions: Evaluation of BSC via spirometry is feasible and yields additional airflow measures which may further aid assessment of BSC in individuals with neuromuscular and respiratory impairments.



AMYOTROPHIC LATERAL SCLEROSIS' DYSPHAGIA SELF-PERCEPTION AND SPIROMETRY

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Introduction: Dysphagia can occur in all patients with ALS and often affects the inspiratory muscles leading to a reduction in respiratory muscular strength and decrease the strength of the cough reflex which is crucial to allow safety of the airway facilitating the aspiration of food. Thus the purpose of this work is to relate the self-assessment of the risk symptoms of dysphagia of ALS patients with the results of spirometry.

Materials and Methods: Study approved by Ethical Committee in Research by number 2.032.647. For the evaluation of the Perception of Dysphagia it was used the Eating Assessment Tool—EAT-10 which consists of 10 questions with different situations related to swallowing where patients should classify responses according to a scale from 0 to 4 where 0 is not a problem and 4 is a very big problem. The spirometry was carried out with the PEAKFLOW instrument Microlife ® brand PF100 model with patients sitting with nasal occlusion and performed three times for the realization of the average.

Results: The sample was composed of six men and two women. In result of the EAT-10 5 individuals have resulted less than 3 or they did not observe any difficulty with the swallowing and 3 individuals with a score greater than 3 being indicative of swallowing problems.

In spirometry the result of FVC and PEF were for 100% of the sample. Using Student *T* Test there was no relationship between the findings of the two results.

Conclusions: It was possible to observe that the EAT-10 may be a good screening tool for dysphagia self-perception with ALS patients but it should be taken into account that patients present several changes (respiratory motor emotional etc.) and who may not perceive effectively how the issues are affecting their quality of life in view of the day to day they manage to make small adjustments and/or stop eating certain foods.

Keywords: swallowing disorder; spirometry; Amyotrophic Lateral Sclerosis

		Levene's Test			T-Test			95% difference		
		F	Sig.	t	diff.	p-value	Mean difference	Standard Error difference	Lower	Upper
Mean PEF	equal variance assumed	.141	.720	1.768	6	.127	1.96267	1.11014	-.75374	4.67908
	equal variance not assumed			1.966	5.732	.099	1.96267	.99848	-.50847	4.43381
Mean VEF	equal variance assumed	1.394	.282	.510	6	.628	28333	.55590	-1.07689	1.64356
	equal variance not assumed			.445	2.929	.087	28333	.63667	-1.77072	2.33738

ASSOCIATION BETWEEN CERVICAL AUSCULTATION AND ELECTROMYOGRAPHY IN THE PHARYNGEAL PHASE OF SWALLOWING

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Introduction: The swallowing process is a neuromuscular activity with coordinated movements. In pharyngeal phase sounds are produced by the directing the food bolus through esophagus and the airway protection. Cervical auscultation-CA is a complementary method of clinical evaluation that allows to listen to swallowing sounds. Surface electromyography-SEMG is a method for assessing the supplementary muscle group as involved into swallowing. This study aimed to evaluate the acoustic data of CA with the electrical activity of the muscles involved in the pharyngeal phase of swallowing without disorders.

Materials and Methods: It is cross-sectional study involving a quantitative approach approved by University Ethical Committee in Research (number 1.389.050). All participants signed the informed consent form. By swallowing 90 ml of water the pharyngeal phase of swallowing with auscultation and SEMG was evaluated. The CA values were transferred to the Deglutisom[®] software and the measures of duration and amplitude of electromyographic activity during swallowing were made by SEMG. The Student's *t*-test to compare means and the association between variables by the Pearson correlation coefficient were used. The level of significance adopted was 5%.

Results: Fifty-seven adult women participated in this study with mean age of 23.4 years. Table 1 shows the association of acoustic data from cervical auscultation (intensity and frequency) with the electrical activity of the suprahyoid and infrahyoid muscles. The suprahyoid region was greater than the peak muscle activity of the infrahyoid region for swallowing 90 ml of uninterrupted water.

Conclusions: Acoustic swallowing parameters in healthy individuals are associated with the electrical activity of muscles involved in the

pharyngeal phase of swallowing. These data complement the clinical swallowing evaluation.

EATING ASSESSMENT TOOL (EAT-10) AND PENETRATION-ASPIRATION SCALE IN HEAD AND NECK CANCER PATIENTS

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Objective: This study compared the dysphagia risk score in the Eating Assessment Tool-10 (EAT-10) and Videofluoroscopic Swallowing Study (VFSS) by Modified Barium Swallow Impairment Profile (MBSImPTM) with penetration-aspiration scale (PAS) in individuals with head and neck cancer (HNC).

Materials and Methods: Fifty-one HNC patients were evaluated with EAT-10 and Videofluoroscopic Swallowing Study (VFSS) by Modified Barium Swallow Impairment Profile (MBSImPTM) on the same day. The EAT-10 score was related to the penetration-aspiration scale (PAS).

Results: Patients (17 T1/T2 and 34 T3/T4) participated in this study of which 86.27% were male. The mean age of the patients was 62.0 years. The aspiration (38.24%) was higher in T3/T4 group ($p = 0.0353$). The group treated by surgery presented more aspiration (53.85%) than the radiochemotherapy group (46.15%)— $p = 0.0204$. Significant correlations were revealed between EAT-10 scores and the PAS: aspiration > penetration ($p = 0.0214$). The sensitivity of a EAT-10 higher than 11 in detecting aspiration was 86.0% and the specificity was 62.0%. A EAT-10 score of higher than 11 has a positive predictive value of 46.0% and a negative predictive value of 92.0%. Patients with a EAT-10 score higher than 11 had 5.75 more risk of aspiration (Table 1).

Conclusion: EAT-10 correlated to PAS in relation to penetration and aspiration. It has high sensitivity 86% and low specificity 46%. The negative predictive value of test is high 92%. Patients with low score on EAT-10 has a low rate of aspiration. When score are higher than 11 there is a 5.75 more risk of aspiration but other tests must be performed.

Table 1 EAT-10 scores and aspiration results on Videofluoroscopic Swallowing Study

EAT-10 Score	Aspiration		Total
	Present (N)	Absent (N)	
>11	12 (a)	14 (b)	26
<12	2 (c)	23 (d)	25
Total	14	37	51

EAT-10 (Eating Assessment Tool)

Sensitivity: $a/(a + c) = 86.0\%$; specificity: $d/(b + d) = 62.0\%$; positive predictive value = $a/(a + b) = 46.0\%$; negative predictive value = $d/(c + d) = 92.0\%$; relative risk = $a/(a + b)/c/(c + d) = 5.75$.

PREVALENCE OF DYSPHAGIA IN THE HOSPITALIZED POPULATION – PRELIMINARY RESULTS

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Introduction: Dysphagia is associated with aspiration pneumonia malnutrition and prolonged hospital stay. Appropriate care for

dysphagia may prevent these complications. However little is known about the prevalence of dysphagia in a generalized hospitalized population. This study aims to establish the prevalence of dysphagia in a general hospitalized population.

Methods: A cross-sectional study of patients admitted 24–72 h to general wards (internal medicine cardiology pulmonology neurology general surgery gastroenterology or geriatrics) in two hospitals from November 2017 until April 2018 in Gelre hospitals Apeldoorn and Zuyderland Hospital Heerlen the Netherlands. The Eating Assessment Tool (EAT-10) and the Volume-Viscosity water Swallow Test (V-VST) were utilized to assess the prevalence of dysphagia in a generalized hospitalized population. Also nursing staff recognition of dysphagia was assessed.

Results: Medical records of 1690 patients were evaluated for exclusion criteria. 219 patients were included. The mean age was 67.5 years (SD 15.3) with 120 males and 99 females. 22.4% (49) reported an EAT-10 ≥ 2 and 7.8% (17) had a divergent V-VST. A divergent EAT-10 was not significantly associated with age (66.9 years (SD 15.0) vs. 69.5 years (SD 16.5) $p = 0.732$) (Table 1). A divergent EAT-10 was significantly associated with a divergent V-VST ($\chi^2 (1) = 3.941$; $p = 0.047$). The department was significantly associated with the presence of a divergent EAT-10 ($\chi^2 (6) = 16.631$; $p = 0.011$) with the proportion of patients with a divergent EAT-10 the highest in the geriatric ward (50%). In only 3 out of 49 (6.1%) cases with a divergent EAT-10 the nursing staff had a suspicion of dysphagia.

Conclusion: Dysphagia is a large burden on the hospitalized population. However the presence of dysphagia is poorly recognized by the nursing staff. This research is still in progress until a total of 300 patients are included. Expected end of inclusion is end of June 2018.

	EAT-10 <2 n = 170 (77.6%)	EAT-10 ≥ 2 n = 49 (22.4%)	P-value
Age in years, median	66.9 (SD 15.0)	69.5 (16.5)	0.732
Sex, male, n (%)	91 (76.5%)	28 (23.5%)	0.555
Sex, female, n (%)	79 (79.8%)	20 (20.2%)	
Department			0.011
- Cardiology, n (%)	32 (91.4%)	3 (8.6%)	
- Gastroenterology, n (%)	26 (86.7%)	4 (13.3%)	
- Geriatrics, n (%)	5 (50%)	5 (50%)	
- Internal medicine, n (%)	28 (82.4%)	6 (17.6%)	
- Neurology, n (%)	26 (72.2%)	10 (27.8%)	
- Pulmonology, n (%)	23 (62.2%)	14 (37.8%)	
- Surgery, n (%)	30 (83.3%)	6 (16.7%)	
Divergent V-VST	10 (58.8%)	7 (41.2%)	0.047

SURFACE ELECTROMYOGRAPHY FOR EVALUATION OF SWALLOWING PHASES IN DYSPHAGIA: A PILOT STUDY

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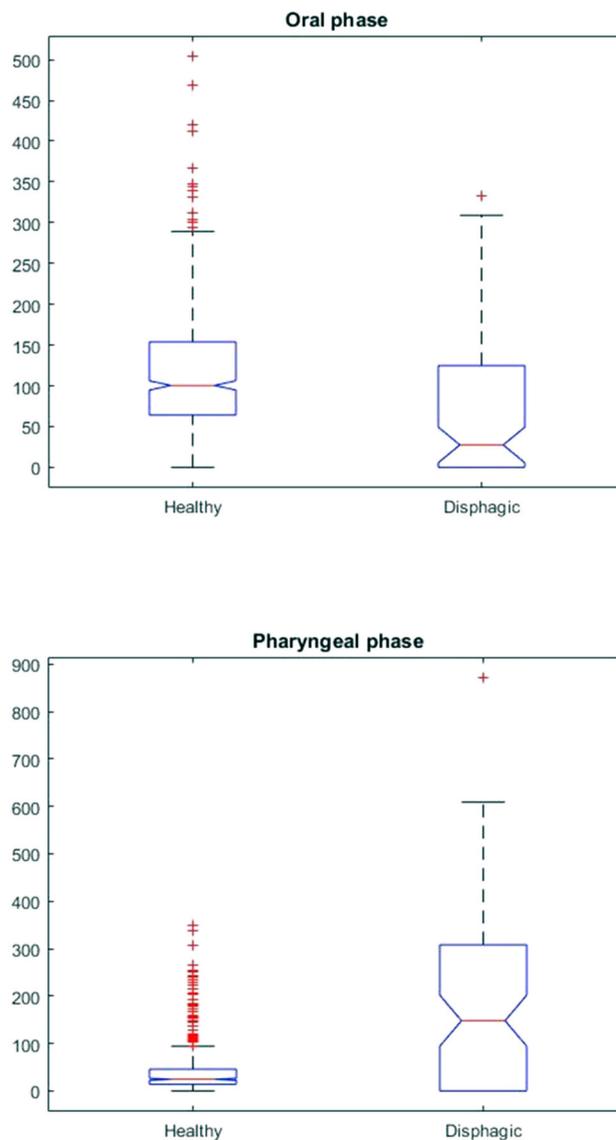
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Introduction: Invasiveness and subjectivity characterize the reference tests for diagnosis and follow-up of dysphagic patients. Non-invasive and quantitative alternatives have emerged for improving the results of the swallowing therapy. This study presents preliminary results of the application of an automatic algorithm for classification between healthy and dysphagic swallows by surface electromyography (sEMG).

Methods: sEMG signals were collected from two groups of individuals: (1) 122 healthy subjects age 49.7 ± 9.8 (32–83 years); and (2) 4 patients with dysphagia (two with stroke one with Amyotrophic Lateral Sclerosis and one by idiopathic multifocal dystonia) aged 44–81 years. 8 sEMG channels were recorded at the masseteric

anterior cervical and perioral regions. Each subject swallowed 3 consistencies with different volumes (saliva water—5, 10, 15 ml and yogurt—3, 5, 7, 10 ml). We trained and validated an artificial neural network (ANN) with the root mean square of sEMG of 47 subjects of the group 1. Afterwards the trained model was used to classify three swallowing phases: background oral (onset of orbicularis oris) and pharyngeal (onset of submental group and larynx elevation). We compared the presence of oral and pharyngeal phases in both groups (group 1: remaining 75 subjects) by Kruskal–Wallis test.

Results: With the ANN classifier (accuracy: 94.34 ± 0.58) we found significant differences between distributions of the pharyngeal and oral phases in both groups ($p < 0.001$). This behavior was observed for all boluses.



Conclusions: Our pilot study suggests that sEMG signals recorded during the oral and pharyngeal phase are suitable to discriminate between normal and pathological swallowing patterns. Although the results are promising further research with a larger sample of individuals is required to assess the generalization capability of the

proposed approach. We propose the integration with other non-invasive signals for improving the swallowing.

HOW TO MEASURE SALIVA SWALLOWING FREQUENCY DURING 24-HOURS: A SYSTEMATIC REVIEW

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Introduction: In patients who suffer from drooling of saliva (e.g. in Parkinson's disease) accumulation of saliva is thought to be one of the causal factors which may result from a reduced saliva swallowing frequency (SSF). To better understand this phenomenon a reliable and valid measurement is needed that can register SSF in everyday life: ambulant and during 24 h. The aim of this study was to review measurements that meet these requirements.

Methods: We conducted a systematic search in Pubmed and Embase on SSF and independently included studies in which SSF was measured with details about measuring technique and duration. Exclusion criteria: instructed saliva swallowing animal studies.

Results: The search provided 795 studies of which 89 were eligible. After full text appraisal 53 studies could be included. Techniques could be divided into five groups: (1) surface electromyography (sEMG; submental muscles contraction indicating a swallow; 18 studies) (2) acoustic measurement (microphone near the larynx registering sound during a swallow; 11 studies) (3) manometry (registration of pressures in the esophagus following a swallow; 7 studies) (4) impedance measurement (a catheter measuring esophageal impedance where a swallow is indicated by a decrease in impedance; 5 studies) and (5) accelerometry (sensor registering laryngeal excursion by a swallow; 3 studies). All appear reliable and valid but only impedance measurement and manometry meet the requirements to measure SSF during 24 h: ambulant outside the lab regardless of being awake or asleep and undisturbed by speaking or moving around.

Conclusion: Despite the invasive nature of impedance measurement and manometry esophageal measurement is currently the most suitable for 24-h measurement of SSF. sEMG acoustic measurement and accelerometry are presently only suitable for measuring SSF for limited conditions because of restrictions in moving speaking or measurement location.

MEDICALLY UNEXPLAINED OROPHARYNGEAL DYSPHAGIA AT THE UNIVERSITY HOSPITAL OUTPATIENT CLINIC FOR DYSPHAGIA: A CROSS-SECTIONAL COHORT STUDY

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Introduction: Medically unexplained oropharyngeal dysphagia (MUNOD) is a rare condition. It presents without demonstrable abnormalities in the anatomy of the upper aero-digestive tract and/or swallowing physiology. This study investigates whether MUNOD is related to affective or other psychiatric conditions.

Materials and Methods: The study included patients with dysphagic complaints who had no detectable structural or physiological abnormalities upon swallowing examination. Patients with any underlying disease or disorder that could explain the oropharyngeal dysphagia were excluded. All patients underwent a standardized examination protocol with FEES examination the Hospital Anxiety and Depression Scale (HADS) and the Dysphagia Severity Scale (DSS). Two blinded judges scored five different FEES variables.

Results: None of the 14 patients included in this study showed any structural or physiological abnormalities during FEES examination. However the majority did show abnormal piecemeal deglutition which could be a symptom of MUNOD. Six patients (42.8%) had clinically relevant symptoms of anxiety and/or depression. The DSS scores did not differ significantly between patients with and without affective symptoms.

Conclusions: Affective symptoms are common in patients with MUNOD and their psychiatric conditions could possibly be related to their swallowing problems. Therefore consultation of a psychiatrist and multidisciplinary integrated care are recommended for patients with MUNOD.

Session 13. Poster session 13C: Dysphagia in Stroke 2

CHARACTERIZATION OF THE SPEECH-LANGUAGE PATHOLOGIST'S ROLE IN THE BRAIN STROKE CARE OF A PARTICULAR HOSPITAL IN SAO LUIS-MA BRAZIL

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¹CSA

Introduction: The brain stroke care is a program adopted by the hospital aiming at its identification and previous intervention and a multiprofessional team along with the patient in this condition. The dysphagia incidence after the stroke increases the risk of pulmonary complications malnutrition dehydration and death. The present study aimed to describe the role of the speech-language pathologist in the brain stroke care.

Materials and Methods: This is a retrospective qualitative descriptive cohort study. Data were collected from the Speech-Language Pathology service statistics including data from patients who were on the stroke care program from October to December 2016. The variables collected were related to "gender" "feeding pathway" "dysphagia classification according to the Functional Oral Intake Scale (FOIS)" "communication changes" "speech-language pathology approach and diagnosis" "aspiration pneumonia incidence".

Results: From October to December 2016 33 patients were identified in the brain stroke program all of whom (100%) received Speech-Language Pathology attention. 14 were male (42.4%) and 19 female (57.6%) 12 (36.4%) patients were evaluated in the emergency room (6.06%) 11 in the hospitalization unit (33.3%) and 10 in the intensive care unit (30.3%). Regarding the swallowing function according to FOIS we found: 7 patients at level I (21.2%) 2 at level V (6.0%) 3 at level VI (9.0%) and 22 at level VII (66.6%). 25 patients remained on oral diet (75.8%) 7 patients were recommended to use nasogastric tubes (21.2%) and 2 patients evolved to gastrostomy (6.0%). Only 2 patients required swallowing videofluoroscopy (6.0%). In the speech and oral language evaluation 12 patients presented dysarthria (36.4%) 10 patients aphasia (30.3%) and 11 patients did not present language alterations (33.3%) no patient developed pneumonia aspiration.

Conclusion: was possible to demonstrate the importance of early risk identification need future research.

ESTABLISHING INTER-RATER RELIABILITY SCORES FOR TIMING MEASURES IN VIDEOFLUOROSCOPY IN STROKE

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Introduction: The use of timing measures in Videofluoroscopy Swallow Studies (VFSS) is common in research but can be difficult to carry out. There is a lack of operational detail on how to perform these measurements. This study reports on a project to establish inter-rater reliability ratings for timing measurements.

Materials and Methods: Inter-rater reliability was assessed on timing measures from VFSS data of acute stroke patients from the STEPS trial of Pharyngeal Electrical Stimulation (5 ml boluses of thin fluids 40% w/v at 25 fps). A variety of measures were carried out for example Oral Transit Time (OTT) Laryngeal Closure Duration (LCD) Pharyngeal Transit Time (PTT) and Upper Oesophageal Sphincter Duration (UESD). Two Speech and Language Therapists rated the same data on separate occasions. These data were analysed using the Intraclass Correlation Coefficient (ICC) and corresponding 95% confident intervals were calculated using SPSS statistical package v. 24 using single measures absolute-agreement 2-way random-effects model.

Results: Repeated ICC trials and detailed practice of data in between trials was needed to establish excellent ICCs (> 0.9). OTT LCD and UESD required the most training. ICCs for SRT, ILC, and PTT were achieved more readily. Operational rules to conduct the timing measures were refined following each ICC trial.

Conclusions: Practise on a wide variety of different patients was essential to ensure operational rules were established for atypical swallowing patterns. Quality of VFSS data also influenced the process. Establishing competence in conducting timing measures in VFSS for stroke patients with dysphagia is an iterative process that requires extensive practice. It is crucial that studies using timing measures report ICCs.

POST-STROKE DYSPHAGIA: THE EXPERIENCE OF THE STROKE UNIT OF UNIVERSITY CLINIC IN UKRAINE

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Oropharyngeal dysphagia (OPD) is one of the most common post-stroke complications. The occurrence of post-stroke OPD varies dependently on the stroke severity the localization of lesion the efficacy of screening and management. There is considered that persistent dysphagia is an independent predictor of clinical outcomes and institutionalization issues.

The aim of the study was to assess the occurrence of post-stroke OPD and its clinical consequences in the conditions of the stroke unit.

Screening for dysphagia was conducted in the first 2 h after the admission to hospital accordingly to the Order #602 of Ministry of Health issued on 03.08.2012 with the use of the test with 3 tea spoons of water and by the GUSS test recommended by the international guidelines. For patients with confirmed OPD ($n = 103$ or 52.5% of 196 patients with acute stroke) there were applied the treatment and rehab practices including swallowing manoeuvres food modification the use (if necessary) of nasogastral tube apparatus electrostimulation

and so on. In the prospective study all patients were randomly distributed into two cohorts. For the first group (control) there were used routine practices for dysphagia treatment ($n = 53$) and for the second (basic) 2nd group ($n = 50$)—complex treatment and rehab using VitaStim in the absence of contraindications by the motor-enhancing scheme (100% of motor threshold 80 Hz, 700 μ s. The average duration of stay in the stroke unit and its rehab subunit was 14.9 ± 1.1 days. The follow-up period was 6 months.

The results of the study demonstrates good functional results in the both clinical groups. The severity of dysphagia correlated with NIHSS score but not with the stroke lesion localization. The patients received VitaStim treatment has less occurrence of the residual swallowing disorders after the discharge ($\chi^2 = 5.12$; $df = 1$; $p = 0.02$).

HYDRATION STATUS IN ACUTE STROKE PATIENTS WITH DYSPHAGIA

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Introduction: Acute stroke patients with oropharyngeal dysphagia (OD) are at increased risk for dehydration (Dh). Dh is a well-known problem in institutionalized people. The aim of our study is to evaluate the hydration status of patients on admission to our Stroke Unit and at discharge through creatinine (Cr) values.

Methods: Patients with a final diagnosis of ischemic and hemorrhagic stroke admitted to the Stroke Unit of the Hospital del Mar consecutively between January to October 2017 were evaluated. It is a descriptive study that analyses hydration status dichotomized according to arrival Cr level in initial blood sample and at discharged (Dh = men, Cr > 120 mg/dl and women Cr > 09 mg/dl). OD was evaluated with MECV-V test and classified in absent mild moderate and severe. The variables that have been collected were: age sex stroke subtype stroke severity presence/absence of dysphagia prior to stroke during stroke admission baseline/discharge Cr hydration in ml/day and diuretics.

Results: Among the 200 patients included 51% were female with a mean age 73.1 years. A 90.5% of strokes were ischemic with a mean admission time of 6 days. Dh was identified on admission in 22.5% of the cohort in a 23.2% at discharge and a 6% of patients without initial Dh present it at hospital discharge. A 65.5% haven't OD in the acute phase a 6% mild 13.5% moderate and a 15% severe. Dehydratase patients at discharge presented significantly greater stroke severity (NIHSS; $p < 0.001$) and were older (72.4 years vs 77.7 years; $p = 0.053$). Moreover patients without OD (27.7%) mild (25%) or moderate OD (26%) presented more often Dh than those with severe OD (3.3%).

Conclusions: In our stroke cohort we found that patients without mild or moderate OD presented more often Dh than those with severe OD in whom the fluid requirements were more controlled. Importantly a 22.5% of patients were dehydrated at hospital arrival.

NASOGASTRIC TUBE PLACEMENT FOLLOWING ACUTE STROKE: WHERE ARE THE DELAYS?

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Introduction: Dysphagia following stroke is common affecting 28–72% of people in the acute phase. Not too infrequently a nasogastric tube (NGT) is required to provide or support nutritional

requirements or the taking of medication. The placement of a NGT has many stages from the time of decision to place to readiness for use. Each stage has a potential for delay.

Methods: This was an observational study of the NGT placement pathway. Patients > 18 years of age admitted to an acute stroke unit with a confirmed diagnosis of acute stroke (confirmed on MRI/CT) and clinical examination (NIHSS) were eligible to be recruited to the study. The decision to place the nasogastric tube was a clinical one. Research staff began timing the pathway from the minute the pathway was commenced (Decision to place the NGT) to its end (NGT ready to use).

Results: 150 stroke patients were recruited from 5 English Hospitals. Majority were severe strokes (NIHSS > 15, mRS > 4). The mean time from admission to the decision to place a NGT was 784.6 min (median 359.5 min) which is more reflection of clinical need than process. The time taken from the clinical decision to deployment of the NGT to its positioning being confirmed was a mean of 467.15 min (23–4853). The mean time delay between decision and commencement of placement was 977.7 min (10–4727); with a mean time from the commencement of the NGT placement to confirmation of correct positioning being 333.9 min (60–4035). Dichotomizing the results into two NIHSS < 16 and 16 + suggested that those people with a greater NIHSS were more likely to wait for the tube to be ready for use (452.9 min vs. 74.1 min $p = \text{NS}$) particularly between confirmation and use (737.4 min vs. 900.9 min $p = \text{NS}$).

Conclusions: This study has high lighted that there is a variation in practice between organisations. There are delays across the whole pathway; many of these can be eliminated with a redesign of the NGT pathway.

ASSESSMENT OF DYSPHAGIA IN STROKE PATIENTS WITH FIBEROPTIC ENDOSCOPIC EXAMINATION OF SWALLOWING (FEES)

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Introduction: The aims of this study is to assess swallowing processes using FEES examination and determine prevalence of silent aspiration based on stroke location.

Methods: This is a descriptive cross sectional study. FEES examination was conducted by a team that consists of an otolaryngologist a physical medicine and rehabilitation doctor and clinical nutritionist. Forty-eight stroke patients with dysphagia were included in this study and FEES was performed to evaluate the abnormality of swallowing in 5 parameters which are preswallowing leakage standing secretion residue penetration and silent aspiration.

Result: Of 48 total patients 771% are male and most frequently appears in the 50–59 age group and 56.3% patients had their first stroke and half of total patients complained prolonged eating time. The most common type of stroke is ischemic stroke (72.9%) and location of the lesions were mostly found in the hemisphere (77.1%). Preswallowing assessment revealed abnormal cough reflex in 77.1% patients and weaknesses of tongue movement in 47.9% patients. On swallowing assessment standing secretion occurred in 56.3% patients and is the most prevalent in patients with brainstem lesions (83.1%). Preswallowing leakage occurs in the majority patients(91.7%) and happened in all stroke patients with mixed lesions and brainstem lesions. FEES also revealed the presence of food residues in 81.3%

patients. Penetration occurred in 72.9% of total patients and all of stroke patients with mixed lesions. The prevalence of silent aspiration was 29.2%. The most of them found in stroke patients with mixed lesions(60%) and the least occurred in stroke patients with hemisphere lesions (24.3%). The risk of silent aspiration on a recurrent stroke is five times greater than that of the first stroke ($p = 0.013$).

Conclusion: The prevalence of silent aspiration in stroke patients was 29.2% mixed lesions have more severe oral and pharyngeal phase and more risk for aspiration.

SWALLOW FUNCTION IN UNILATERAL HEMISPHERIC STROKE PATIENTS

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Introduction: The characterization of swallowing pathophysiology after stroke is challenging because of the variable nature of damage caused to the central nervous system. Combined high-resolution impedance manometry (HRiM) quantifies deglutitive pharyngeal and upper esophageal sphincter (UES) motility and bolus flow. The aim of this retrospective case–control design study was to biomechanically characterize deglutition in dysphagic stroke patients.

Materials and Methods: 11 dysphagic unilateral hemispheric stroke (8 left 3 right) patients (8 M 73 ± 13 years) referred to University Hospitals Leuven underwent HRiM. Dysphagia assessment also included clinical information FEES VFSS. 10 ml liquid swallows were characterized. An online HRM analysis portal (swallowgateway.com) was used to determine swallow function metrics. Results were compared with 11 age and sex matched healthy controls (8 M 69 ± 7 years).

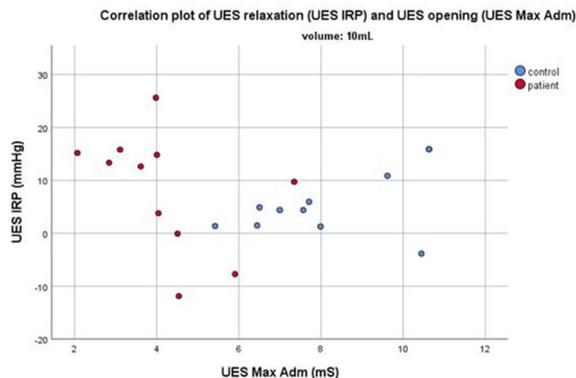
Results: The UES Maximal Admittance a measure of UES opening and non-specific marker of deglutitive dysfunction was significantly reduced in stroke patients compared to controls. However other measures indicative of specific components of the swallowing mechanism were not significantly different compared to controls (Table 1). A low UES Maximal Admittance correlated to UES Integrated Relaxation Pressure ($p = 0.011$ Spearman's correlation coefficient = - 0.727) (Fig. 1).

Conclusions: This pilot study suggests that reduced UES Maximal Admittance (inferring reduced UES opening) is a non-specific marker of swallowing pathophysiology in stroke as is the case in other neurogenic disease (Cock et al. 2016).This decreased UES opening correlated with incomplete UES relaxation. The absence of other biomechanical differences within this small cohort is likely to be due to the fact that dysphagia following stroke has multifactorial causes.

	Control (n=11)	Patient (n=11)	p-value
SRI	4 [1; 6]	5 [2; 12]	0.654
UES max Adm (mS)	8 [7; 10]	4 [3; 5]	0,000*
IBP (mmHg)	11 [5; 20]	15 [5; 28]	0.519
UES IRP (mmHg)	4 [1; 11]	13 [0; 15]	0.606
UES Open Time (s)	0,65 [0,58; 0,70]	0,63 [0,55; 0,69]	0.332
VTI (mmHg.cm.s)	174 [79; 317]	270 [118; 572]	0.151
PeakP (mmHg)	159 [101; 233]	147 [102; 231]	0.874
UES PeakP (mmHg)	282 [200; 384]	350 [251; 464]	0.401
DCL	0,49 [0,34; 0,51]	0,41 [0,39; 0,46]	0.065
PhCI (mmHg.cm.s)	385 [295; 706]	487 [352; 742]	0.387

Table 1. PFA data from unpaired samples assessed with Mann-Whitney U test presented as median [IQR]. Significant p-values <0.05.<P>

Figure 1. Correlation plot of UES relaxation (UES integrated Relaxation Pressure) and UES opening (UES Maximal Admittance)



Session 13. Poster session 13D: Paediatric Dysphagia 3

PARENTS' EXPERIENCES OF FEEDING AND SWALLOWING PROBLEMS IN CHILDREN WITH 22Q11 DELETION SYNDROME: A NATIONAL SURVEY

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Background: 22q11 deletion syndrome is a disorder caused by chromosomal deletion. 22q11 deletion syndrome is associated with wide variety of deformities. Five of these deformities are known to cause feeding and swallowing disorders. These include craniofacial anomalies cardiac disease respiratory problems gastrointestinal problems and pharyngeal dysmotility (1, 2). The prevalence of 22q11 deletion syndrome in Ireland is unknown. Dysphagia prevalence is estimated to be around 30% (3). Research aims were to examine caregivers' experiences of dysphagia in children with 22q11 deletion syndrome and identify services needs in the Republic of Ireland.

Methods: Cross sectional descriptive web based survey was chosen as a research methodology. Non-probability purposive sampling was used. The survey was distributed by 22q11 Ireland support group to organization members. Data was collected online using surveymonkey.

Results: 43 caregivers all of them parents participated in the study. 97.44% reported that their children had one or more of the symptoms associated with dysphagia. Most parents discovered dysphagia within the first week of life. 82.50% reported difficulties feeding their children with 22q11 deletion syndrome. The most frequent complaint was nasal regurgitation. 57% of participants reported that the feeding problem had resolved over time. Nasal regurgitation and the inability to extract milk from the bottle were reported as the most challenging feeding difficulties. With regard to services specialist services (e.g. geneticist) and long waiting lists were cited as difficulties.

Conclusions: Dysphagia in children with 22q11 deletion syndrome is under investigated. Early identification availability of clinical guidelines and improved service provision is required to improve the services needed by this population in Ireland.

PEDIATRIC FEEDING DISORDER: CONSENSUS DEFINITION AND CONCEPTUAL FRAMEWORK

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Background: Pediatric feeding disorders lack a universally accepted definition. Feeding disorders require comprehensive assessment and treatment of four closely-related complementary domains (medical psychosocial feeding skill-based systems and associated nutritional complications) but previous diagnostic paradigms have typically defined feeding disorders using the lens of a single professional discipline. Despite inherent multiple underlying mechanisms and need for multidisciplinary care the diagnosis of feeding disorders has been approached unilaterally with each professional discipline suggesting its own approach. These diagnostic paradigms typically focus on specific aspects and do not capture the complexity of feeding disorders as a whole.

Aims: To use the framework of the World Health Organization's International Classification of Functioning Disability and Health to develop diagnostic criteria for "Pediatric Feeding Disorder".

Methods: A multi-disciplinary expert group was convened a comprehensive literature review was performed and a unifying diagnostic term is proposed.

Results: "Pediatric Feeding Disorder" (PFD) is defined as impaired oral intake that is not age-appropriate and is associated with medical nutritional feeding skill and/or psychosocial dysfunction. The proposed diagnostic criteria for PFD use a conceptual framework that goes beyond disease-oriented or unilateral diagnostic paradigms recognizing PFD as causing dysfunction in at least one of four closely-related complementary domains.

Conclusion: Pediatric feeding disorders have lacked a universally accepted definition. The proposed diagnostic criteria will enable practitioners to better characterize the needs of patient populations and promote the use of common precise terminology necessary to advance clinical practice research and health-care policy.

CHILDREN WITH ISOLATED DYSPHAGIA- A REVIEW OF PRESENTATION TREATMENT AND OUTCOMES IN OUR LADY'S CHILDREN'S HOSPITAL CRUMLIN

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Background: Dysphagia is commonly seen in at risk children e.g. those born prematurely who have neuromuscular conditions upper airway malformations. Isolated dysphagia is defined as the presence of aspiration or significant risk factors for aspiration in a child who is typically developing has no co-morbid medical diagnosis and no airway issues associated with dysphagia. In OLCHC isolated dysphagia is diagnosed when a child presents with dysphagia as assessed by a Speech and Language Therapist (SLT) with normal ENT and neurology assessments. Few studies have reported on children with isolated dysphagia.

Methods: A retrospective chart review was conducted of all children who presented with isolated dysphagia over a 10 years period. We describe these patients' presentation clinical feeding assessment findings radiological findings treatment strategies and outcomes.

Results: We identified 17 children with isolated dysphagia. The most common respiratory symptom was recurrent respiratory illnesses (82%). On videofluoroscopy 71% demonstrated aspiration 29% showed penetration and were felt to be at high risk for aspiration. Full oral feeding was continued in 9 (53%) cases. Thickening of fluids was required in 7/9 (78%). Treatment with prophylactic azithromycin was instigated in 26%. Enteral feeding was required in 47% of cases.

At follow up 11 (65%) had resolution of symptoms and were on full unmodified oral diet. The mean age at resolution was 3.45 years (range 0.25–7.5 years).

Conclusion: A small population of otherwise typically developing children have isolated dysphagia leading to significant respiratory symptoms. There is often a delay in diagnosing these children likely due to a lack of awareness of this condition. Isolated dysphagia should be included in the differential diagnosis of young children presenting with recurrent otherwise unexplained respiratory symptoms. Timely SLT assessment reduces delay in diagnosis avoiding prolonged hospital stay.

A NARRATIVE SYNTHESIS OF PARENTAL EXPERIENCES OF TUBE FEEDING

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Background: Dysphagia in paediatric populations can be caused by a variety of different conditions. Severe dysphagia can result in a child needing to be tube fed. This is often a complex and difficult choice for carers with a wide range of implications and challenges for the child and their carers including parents adapting to a new role where there are responsible for a technical health procedure. Little is known about parent's experiences of non-oral feeding and the day to day implications of tube feeding their child. The objective of this research was to systematically review the literature regarding parental experiences of tube feeding their child.

Methods: A systematic review of the literature from key health related databases in accordance with PRISMA guidelines was performed. A novel data extraction framework was then compiled to identify the key themes from the literature.

Results: Parental experiences of tube feeding can be largely divided into three categories: health-related experiences; practical experiences and; emotional experiences. While parental health-related experiences are largely positive practical and emotional experiences of tube feeding are more variable and in many instances perceived as negative.

Conclusions: This review has found that despite the medical benefits accruing the practicalities of and emotions experienced by parents while caring for a child who is tube fed are challenging. Research to date has not fully explored these experiences. More up to date research encompassing all family members may lead to improved decision making systems and support for parents.

VALIDITY AND RELIABILITY OF THE MIXING ABILITY TEST AS MASTICATORY PERFORMANCE OUTCOME IN CHILDREN WITH SPASTIC CEREBRAL PALSY AND CHILDREN WITH TYPICAL DEVELOPMENT

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Introduction: The mixing ability test as masticatory performance is largely used in studies with adults with oral pathology. This study aimed to test the construct validity and the test–retest reliability of the mixing ability test (MAT) in children with spastic cerebral palsy (CP) and children with typical development (TD).

Methods: To evaluate the construct validity the results of the MAT were correlated with tongue movements mandible movements relative muscle contraction and clinical observation measured with ultrasound 3D kinematics electromyography (EMG) and relevant items of the Mastication Observation and Evaluation (MOE) instrument respectively. Moreover the between groups effect was tested. Test–retest reliability was calculated with an intraclass correlation coefficient (ICC) and standard error of measurement (SEM).

Results: Twenty-one children (7 children with spastic CP and 14 children with TD) participated in this study. The MAT scores showed moderate to good correlations with some variables of the tongue movements horizontal mandible movements and occlusion duration relative muscle contraction of the left temporalis and all six MOE items ($-0.80 < r < 0.49$). The MAT scores were significantly higher for children with CP (mean 22.6; SD 2.4) compared to children with TD (mean 19.9; SD 1.9). The test–retest reliability had an ICC of 0.7 and a SEM of 1.16 ($\pm 5\%$ of the mean score).

Conclusion: These results indicate that the MAT is suitable and complementary to ultrasound 3D kinematics EMG and observation in comparing the masticatory performance of children with CP and children with TD with an acceptable test–retest reliability.

SAVING BED DAYS IN NEONATAL INTENSIVE CARE (NICU) BY SUPPORTING FEEDING PROGRESSION AND DISCHARGE: COST SAVINGS CALCULATIONS

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Background: Attaining oral feeding is an important discharge criteria from Neonatal Intensive Care. Prevalence of feeding difficulties in preterm infants is estimated at 15–21%. (1) Irish NICUs have sporadic SLT input and multidisciplinary approaches to managing feeding problems are lacking. (2) A recent Cochrane review. (3) identified that oral stimulation in preterm infants can reduce time to transition to oral feeding duration of hospitalisation and duration of parenteral nutrition. Such reductions should have an impact on reducing cost of care. This study aims to identify potential cost savings in one NICU by employing just one specialist SLT.

Methods: By combining one finding of the Cochrane review for potential hospital bed days saved average of 5.26 (SD 3.19–7.34) with known prevalence figures (15–21%) admission data for one NICU in 2015 and cost of bed day in that NICU4 (€813 overnight stay) and salary for 1 specialist SLT at midpoint on scale €60 000 (€55 564–€64 638)5 savings calculations were possible.

Results: 1949 babies admitted NICU in 2015 107 weighed < 1500 g at birth. Estimated Prevalence of 15–21%: possibly 292–409 babies could have had feeding issues in that particular group that year (Table 1). Specialist SLT would only need to intervene with 14 babies to pay annual salary.

Save an average of 5.26 (SD 3.19-7.34) bed days at 813 euro per day for	Average Savings in euro
1 baby	4, 276 (2, 593 - 5, 967)
10 babies	42, 760 (25, 934 - 59, 674)
50 babies	213, 819 (129, 673 - 298, 371)
Estimated prevalence lower end 292 babies	1, 248,702 (757, 293 - 1, 763, 852)
Estimated prevalence higher end 409 babies	1, 748,884 (1, 060, 729 - 2, 440, 674)

Discussion: The cost of NICU care is high. Oral stimulation in this group shortens hospital stay. It can be argued that employing specialist therapy staff to support feeding in NICU leads to significant cost savings upwards of €1,000,000 based on the above calculations. There would be benefit to SLT services in other tertiary centres who may see babies whose feeding issues are not resolved in NICU thus leading to further savings in cost of care.

RELATIONSHIP BETWEEN STRESS LEVELS AND PSYCHOLOGICAL STATUS OF PARENTS OF CHILDREN WITH SWALLOWING DISORDERS

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Introduction: The purpose of this study was to assess the relationship between stress levels and psychological status of parents of children with swallowing disorders.

Materials and Methods: Nineteen children with various neurological disorders who were suffered from swallowing dysfunction and their primary caregivers from their families were included in the study. Descriptive information including diagnosis gender age feeding type was recorded. The dysphagia symptom severity of children was determined with the Pediatric version of the Eating Assessment Tool (PEDI-EAT-10). The Parenting Stress Index Short Form (PSI/SF) was used to assess the stress levels of the caregivers and the Symptom Check List 90 Revised (SCL-90-R) was used for psychological assessment.

Results: Nineteen children with a mean age of 45.21 ± 35.78 months were included of which 63% were male. All children were fed by orally. All primary caregivers were mothers. The mean PEDI-EAT-10 score was 16.84 ± 10.86. The mean PSI/SF score was 76.68 ± 19.67. It was determined that 36% (n = 7) of mothers defined psychological distress according to the SCL-90-R. A moderate correlation was found between PSI/SF and SCL-90-R (r = 0.503; p = 0.028).

Conclusions: Caregiver participation was essential for swallowing rehabilitation. Parental stress and psychological status are the most important factors for their participation. It was found that stress levels of mothers were high and their psychological status was negatively affected according to this study. In addition there is a relationship between stress levels and psychological status of mothers. Therefore it is important to evaluate the stress and psychological status of caregivers and guide them to receive appropriate support.

IMPROVING FEEDING OUTCOMES IN LONG TERM TRACHEOSTOMY AND VENTILATOR DEPENDENT BABIES: A 12 YEAR REVIEW

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Background: Feeding and swallowing is a complex skill. With increasing survival rates of babies with medically complex congenital conditions requiring tracheostomy and ventilation establishing feeding and swallowing skills is a challenge. In addition to airway craniofacial neurological and developmental issues preventing oral aversion in these babies is important. We previously reported poor feeding outcomes in a cohort in a unit for long term ventilated babies over an 8 year period (1) 2005–2013. In 2014 we embarked on an programme of speaking valve modification to provide speaking valves to all previously ineligible babies. (2) Speaking valves restore oral airstream facilitate swallowing and voice/speech development and earlier intervention should have benefit.

Methodology: All babies discharged from the unit between 2014 and May 2018 were included (group 2). All had congenital conditions necessitating a tracheostomy for long term ventilator purposes. Older children with acquired conditions or those who were decannulated or died before discharge were excluded. Outcomes of interest at discharge were the same as the 2005–2013 cohort (group 1): numbers of full oral feeders those with oral feeding and a feeding tube those who were tube dependent aversive feeders. Records of groups were reviewed to see how many in each group had speaking valves on discharge.

Results: 88% of group 2 had speaking valves provided had more full oral feeders and less tube dependent aversive children on discharge. 29% more children had attained oral feeding skills by discharge in the later group (Table 1).

Discussion: Feeding issues in this group are complex. Feeding outcomes are improving. Earlier intervention using modified speaking valves along with multidisciplinary developmentally supportive interventions appear to equip these babies with skills required for oral feeding with a reduction in aversion and tube dependency.

On Discharge From unit	Group 1 2005 - 2013 (N=32)	Group 2 2014 -2018 (N = 17)
Full Oral Feeders	3 (9%)	7(41%)
Tube and Oral	16 (50%)	8(47%)
Tube Dependent/Aversive	9(29%)	2(11%)
Speaking valves	7(21%)	14(82%)
% Children leaving unit with oral feeding skills	59%	88%

Session 13. Poster Session 13E: Treatment 3

PER-ORAL ENDOSCOPIC MYOTOMY (POEM): BIOMECHANICAL CHANGES IN ACHALASIA PATIENTS USING PRESSURE FLOW ANALYSIS

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Introduction: Recently per-oral endoscopic myotomy (POEM) has been introduced for the treatment of achalasia. We aim to describe biomechanical changes in esophageal function before and after POEM using Pressure Flow Analysis (PFA).

Materials and Methods: We analyzed data of 16 achalasia patients [12F; 50 ± 16 years] who underwent high-resolution manometry with impedance measurements (HRIM) with liquid [n = 16] semisolid [n = 10] and solid boluses [n = 9] before and after POEM. Swallows

were analyzed using PFA (swallow gateway) quantifying esophageal motility (DCI, DL, and IRP4s) and bolus flow (PFI, IR, DPCT, DPE, and RP) (Table 1). For comparison 16 sex and aged matched-controls were recruited [12F; 50 ± 17 years].

Results: We included 16 achalasia patients based on Chicago Classification: 4 Type I, 10 Type II, and 2 Type III. 2 months after POEM [range 1–3 months] HRiM was repeated. In all patients a significant change was documented after POEM (Table 2). After POEM there was decreased esophageal contractile vigor (DCI) reduced deglutitive relaxation (IRP) and decreased flow resistance in mid and distal esophageal body (DPCT) for liquid boluses. Similar patterns were found for more viscous boluses. However in semisolids and solids POEM also improved esophageal clearance (IR). Esophageal vigor after POEM for liquid and semisolid swallows did not differ from matched controls.

Conclusion: POEM intervention in achalasia patients improved relaxation of the esophago-gastric junction (EGJ) resulting in decreased flow resistance in esophageal body and EGJ. Our data suggests improved esophageal clearance and reduced esophageal bolus residue after POEM. POEM intervention does not only alter EGJ function and esophageal clearance the esophageal vigor in treated achalasia patients also becomes more comparable to those in healthy subjects. Prospective randomized controlled trials investigating the effect of POEM on esophageal motor function and bolus flow using PFA seem warranted.

Table 1

	Controls (N=16)	POEM pre Liquids (N=16) Semisolids (N=10) Solids (N=9)	POEM post Liquids (N=16) Semisolids (N=10) Solids (N=9)	Patients pre vs. post POEM p-value	Controls vs. patients post POEM p-value
Distal Contractile Integral (DCI, mmHg/s/cm)	L: 983 [528-1764] SS: 790 [648-1382]	L: 186 [288-3249] SS: 2565 [1474-6439] S: 2813 [1729-9803]	L: 372 [61-2183] SS: 627 [495-1404] S: 1312 [324-2066]	L: 0.008 SS: 0.005 S: 0.008	L: ns SS: ns
EGJ 4s Integrated Relaxation Pressure (IRP4s, mmHg)	L: 11 [7-14] SS: 10 [4-13]	L: 38 [30-50] SS: 48 [28-62] S: 46 [40-84]	L: 22 [16-28] SS: 18 [12-27] S: 19 [14-31]	L: 0.002 SS: 0.007 S: 0.011	L: 0.001 SS: 0.005
Distension Pressure Compartmentalized Transport (DPCT, mmHg)	L: 1 [-0.8-6] SS: 10 [4-13]	L: 23 [7-28] SS: 30 [22-42] S: 33 [23-39]	L: 14 [4-13] SS: 15 [5-16] S: 14 [11-23]	L: 0.001 SS: 0.007 S: 0.008	L: 0.007 SS: ns
Distension Pressure Emptying (DPE, mmHg)	L: 8 [4-13] SS: 14 [10-24]	L: 52 [22-52] SS: 46 [28-66] S: 49 [29-78]	L: 25 [14-28] SS: 27 [20-38] S: 31 [24-43]	L: 0.008 SS: 0.022 S: ns	L: 0.001 SS: 0.023
Impedance Ratio (IR)	L: 0.21 [0.17-0.28] SS: 0.34 [0.08]	L: 0.56 [0.39-0.68] SS: 0.71 [0.93]	L: 0.505 [0.42-0.54] SS: 0.57 [0.18]	L: ns SS: 0.013 S: 0.028	L: 0.000 SS: 0.000
		S: 0.73 [0.62-0.80]	S: 0.66 [0.52-0.69]		

Table 2

Esophageal Metrics	Abbreviation	Unit	Explanation
Pressure Flow Index	PFI	–	High = abnormal function associated with flow resistance
Impedance Ratio	IR	–	High = abnormal bolus residual
Distal Esophageal Contractile Integral	DCI	mmHg cm s	Low = regional weakness High = hypercontractility
Distal Latency	DL	s	Short = early contraction
EGJ 4s Integrated Relaxation Pressure	IRP4s	mmHg	High = EGJ obstruction
Distension Pressure Compartmentalized Transport	DPCT	mmHg	High = flow resistance in the esophageal body
Distension Pressure Emptying	DPE	mmHg	High = flow resistance above the EGJ
Distal Ramp Pressure	RP	mmHg/s	High = the luminal closure resistance

REPRODUCTION OF VACUUM SWALLOWING: A NOVEL SWALLOWING METHOD BASED ON A STRONG NEGATIVE ESOPHAGEAL PRESSURE

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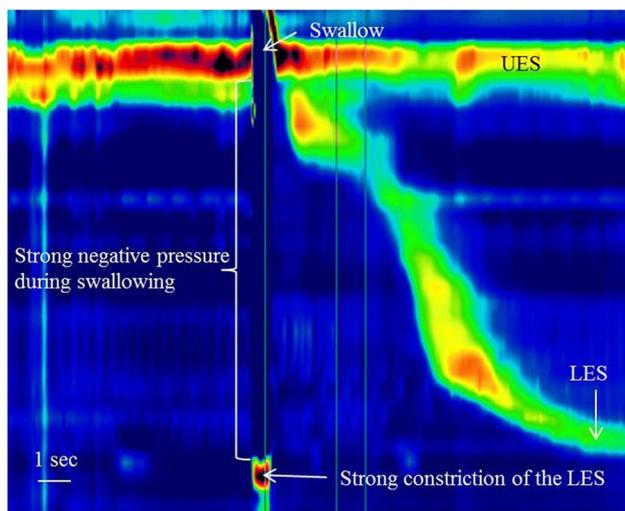
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Introduction: We previously reported a case involving a patient with dysphagia who acquired a unique swallowing method to improve the pharyngeal passage of a bolus by creating a strong negative pressure in the esophagus. This unique swallowing method was termed “vacuum swallowing” because the bolus was rapidly sucked from the pharynx into the esophagus during swallowing. In the present study we assessed whether vacuum swallowing can be reproduced by healthy individuals.

Materials and Methods: First two healthy individuals mastered the technique of vacuum swallowing by observing the previously reported patient with dysphagia. Then they taught this technique to 13 healthy subjects who performed normal swallowing and vacuum swallowing with 5 ml of water five times each. The minimum esophageal pressure and the maximum pressure and contractile integral (CI) of the lower esophageal sphincter (LES) were evaluated during each swallow using high-resolution manometry (HRM).

Results: Ten subjects including the two instructors succeeded in reproducing vacuum swallowing. In total 48 successful vacuum swallows were analyzed. The minimum esophageal pressure (– 15.4 ± 18.2 vs. – 56.3 ± 19.4 mmHg; *p* < 0.001) was significantly lower and the maximum pressure (38.1 ± 37.7 vs. 159.5 ± 83.6 mmHg; *p* < 0.001) and CI (1.1 ± 2.7 vs. 94.4 ± 80.2 mmHg s cm; *p* < 0.001) of LES were significantly higher during vacuum swallowing than during normal swallowing.

Conclusions: We found that healthy individuals can generate a strong negative pressure in the esophagus during swallowing. Further study is necessary to determine the dysphagic population that would benefit from this novel technique known as vacuum swallowing.



MANAGING SWALLOWING DISORDERS IN ADULTS WITH INTELLECTUAL DISABILITY: A SYSTEMATIC REVIEW OF THE EVIDENCE

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Introduction: Eating drinking and swallowing disorders (EDS) are prevalent in adults with Intellectual Disability (ID) (1). Difficulties in EDS can potentially lead to discomfort poor nutritional status dehydration aspiration and choking. Most common interventions for EDS in adults with ID include: risk assessment diet modification altering positioning giving advice on equipment environment modification caregiver training and in some cases non-oral feeding. However the research evidence for these interventions is lacking (2). This systematic review aimed to establish the safety and the effectiveness of interventions for EDS disorders in adults with ID to appraise the current evidence and to identify key areas for future research.

Materials and Methods: Nine electronic databases conference proceedings and reference lists of relevant studies were reviewed. Published and unpublished studies involving interventions for EDS in adults with ID from October 2017 to April 2018 were retrieved. No language or date restrictions were applied.

Results: From 11642 papers only three articles met the inclusion criteria. Data were extracted by two independent reviewers. All the included studies presented interventions related to enteral feeding and mainly considered adverse events and outcome measures for PEG tube insertion. The studies were designed as observational studies. Methodological quality was assessed by two independent reviewers using the “Downs and Black checklist” (3). Risk of bias was high with variability in methodological quality.

Conclusion: The safety and effectiveness of interventions for EDS in adults with ID is unclear. This review highlights the lack of evidence base in management strategies for this population despite their common use. Directions for further research are provided.

CARBONATED LIQUIDS FOR PREVENTION OF ASPIRATION

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Introduction: The aim of the study was to evaluate the effect of carbonated thin liquid on penetration and aspiration using fiber-optic evaluation of swallowing (FEES).

Materials and Methods: Prospective study. 115 patients attending our swallowing rehabilitation clinic for a swallowing examination using FEES were included and were scored for penetration-aspiration of a 100 ml thin liquid challenge using the penetration aspiration scale (PAS). Patients with penetration ($2 \leq PAS \leq 5$) or aspiration ($6 \leq PAS \leq 8$) were subsequently offered 100 ml carbonated thin liquid (CTL) and its effect on PAS for liquids was evaluated.

Results: 20 patients had penetrations of thin liquids. When these patients were offered CTL 4 showed normal swallows (PAS = 1) 2 showed less severe penetrations (PAS decreased from 4 or 5 to 2) compared to non-carbonated liquids 2 patients showed worsening of PAS to 8 (silent aspirations) and 12 had unchanged PAS scores. 28 patients presented with aspiration of thin liquids. When these patients were offered CTL 2 patients improved to PAS = 1 6 patients showed only penetrations (PAS < 6) and 20 patients had unchanged PAS scores. Overall the PAS of carbonated liquids was significantly lower than for thin liquids ($p < 0.05$).

Conclusions: The use of carbonated instead of thin liquids may prevent aspiration in selected group of patients but in some cases may worsen it.

THE RELATIONSHIP BETWEEN TONGUE PRESSURE GENERATION AND TIME OF LARYNGEAL VESTIBULE CLOSURE IN HEALTHY ADULTS

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Introduction: Tongue pressure generation is critical for oropharyngeal bolus transport. Higher tongue pressures are seen for thicker consistencies but it remains unclear how tongue pressure amplitude or duration influence the timing of pharyngeal swallow events. Understanding this relationship is key for determining whether tongue pressure resistance training may be indicated. We explored relationships between tongue pressure and swallow timing measures for thin to mildly thick liquid consistencies in healthy adults. We hypothesized that higher areas-under-the-curve for tongue pressure amplitude over time (TPAUC) would be associated with shorter latencies to pharyngeal phase events.

Materials and Methods: 37 participants (17 male mean age = 33 range 21–55) swallowed 3 boluses each of thin slightly thick and mildly thick barium (20%w/v) under 30 fps videofluoroscopy (VFSS) with simultaneous tongue pressure measurement. TPAUC was calculated from the tongue pressure waveforms. Blinded VFSS ratings identified the timing of bolus passing mandible (BPM) laryngeal

vestibule closure (LVC) and peak XY hyoid position (PKHYOID).

Results: Linear mixed models were fitted to explore effects of consistency and TPAUC on event latencies. Results showed that with other measures held constant a 1 frame decrease in time-to-BPM requires a 240 mmHg increase in tongue pressure or a 36 frame increase in pressure rise duration. TPAUC also impacted time-from-BPM-to-LVC but not time-from-LVC-to-PKHYOID. Significant main effects of consistency were also found with 2 to 2.7 frame increases in BPM latency for mildly and slightly thick relative to thin liquids respectively. Later events were not influenced by consistency and there were no significant interactions.

Conclusions: The results confirm a link between tongue pressure generation efficiency oral transit times and time-to-LVC. These data support tongue pressure resistance training as an intervention to facilitate earlier airway protection.

EFFICIENCY OF A FOLDING TRANSPORTABLE DEVICE FOR MAINTAINING SEATED POSTURE ON SWALLOWING DISORDERS

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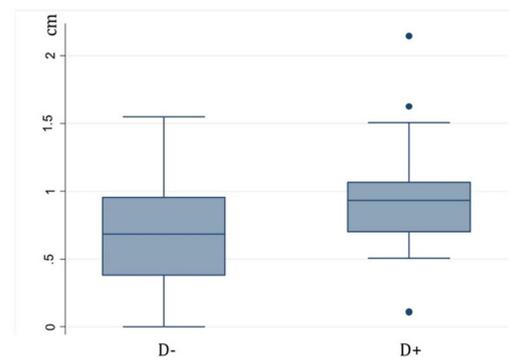
Introduction: A folding transportable device for maintaining seated posture to place on a standard seat was created (PATENTEE WO2011121249A1) for helping patient to modify their positioning when eating. The main objective of this study is to validate the efficiency of this device on swallowing measuring the hyoid bone movement (HBM) on videofluoroscopy of swallowing (VFS) after 1 month of use.

Methods: Comparative clinical trial randomized by superiority in 2 parallel groups. The arm without the device (D-) have had as the arm with the device (D +) an training session but the D group didn't keep the device to support the positioning correction. The arm of the patient was without knowing the examiner who estimates the main assessment criterion. Inclusion criteria were: Dysphagia Handicap index up to 11 score up to 0 at the pelvic subscale of a seated adaptation positioning control scale (MCPAA). The whole assessment (MCPAA VFS FOIS medical parameters) was performed before the training session and 2 months after the end of the training. Bivariate analysis was used for comparing the 2 groups multivariate analysis for the main assessment criterion.

Results: 56 patients ended the study: 26 D + 30 D – varied aetiologies of SD (43% of degenerative diseases). MCPAA is improved with a significant difference for D + ($p < 0001$). The device seems to have an effect on the global HBM ($p = 0061$). This difference is significant for the horizontal part of the HBM ($p = 0038$) and not for the vertical one. With a linear regression for modeling the hyoid bone movement the effect of the device is confirmed. In initial severity prognosis and associated treatment equal the global HBM is significantly better (037 cm IC 95% = [020; 053]) in D + ($p < 0001$). No significant difference on PAS NIHSS of VFS and FOIS.

Conclusion: Using a device for maintaining seated posture has an impact of the movement of the hyoid bone during swallow but not on other swallowing parameters.

	D+			D-			p
	n	m	sd	n	m	sd	
FOIS	30	6	0,9	26	5,8	1,1	0,717
Horizontal HBM (cm)	28	0,68	0,39	25	0,93	0,48	0,038*
Vertical HBM (cm)	28	1,27	0,47	25	1,39	0,58	0,402
Global HBM (cm)	28	1,51	0,46	25	1,76	0,51	0,061
NIHSS	28	1,3	1,4	25	1,3	1,6	0,746
PAS	28	1,7	1,3	25	1,9	1,9	0,532
MCPAA	30	15,1	3,8	26	3,2	2,2	<0,001*



Horizontal movement of Hyoid bone for group D+ and D-

EFFECT OF SWALLOWING TRAINING IN HEAD TILT BACK POSITION ON AIRWAY PROTECTION

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Introduction: Movement magnitudes in normal swallowing adapt to different head positions to maintain swallow safety. Healthy adults were found to increase their laryngeal elevation when swallowing in head tilt back posture compared to neutral. This may be to ensure hyolaryngeal approximation in this “challenge” swallow posture. We studied the safety and effect of training swallowing in head tilt back posture as a challenge swallow exercise.

Methods: 15 dysphagic patients (mean 64 years old) swallowed liquids in neutral posture and head tilt back 15° from neutral in counterbalanced order under videofluoroscopy (VFS). Five of them also practiced swallowing in head tilt back posture on liquid volumes up to 2 ml for up to 50 swallows a day over 5 to 7 days. VFS was repeated post-training. Penetration-aspiration scale (PAS) scores were compared between head positions and pre/post-training within subjects.

Results: Intra and inter-rater reliability of PAS scores were 0.95 and 0.94 respectively. At baseline VFS patients performed at least 2 swallow trials in each head position except for 2 patients with only 1 trial in one or both positions due to high aspiration severity. Worst PAS scores across trials in head tilt back position did not differ from neutral position ($Z = -0.69$; $p = 0.49$). Neither head position nor trial sequence in each position affected PAS scores at baseline ($p > 0.3$). Patients who underwent swallow training practiced on

average 325 swallows over the 1-week period (target = 350) with no adverse events. Post-training worst PAS scores in neutral and head tilt back positions improved by at least 4 points in 2 out of 5 patients.

Conclusions: Results demonstrated the safety and feasibility of repeated swallow practices in head tilt back position as a home-based exercise. This challenge swallow posture did not worsen penetration or aspiration severity when first introduced and had the potential to improve airway protection in patients with dysphagia with practice.

EFFECTIVENESS OF CHIN-TUCK IN PREVENTION OF ASPIRATION IN ACQUIRED NEUROLOGICAL POPULATION: A SYSTEMATIC REVIEW

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Introduction: Chin tuck manoeuvre or “Chin down” is the most frequently employed postural manoeuvre in the management of neurogenic oropharyngeal dysphagia specifically in the prevention of aspiration. However the evidence for its use in this population is unclear.

Aim: To investigate the effectiveness of the chin tuck manoeuvre in the prevention of aspiration in individuals with acquired neurological dysphagia.

Materials and Methods: All published and unpublished randomised controlled trials (RCTs) and clinical controlled trials (CCTs) investigating the effectiveness of chin-tuck in adult acquired neurological populations to eliminate aspiration were sought. Electronic databases (AMED; Academic Search Complete; Cochrane Library; CINAHL; EMBASE; HSE Library; Google Scholar; CENTRAL; SCOPUS; PsycINFO; Web of Science and MEDLINE) were searched from inception to April 2018. No language restriction was imposed. Assessment of quality was conducted using the Cochrane Risk of Bias tool and GRADE.

Results: 4 studies met the inclusion criteria. The overall quality of these studies varied and meta-analysis was not possible. Two studies were part of the same large multi-centre study. The population studied were Parkinson’s disease and dementia. The two other studies included participants with stroke TBI unilateral lower cranial lesion and individuals with dysphagia associated with pharyngolaryngeal dysfunction. Findings suggest that effectiveness of chin tuck varied across populations in prevention of aspiration but it can improve other aspects of swallowing.

Conclusion: Despite its wide use there is limited evidence for the use of chin tuck to prevent aspiration in neurologically impaired populations. It may be more effective in some groups thus directions for new research in this area are provided.

Session 13. Poster Session 13F: Professional Roles in Dysphagia Management 3

DYSPHAGIA AND MEALTIME DIFFICULTIES IN DEMENTIA: A QUALITATIVE STUDY OF ALLIED HEALTH PROFESSIONAL ROLES

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People with dementia may present with mealtime difficulties and dysphagia at different points in the disease with complex and

multifactorial aetiologies. Difficulties may relate to changes to cognitive processes impacting on mealtimes such as increased confusion behaviour changes and agnosias. Dysphagia may also be related to neuromuscular changes due to the disease process. This may lead to weight loss malnutrition dehydration and loss of vitality. Food and mealtimes are often associated with quality of life and mealtime difficulties can lead to isolation decline in health-related quality of life and caregiver stress. The effective management of dysphagia and mealtime difficulties is a priority issue for caregivers and allied health professionals (AHPs) though role and scope may not be clearly defined.

A qualitative methodology was employed to explore the roles experiences and practices of AHPs supporting people with dementia. A semi-structured interview schedule was developed based on previous research and literature searching. Twenty dementia-specialist AHPs from Scotland were interviewed. Thematic analysis was applied (Braun and Clarke 2006).

Preliminary findings indicated that services offered to people with dementia were dependent on the area they lived and type of service accessed. The scope and role of AHPs supporting mealtime and swallowing difficulties was also variable. Participants reported that overlap between professional roles was common and they indicated a preference for increased collaborative working. Lack of resource (e.g. time and access to allied health colleagues) and high support staff turnover were identified as barriers to facilitating quality mealtimes.

Findings from this study are noteworthy as they demonstrate that improved inter-disciplinary working is needed to optimally support people with dementia with dysphagia and mealtime difficulties. They also found that clearer guidance around AHP role and scope is needed.

WHEN ALL TESTS ARE REPORTED AS CLEAR BUT THE PATIENT IS UNABLE TO EAT FOR OVER TWO YEARS: A CASE OF DYSPHAGIA ASSOCIATED WITH LYME DISEASE

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Introduction: Lyme disease (borreliosis) is an infectious disease spread by ticks which often progresses in stages. Early diagnosis and treatment with antibiotics are crucial when considering patient’s prognosis. Lyme disease (LD) is classified as a multisystem illness with possible cardiac rheumatological neurological ophthalmological and dermatological symptoms. Little is known about the specifics of dysphagia associated with LD and the role of speech & language therapy (SLT).

Objective: To present a rare case of severe dysphagia associated with LD and raise the question about the role of SLT in the management of dysphagia as part of LD.

Methods: A case report of 36-years old female who became unable to swallow anything except fluids for the period of at least 2 years. Sandra presented to SLT complaining of pharyngeal dysphagia for 7 months with pain the pharynx and perceived inability to clear the residue. One severe choking episode was reported. Sandra continued to lose weight. She was able to swallow fluids only and was on oral supplements. Sandra underwent multiple investigations (for example videofluoroscopy FEES gastroscopy and manometry) which were all reported as normal. Dysphagia continued to progress and over the 12 months the symptoms appeared to travel from the pharynx into oesophagus and stomach. Severe pain and discomfort associated with any trials of soft food was reported. A trial of manual laryngeal

therapy appeared to improve the symptoms of pharyngeal discomfort for a short time.

Conclusions: A journey from symptoms onset to diagnosis of LD was complicated and traumatic for the patient especially that some professionals dismissed her complaints. A question is posed as to the role of SLT in the management of dysphagia in LD. International collaborations appear necessary to establish optimal pathways of care/therapy potential.

ORAL HYGIENE ON AN ACUTE STROKE UNIT : A PILOT FOR QUALITY IMPROVEMENT IN PARTNERSHIP WITH THE SCHOOL OF DENTISTRY AND RVH STROKE UNIT

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Introduction: Oral hygiene is a challenge in acute stroke patients. Poor oral care and dental hygiene increase the risk of pneumonia cause discomfort and reduce quality of life post-stroke; particularly if dysphagia is present or in patients who are enterally fed. There are guidelines for best practice but the optimum way to deliver oral care is uncertain and practice varies greatly.

Methods: The aim was to gather evidence-based research to inform the development of a protocol for the management of oral hygiene post-stroke. This was an interdisciplinary project in collaboration with the school of dentistry and stroke professionals.

Results: Following a literature search training needs on oral health and oral care were identified. Oral hygiene products and solutions were also identified discussed and approved by the school of dentistry. A training programme delivered by the school of dentistry was developed for all stroke staff. An oral health risk assessment bundle was developed. Training was provided to all staff on the use of the bundle.

Conclusions: This initiative was driven by RCP (6.22) and NICE guidelines (1.7.3). Failure to provide adequate oral care is likely to contribute to pneumonia and potentially have detrimental effects on quality of life post-stroke. This quality improvement will ensure staff will have the knowledge and skills to deliver appropriate oral care which is evidenced-based documented and systematic.

PREVALENCE OF MALNUTRITION AND NUTRITIONAL INTERVENTION IN AN OROPHARYNGEAL DYSPHAGIA UNIT

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¹Germans Trias i Pujol University Hospital

Introduction: Oropharyngeal Dysphagia (OD) unit ensures a correct evaluation and management of the patient with dysphagia. Registered dietitians should be included in the OD because dysphagic patients are at particularly high risk of malnutrition.

Materials and Methods: All patients referred to OD unit during 2017 were studied. Nutritional status was assessed by Subjective Global Assessment (SGA). Dysphagia was diagnosed by Fiberoptic Endoscopic Evaluation of Swallowing (FEES). Nutritional management was classified in 3 categories: modified texture diet nutritional supplements and tube feeding–ostomy indication.

Results: 76 patients; Average age 65 (\pm 14.35 years) 59.2% of whom were men. 59.2% were neurologic patients and 11.8% were

oncologic patients. 61.8% of patients referred to OD unit presented dysphagia. 29.8% of patients with dysphagia presented undernutrition. 71.4% of malnourished patients presented a deglutition efficacy alteration. 76.6% 42.6% 10.6% and 8.5% of patients with dysphagia needed dietetic advice texture modified diet nutritional supplements and tube feeding or ostomy indication respectively.

Conclusions: Nutritional intervention in an Oropharyngeal Dysphagia (OD) unit is obliged because malnutrition is common in patients with dysphagia. Prevalence of deglutition efficacy alteration is high in malnourished patients. The majority of patients with dysphagia needed nutritional intervention.

DYSPHAGIA IN MEDIUM-TERM CARE ORGANIZATIONS: RISK MANAGEMENT USING HFMEA

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Introduction: Risk management inclusion in health policies is already a global trend and relevant examples can be noticed when applying related tools and methodologies to patient safety. Dysphagia is a swallowing disorder that reduces quality of life promotes significant expenditures and may induce pneumonia malnutrition and even death. HFMEA is a tool to evaluate risk to health and its implementation is of value in healthcare organizations risk management.

Materials and Methods: In accordance to ISO 31000:2018 a context analysis was performed to better characterize dysphagia in a medium-term unit of care and rehabilitation. Afterwards HFMEA was implemented to assess related risks as well as to establish a preventive action plan to mitigate or eliminate unacceptable risks.

Results: The outcome of HFMEA implementation included: a process diagram identifying the main stages; The HFMEA framework in which 6 failure modes were identified: “diagnosis failure” “late diagnosis” “incorrect diagnosis” “applied therapy failure” “swallowing failure” “food preparation/adaptation failure”. 35 causes were discussed. 14 of them had a high level of risk and only 6 of these were controlled by the institution 13 were acceptable and 8 were tolerable. The action plan developed focused on reducing dysphagia risk through the increase of professional skills and evaluation/intervention times and improvement of data and information systems.

Conclusions: there aren't many studies on dysphagia related risk management in Portugal and none using HFMEA. The HFMEA implementation supported a systematic approach to patient safety and the establishment of a pro-active action plan aiming to minimize dysphagia in rehabilitation and medium-term care related risks and at the same time promoting a comprehensive involvement of all those taking part in patient rehabilitation.

DO NOT PORTUGUESE HAVE SWALLOWING DISORDERS ? HOW MUCH CAN A DYSPHAGIA CONSULTATION SAVE TO THE HOSPITAL ADMINISTRATION FUNDS

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Introduction: Dysphagia is a pathology with a high prevalence even in healthy individuals associated with aging. Data from the American Speech-Language-Hearing Association indicate a prevalence of 22% in individuals over 50 years of age 52% in the elder population and about 68% in institutionalized individuals. The Agency for Health Care Policy and Research reports that one-third of people with dysphagia develop aspiration pneumonia (AP). AP has a tremendous negative impact on patient health status increasing hospitalization time and causing costs to rise. The prevalence of dysphagia in Portugal is still unknown.

Objectives: Contribute to knowledge of dysphagia and aspiration pneumonia prevalences in Portugal based on a case study from the Garcia de Orta Hospital (GOH). Alert to the need for correct identification and coding of these pathologies. Highlight the role of a Flexible Endoscopic Evaluation of Swallowing (FEES) in the primary and secondary prevention of AP in the inpatients universe. Estimate what costs can be reduced in the context of dysphagia and associated AP by contribution of an Dysphagia Consultation at GOH.

Materials and Methods: It was done a retrospective study with statistical analysis of all hospitalizations indexed to primary or secondary diagnoses of all non-viral pneumonias AP and dysphagia (according to the International Classification of Diseases 9th Revision Clinical Modification (CID-9-MC)) registered in the last 5 years in the various hospital departments of GOH. It was also done a statistical analysis of the numbers and results of FEES performed by the team ENT specialist/Speech Therapist in that period of time.

Results: In a universe of 4117 hospitalization episodes due to non-viral pneumonia in the last 5 years in GOH 1074 (26%) were by an aspiration mechanism. The FEES numbers performed do not match the coding numbers of dysphagia; on the other hand it may be suspected that a large part of the aspiration pneumonia.

EFFECTIVENESS OF A PARTICIPATORY DYSPHAGIA WORKSHOP “ENGE-JUKU” FOR MULTIDISCIPLINARY HOSPITAL STAFF

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¹Iizuka Hospital

Introduction: Efficient care for dysphagic patients requires the understanding of multidisciplinary staff. However most staff face uneasiness possibly due to the complex pathophysiology risk of aspiration or simple ignorance. Support towards individual cases such as bedside rounds or detailed lectures on complex anatomy is often ineffective in building applicable skills. We launched a monthly participatory dysphagia care workshop for multidisciplinary staff. Three workshops were repeated throughout the year. The featured topics were: 1. texture-modified foods and fluids (TMFs) 2. meal assistance and 3. rehabilitation/oral care. The workshop focused on acquiring safe and simple techniques applicable in variable settings. Participants actively experienced delivering and receiving each care technique. Before and after each workshop participants completed a questionnaire and test anonymously. This retrospective study aimed to investigate the effectiveness of our workshop.

Materials and Methods: This is a descriptive study. The results of an original questionnaire and test were evaluated. Test questions were taken from the official e-learning test questions published by The Japanese Society of Dysphagia Rehabilitation. Five true or false questions were taken from each of the following areas: general theory TMFs meal assistance and rehabilitation/oral care. Sequential changes in the results were analyzed.

Results: 40 to 80 participants consisting of 10 or more professions with an average of 10 years of experience attended each workshop. The analysis revealed negative emotions towards dysphagia care lessened as the workshop was repeated. Test scores regarding the featured topic improved as the number of times of participation in workshops increased. This indicated the information delivered in the workshop remained in their memories months after participation.

Conclusion: Participatory workshops effectively improved hospital staffs' interest and knowledge on dysphagia.

Session 13. Poster session 13G: Neurodegenerative Diseases 2: PD & Dementia

COLLABORATIVE WORKING IN THE ASSESSMENT AND TREATMENT OF PHARYNGEAL DYSPHAGIA IN A PERSON WITH PD: A CASE STUDY

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Introduction: Pharyngeal dysphagia is associated with Parkinson's disease (PD). Reduced airway protection leads to aspiration and pneumonia in people with PD (pwPD). A delayed swallow reflex coupled with reduced hyo-laryngeal elevation are contributory factors to dysphagia in pwPD. Expiratory muscle strength training (EMST) has been shown to activate sub-mental muscle complex increase hyolaryngeal elevation and improve airway protection in pwPD.

Clinical Case: We report on collaborative (acute hospital and primary community care) Speech & Language Therapy (SLT) working in the assessment and treatment of pharyngeal dysphagia in a 73 year old male ('John') with a 20 year history of PD. John reported increased coughing on fluids with development of chest infections and hospitalisation for pneumonia. On Fiberoptic Endoscopic Evaluation of Swallowing (FEES) he had a moderate-severe pharyngeal dysphagia (AUS TOMS Impairment score 2) with penetration to the vocal folds on thin fluids [Penetration-Aspiration Scale (PAS) score 5]. He declined thickened fluids which reduced penetration during the FEES exam. We considered that Expiratory Muscle Strength Training (EMST) might improve airway protection for John and a treatment programme commenced. To evaluate treatment effect we have set a change in PAS scores on repeat FEES as the primary outcome measure and a change in the number of chest infections treated with antibiotics 9 months pre- and 9 months post commencing EMST as the secondary outcome. We will report on these findings in our presentation.

Conclusion: Collaborative working between a hospital and a community based Speech and Language Therapist resulted in co-ordinated and effective care for John.

IS THERE A RELATIONSHIP BETWEEN THE PRESENCE OF DYSPHAGIA AND GAIT DISTURBANCE IN PARKINSON'S?

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Introduction: Dysphagia is a common symptom in Parkinson's disease (PD) and may occur at any stage. Some studies suggest that factors including the patients' age gender the progression of PD and coexisting diagnosis of dementia correlate with dysphagia presence. Nonetheless the response of dysphagia to dopaminergic medications is usually limited similarly to other "axial" symptoms such as falls and gait disturbance. Here we investigated the relationship between these symptoms in PD given the possibility of shared pathophysiology due to non-dopaminergic and extranigral dysfunction.

Methods: We recruited 23 consecutive non-demented patients with idiopathic PD and at least one clinically determined impairment in swallowing falls or freezing of gait. Swallow dysfunction was assessed using the Swallowing Disturbance Questionnaire (SDQ) (1). The Falls Efficacy Scale(2) and Freezing-of-gait questionnaire(3) were recorded. Total non-motor symptom burden was assessed using the non-motor symptoms questionnaire. Spearman's correlation coefficient was used to determine the relationship between scores of interest.

Results: The mean age of the patients was 70 ± 8 years with a mean disease duration of 10 ± 6 years. Eleven had a clinical history of swallow impairment while 21 had gait impairment and 17 reported freezing of gait. Total SDQ score correlated strongly with the falls efficacy scale ($r = 0.531$; $p = 0.011$) but not with the freezing-of-gait score. Falls severity but not swallow disturbance correlated with total non-motor burden ($r = 0.551$; $p = 0.008$).

Conclusions: The severity of dysphagia in PD is closely related to the severity of falls but not gait freezing. This may be helpful to more precisely elucidate the anatomical substrate of levodopa-resistant axial symptoms in PD and assist in further management.

EFFECTS OF LEE SILVERMAN VOICE TREATMENT (LSVT® LOUD) ON SWALLOWING AND SPEECH IN PATIENTS WITH PARKINSON DISEASE AND PARKINSONISM IN ADVANCED STAGE

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Introduction: Lee Silverman Voice Treatment (LSVT® LOUD; LSVT) focuses on a simple set of tasks designed to maximize phonation. LSVT provides Level 1 evidence for speech and voice treatment of early-stage idiopathic Parkinson's disease (PD). However few reports have described the effects of LSVT in advanced stage PD and Parkinsonism.

Purpose: The purpose of this study was to evaluate whether LSVT can improve swallowing and speech in patients with advanced-stage PD and Parkinsonism (progressive supranuclear palsy [PSP] multiple system atrophy [MSA]).

Materials and Methods: The LSVT program was administered to nine patients (2 PD 4 PSP 3 MSA; age 62–92 years). Five patients were wheelchair users and three walked with assistance and one walked independently. The patients received LSVT four times a week for 4 weeks from an LSVT-certified speech-language-hearing

therapist (SLHT) and performed self-training for 15 min every day. Before and after the 4-week therapy period swallowing function was evaluated by videofluoroscopy (VF) speech intelligibility was evaluated by four SLHTs using a 5-point rating scale (Jpn. J. Logop. Phoniatr. 32:347–353, 1991; from 1 = intelligible to 5 = not intelligible) and voice characteristics were analyzed using Praat (speech analysis software).

Results: In VF oral transit time (OTD) was shortened from 0.24 ± 0.12 s to 0.17 ± 0.04 s pharyngeal transit time (PTD) was shortened from 0.84 ± 0.47 s to 0.68 ± 0.19 s residue in the pharynx and penetration was decreased. Speech intelligibility improved from 2.3 ± 1.4 point to 1.9 ± 1.0 point. The maximum phonation time (MPT) for vowel/a/increased from 9.3 ± 5.09 s to 12.85 ± 8.50 s.

Conclusions: LSVT may improve speech and swallowing function in patients with advanced-stage PD and Parkinsonism.

SWALLOWING SPEED AS POTENTIAL PREDICTOR OF ASPIRATION IN PARKINSON'S DISEASE PATIENTS

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Background: A threshold of ≥ 10 ml/s for swallowing speed was proposed (1) and adopted by recent studies (2–3). In Parkinson's disease (PD) patients a significant reduction of swallowing speed was reported (4). Swallowing speed in PD patients hasn't been compared with objective dysphagia assessments so far.

Methods: In this prospective controlled cross-sectional cohort study 119 PD patients and 32 controls were examined clinically and by flexible endoscopic evaluation of swallowing (FEES) using Rosenbek's Penetration-Aspiration Scale (PAS). Because of silent aspiration for small amounts of water 90 ml-water swallowing test was not applied or had to be interrupted in 3 patients. Thus 116 patients remained for analysis. Receiver operating characteristic (ROC) analysis was performed to associate swallowing speed with aspiration of water.

Results: Swallowing speed was significantly slower in PD patients compared to controls. The correlation of PAS for water with swallowing speed was poor (Kendall's Tau coefficient -0.29 $p < 0.001$). The area under the curve (AUC) was rather low for swallowing speed as predictor of water aspiration. The common cut-off of < 10 ml/s offers a sensitivity of 89% ($n = 24/27$) but a specificity of 19% ($n = 17/89$) and a positive predictive value of 25% ($n = 24/96$). Choosing a lower cut-off of < 6 ml/s results in 74% sensitivity ($n = 20/27$) 60% specificity ($n = 53/89$) and 36% positive predictive value ($n = 20/56$). These cut-offs led to pathological screening results in 69% ($n = 22/32$) respectively 19% ($n = 6/32$) of controls.

Conclusions: We found statistically but not clinically significant differences in swallowing speeds between PD patients and controls (1–4–5). Even with an optimized cut-off of < 6 ml/s swallowing speed seems not to be a valuable predictor of aspiration of water. Furthermore 3 of 119 PD patients (2.5%) would have been at relevant risk (excessive silent aspiration) if water swallowing stress test was applied without former FEES control.

THE NATURE OF OROPHARYNGEAL DYSPHAGIA IN THE SUBTYPES OF DEMENTIA: A SYSTEMATIC REVIEW

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Introduction: There are a number of different subtypes of dementia. The most common type is Alzheimer's disease (AD) followed by Vascular dementia (VD), Mixed dementia (MD), Lewy Body dementia (LBD), Frontotemporal dementia (FTD) & Parkinson's disease dementia (PDD). Oropharyngeal dysphagia (OD) is prevalent in individuals with dementia and differs according to dementia subtype but little information is available and interventions in dementia fail to consider these profile differences. The aim of this study was to investigate the nature of OD in common subtypes of dementia.

Materials and Methods: A systematic review of the literature was completed. PubMed EMBASE AMED CINAHL Elsevier Scopus Web of Science Direct The Cochrane Database of Systematic Reviews & ProQuest Dissertations & Thesis A & I were searched from inception to April 2018. Grey literature Google Scholar and reference lists of studies were included. Two authors were involved in the search process and Down's & Black tool was utilised to assess methodological quality.

Results: 29 studies met the inclusion criteria. It is evident that dysphagia varies between sub-type and profiles of swallowing difficulties for each type of dementia are presented. For example individuals with AD display prolonged oral transit duration for solids and liquids 1 The number of papers that specifically addressed each subtype are: AD ($n = 12$) VD ($n = 3$) FTD ($n = 7$) LBD ($n = 4$) and MD ($n = 0$). Quality of the studies varied. Three studies involved a range of subtypes of dementia. The findings suggest that our interventions need to be tailored more specifically to people with different types of dementia.

Conclusions: Clinical management of individuals with OD in dementia should not be a 'one size fits all' approach. This study will inform future research on interventions for this client group and directing more patient-centered management.

Session 13. Poster session 13H: Dysphagia after HNC Treatment 2–Radiation

DYSPHAGIA PRACTICE PATTERNS IN RADIOTHERAPY TREATMENT FOR HEAD AND NECK CANCER—AN IRISH WEB-BASED SURVEY

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Introduction: Radiation oncology services within the Republic of Ireland (ROI) have rapidly developed since the establishment of the National Cancer Control Program in 2007. Multiple international studies highlight variability in delivering safe effective and patient centred dysphagia care for individuals undergoing radiotherapy for head and neck cancer (HNC). The aim of this study was to identify the current context of Speech and Language Therapy (SLT) administered dysphagia care for individuals with HNC before during or post radiotherapy thus providing a baseline status nationally and a reference for international comparison.

Materials and Methods: A survey by Roe et al. (2012) was adapted for use within an Irish context by two radiation oncology SLTs. This 39 question survey investigating dysphagia care across the radiotherapy treatment continuum was piloted by three SLTs and disseminated through the Irish Association of Speech and Language Therapists SLT managers' network and multiple special interest groups during the period May–June 2017.

Results: 23 SLT teams representing service delivery across specialist oncology acute care and community services responded. 61% of respondents completed the survey in full. Descriptive analysis presented on the data reveals frequency percentages for groups and subgroups as appropriate. Trends in dysphagia management across all aspects of care are reported.

Conclusions: This survey represents the first attempt to baseline the status of SLT service delivery within the context of radiation oncology in ROI. The variation in practices identified in this study confirms the need for attention to SLT resourcing as well as highlights a need for development of formal standards of care and care pathways for SLTs; enhancing SLT confidence improving patient outcomes and promoting evidence based practice in this area of rapid growth.

CLINICAL MEASURES AND PATIENT REPORTED OUTCOMES IN ACUTE PHASE OF RADIOTHERAPY TREATMENT IN HEAD AND NECK CANCER (HNC) PATIENTS. REDYOR STUDY FINDINGS

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Introduction: To evaluate the evolution of different clinical measures and patient reported outcomes in the first 5-month after diagnosis of HNC and to assess the correlation between them.

Patients and Methods: 46 HNC were prospectively included. Participants signed an approved consent form. Inclusion criteria included: Adult > 18 years patients with a recently advanced soft tissue HNC and subsidiary of CRT (chemoradiotherapy) treatment. Participants attended follow-up testing sessions at basal diagnosis at the end of RT and at 3-month follow-up from ending-RT. The main outcomes were: videofluoroscopic assessment EAT10 Visual Analogic Scale (VAS) for self-impaired swallow and maximum isometric tongue pressure with IOPI. All statistical analyses were performed using SPSS 22.0.

Results: All the functional and self-perception values suffered a significant decrease between 6 to 9 week of follow-up. We explore any correlations between EAT-10 and PAS FOIS and VAS: the highest were observed at basal moment for the EAT-10 and VAS ($p = 0.005$); for the EAT-10 and Penetration-Aspiration Scale (PAS) scores and FOIS scores. The lowest one was between the EAT-10 and the FOIS scores at 8-week follow-up. All parameters lost correlation in values in the 8th week and 3-mo follow-up from ending-RT corresponding with the most intensity phase of radiotherapy side-effects and probably because of the drop-off cases.

Conclusions: Patients suffer from intensive side-effects at the end of RT intervention; the correlation between instrumental methods and

self-perception is really poor in this period instrumental evaluation are imperative. This study provides relevant data about a useful screening test widely used by clinicians in different fields and evaluates the necessity to redefine screening tests.

LATE SWALLOWING OUTCOMES IN LONG-TERM SURVIVORS OF NASOPHARYNGEAL CARCINOMA TREATED WITH RADIOTHERAPY

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Introduction: This study aimed to examine late dysphagia in long-term post-irradiated nasopharyngeal carcinoma (NPC) patients.

Materials and Methods: 52 NPC patients (mean age: 57 years; range 40 to 70 years) who completed radiotherapy (RT) were assessed retrospectively. Subjects were classified into early (< 3 years post-treatment) or chronic (\geq 5 years post-treatment) post-RT groups. Multi-dimensional assessments were administered to assess subjects' swallowing functions with either Videofluoroscopic Swallowing Studies (VFSS) or Fiberoptic Endoscopic Evaluation of Swallowing (FEES) as well as the patient-reported Head-and-Neck Cancer Survivor Assessment of Mealtimes (HNSAM). The Penetration-Aspiration Scale (PAS) was used to quantify the severity of penetration and aspiration. Statistical analyses were performed to compare the differences among groups in terms of subjects' highest PAS scores total HNSAM scores and HNSAM subset scores.

Results: A Mann-Whitney test indicated that subjects' highest PAS scores were significantly higher in the chronic post-RT group ($U = 136$; $p = 0.02$) than the early post-RT group. Higher penetration (45%) and aspiration rates (30%) were observed in the chronic group compared to the early group (25% and 8.3% respectively). No group differences were found regarding total or subset HNSAM scores however individual item analysis of the questionnaire showed more significantly impaired interpersonal relationships as a result of swallowing difficulties in the chronic group ($t(50) = -2.00$ $p = 0.05$) suggesting psychosocial implications of dysphagia.

Conclusion: This study is the first to highlight both physiological and psychosocial problems related to late dysphagia in NPC patients beyond 3 years post-RT. The study hopes to yield better understanding of chronic swallowing functions so as to advocate health education in improving the quality of life of these survivors. Acknowledgement: This study is partially funded by Hong Kong General Research Fund (Reference no: 17606015).

POSTRADIOGENIC DYSPHAGIA IN OROPHARYNGEAL CARCINOMA

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Introduction: Dysphagia is common in patients with oropharyngeal carcinoma and results in a significant reduction in quality of life. This

may include postradiogenic mucositis or postoperatively altered anatomy. The presented prospective study evaluated patients with oropharyngeal carcinoma at least 1 year after primary or adjuvant radiochemotherapy.

Materials and Methods: Thirty-six patients with oropharyngeal carcinoma after primary or adjuvant radiochemotherapy were enrolled in the study and evaluated by flexible endoscopic evaluation of swallowing (FEES). The classification of the swallowing capacity of three different consistencies was based on Rosenbek's penetration and aspiration scale (PAS). Leaking residues and clearing function were documented and the swallowing capacity on the scale for swallowing restriction (SSR) was assessed.

Results: Dysphagia was shown in more than 2/3 of the patients. Overall water was swallowed worst (pathological PAS value: water/thickened/solid = 72.3%/52.8%/50%) with a high risk for aspiration. Almost one-third of the patients had leaking of water. Residues also occurred most frequently in water (55.5%). The FEES resulted in clinical consequences for 29% of the patients e.g. a recommendation of compensation maneuvers and swallowing treatment reflected in SSR deterioration. The subjective assessment of the patients' health status correlated to the average PAS results.

Conclusions: Dysphagia is common in head and neck cancer patients. FEES should already be performed during tumor diagnostics to assess the patient's therapeutical options after treatment. Our results showed therapeutical consequence in therapy and nutrition concept. FEES should be standard in follow-up to initiate oral food intake as early as possible accompanied therapeutically.

QUANTIFYING PHARYNGEAL EDEMA OVER TIME IN HEAD AND NECK CANCER TREATED WITH CHEMORADIATION

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Introduction: Edema is a frequent clinical observation after chemoradiation treatment (CRT) for oral/oropharyngeal cancer (O/OP Ca). Our aims were to reliably quantify edema from videofluoroscopy (VF) at 3 time points (baseline 1-month (mo) and 4-mo post CRT) and to explore the relationship between edema and (a) patient-reported outcomes (EAT-10) and (b) functional impairment on VF (Dynamic Imaging Grade of Swallowing Toxicity DIGEST).

Materials and Methods: 15 patients (7 M; age 38–76) with O/OP Ca received radiotherapy (70 Gy 7 weeks) and 3 weekly doses of cisplatin. VF was completed pre-CRT 1-mo and 4-mo post-CRT. Edema was captured by measuring posterior pharyngeal wall (PPW) thickness and pharyngeal area (PA) at rest. EAT-10 surveys were completed on the day of VF. DIGEST scores were rated according to published protocols. Mixed model repeated measures ANOVAs were run for each edema measure (PPW PA) to test for the effect of TIME EAT-10 and DIGEST while controlling for age and sex.

Results: For PPW we found a main effect of TIME but not EAT-10 or DIGEST (Table 1). Post-hoc comparisons revealed a significant worsening from mean at baseline (4.1 mm) to 4-mo post CRT (6.0 mm) but not at 1-mo post CRT (5.4 mm). For PA we found a main effect of TIME and of DIGEST grade (Table 2). Mean PA was significantly smaller at 1-mo post CRT (527 mm²) compared with

baseline (716 mm²) but not different from 4-mo post CRT (652 mm²). Mean PA was significantly greater for grade 2 (751 mm²) compared with grade 0 (442 mm²) contrary to the hypothesized direction.

	df	F	p
Intercept	1, 21.92	114.3	<0.001
TIME (baseline, 1-mo post, 3-mo post)	2, 28.43	3.7	0.04
EAT-10 (<3 vs >3)	1, 33.94	0.12	0.74
DIGEST Grade	3, 28.84	0.72	0.55

Table 1. MM RM ANOVA for PPW

	df	F	p
Intercept	1, 21.0	177.5	<0.001
TIME (baseline, 1-mo post, 3-mo post)	2, 23.1	5.4	0.01
EAT-10 (<3 vs >3)	1, 28.4	1.3	0.27
DIGEST Grade	3, 30.6	3.8	0.02

Conclusions: The data confirm that post-CRT edema can be quantified on 2D lateral VF. Patient reported outcomes (EAT-10) were not independently predictive of edema. Surprisingly worse DIGEST grades were associated with increased pharyngeal area at rest perhaps reflecting impairment associated with pharyngeal atrophy not edema. Future work should monitor patients' edema and swallow function over a longer time period and at a greater frequency.

PHARYNGEAL SWALLOW PRESSURES AND THEIR POTENTIAL RELATIONSHIP TO PATIENT REPORTED BIOMECHANICAL SWALLOW FUNCTION POSTIRRADIATED NASOPHARYNGEAL CARCINOMA SURVIVORS

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Introduction: Nasopharyngeal carcinoma (NPC) is the most common head and neck cancer in Hong Kong. A major long-term morbidity of radiotherapy for NPC is dysphagia with 76% of NPC survivors reporting symptoms of dysphagia and 96% having abnormal findings on videofluoroscopic swallow studies. Dysphagia adversely affects the quality of life of these patients and can also lead to life threatening aspiration pneumonia. Determining the optimal measure for dysphagia remains an important research goal to gain insights into its prevention.

Methods and Materials: In the present study we sought to pilot evaluate the correlations between patient reported biomechanical swallow function as measured by the 17-item Sydney Swallow Questionnaire (SSQ) and objective measure of biomechanical swallow with pharyngeal high-resolution manometry (HRM). A cross-sectional study design was employed evaluated ten irradiated NPC survivors who were more than 3 years post-intensity modulated

radiotherapy (IMRT). Participants completed the SSQ and underwent pharyngeal HRM in the same sitting and performed three 5 ml thin liquid swallows each during pharyngeal HRM. HRM measures pertaining to the velopharynx tongue base (TB) upper esophageal sphincter (UES) and pressure wave velocity (PWV) were extracted. Correlations between SSQ items and HRM parameters were assessed by Pearson's and Kendall's tau correlation coefficient for parametric and nonparametric variables respectively.

Results: Results revealed that TB maximum pressure was significantly correlated with coughing or spitting out food or fluid ($p = 0.02$) UES opening with time require for meals ($p < 0.01$) and PWV with difficulties swallowing soft foods ($p = 0.02$) and choking on fluid ($p = 0.01$).

Conclusions: These findings offer promising objective biomechanical insight into the use of the SSQ and HRM measures in this study population. Further evaluation with these two measures is recommended.

MALNUTRITION SCREENING IN HEAD AND NECK CANCER PATIENTS WITH OROPHARYNGEAL DYSPHAGIA

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Introduction: Malnutrition in head and neck cancer (HNC) patients is associated with a decreased immune status more severe radiotherapy-induced toxicities and lower radio(chemo)therapy response rates. The purpose of this study is two-fold: (1) to identify clinically relevant symptoms of malnutrition in patients with oropharyngeal dysphagia (OD) secondary to HNC and (2) to determine the relationship between clinically relevant symptoms of malnutrition on the one hand versus tumor characteristics HNC treatment modality aspiration and OD-related quality of life (QoL) on the other hand.

Materials and Methods: Fifty-nine dysphagic HNC patients were included. The validated Dutch version of the Short Nutritional Assessment Questionnaire was used to screen HNC patients for malnutrition. Patients underwent a standardized fiberoptic endoscopic evaluation of swallowing to identify aspiration they completed two visual analog scales: Dysphagia Severity Score (DSS) and Dysphagia Quality of Life (DQL) and the Functional Oral Intake Scale was applied. Two blinded judges scored the variable aspiration. Data was analyzed using descriptive statistics and logistic regression.

Results: More than half ($N = 31$; 52.5%) of the HNC patients presented a moderate to severe risk of malnutrition. Aspiration was identified in 25 (42.3%) patients. The majority ($N = 47$; 80%) of the patients received a total oral diet. The median score (25'; 75') of the DSS and DQL was 46 (23; 76) and 31 (17; 75) respectively. There was no significant association between clinically relevant symptoms of malnutrition versus tumor characteristics HNC treatment modality aspiration and OD-related QoL.

Conclusions: This study emphasizes the importance of early nutritional screening in dysphagic HNC patients as the majority of them presents clinically relevant symptoms of malnutrition without a significant association with OD severity.

Session 13. Poster session 13 J: Dysphagia in Geriatric Patients 2

PREVALENCE OF OROPHARYNGEAL DYSPHAGIA AMONG PATIENTS IN ACUTE CARE IN DIAKONHJEMMET HOSPITAL IN OSLO – EAT-10 SURVEY

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Introduction: The EAT-10 is a widely used dysphagia questionnaire designed to measure patient-perceived functional health status (FHS). This study used EAT-10 as a structured interview guide to collect data on the prevalence of dysphagia among patients in acute care in Diakonhjemmet Hospital in Oslo.

Methods: The study population consisted of 301 patients from three hospital departments: ¹Medicine, ²Acute geriatrics and ³Elderly patients with fractures (F = 196 M = 105). Patients were interviewed once during their stay in acute care. The collected data was analysed using descriptive statistics.

Results: The response rate was 63% = 188 patients. The responding population was grouped into four age groups: 20–40 years, *N* = 12; 40–60 years, *N* = 20; 60–80 years, *N* = 61 and 80–100 years *N* = 95. The study found that 37% of the responding patients regardless of age had dysphagia. The study also found the prevalence of dysphagia to be 34% of patients between the ages of 60–80 years and 40% of patients between the ages of 80–100 years. The average percentage of prevalence among the two oldest groups constituted 38%. Furthermore the study found that 58% of patients between the ages of 20–40 years and 20% of patients between the ages of 40–60 years had dysphagia. The results from the three oldest age groups are consistent with previous research whereas the youngest age group show deviant results. It is emphasized that the youngest age groups had the lowest amounts of responding patients and therefore the validity of the findings in these two groups is debatable.

Conclusions: The results showed a high occurrence (38%) of dysphagia among elderly patients in acute care and the study indicates the basis for believing that these findings might be generalised to ill and poorly functioning elderly in the general population.

EATING DIFFICULTIES IN ACUTE GERIATRIC PATIENTS ASSOCIATED WITH POOR NUTRITIONAL STATUS AND REDUCED ACTIVITIES OF DAILY LIVING

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Introduction: Eating difficulties in acute geriatric patients are associated with poor nutritional status and limitations in activities of daily living. The aim of this study was to test the association between eating difficulties and nutritional status and activity of daily living in a geriatric population.

Materials and Methods: A cross-sectional study conducted between March and September 2016. Eating difficulties were assessed using

the Minimal Eating Observation Form (MEOF-II) including observations related to ingestion deglutition and energy/appetite. Eating difficulties were determined based on one or more components of the MEOF-II. Poor nutritional status was defined as age-specific low body mass index (BMI) < 20 kg/m² if < 70 years or < 22 kg/m² if ≥ 70 years. Activity of daily living was assessed using the Barthel Index and defined as low (< 50) or high (50–100).

Results: 297 acute geriatric patients were included; mean age was 83.0 (± 7.7) years and 56.2% were female. The prevalence of eating difficulties was 54.9%. Mean BMI was 26.1 (± 5.6) and median Barthel Index was 47 (30; 58). Patients with normal/high BMI had a risk reduction of 37% in eating difficulties compared to patients with age-specific low BMI (*p* = 0.003). Patients with a high activity of daily living had a risk reduction of 39% in eating difficulties compared to patients with low activity of daily living (*p* < 0.001).

	No eating difficulties N=163	Eating difficulties N=134	
Age	82.4 (±7.5)	83.5 (±7.9)	P=0.871
BMI	27.6 (± 5.3)	24.7 (± 5.6)	P<0.001
Barthel 100	51.0 (39; 74)	42.5 (23; 52)	P<0.001

Conclusions: Eating difficulties are highly prevalent in geriatric patients and associated with poor nutritional status and reduced activities in daily living. Identification of eating difficulties may be important to preserve nutritional status and functioning in the geriatric population.

DESIGN OF A MULTILEVEL SCREENING TOOL TO DETECT MEALTIME PROBLEMS IN OLDER PEOPLE WITH DEMENTIA IN THE COMMUNITY OR RESIDING IN NURSING HOMES: PRESENTATION AND PRELIMINARY RESULTS OF A STUDY PROTOCOL

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Introduction: People with dementia can have difficulties to perform tasks related to eating and drinking and common negative outcomes of dysphagia in dementia are malnutrition and reduced quality of life. Screening tools for caregivers such as the Standardized Swallowing Assessment (SSA) detect dysphagia but only focusses on the functional level. Hence there is a global need for a multilevel screening tool to identify dysphagia in dementia. The Social Ecological Model (SEM) addresses intrapersonal interpersonal environmental and policy factors that can influence eating performance of people with dementia. Caregivers (often non-experts) can have silent knowledge that could help identifying mealtime problems in dementia but that needs to be validated. The current study protocol aims at developing a screening tool for non-experts to identify problems in mealtime performance of elderly people with dementia taking into account the multilevel perspective of the SEM.

Methods: The overall research project consists of five parts. The current abstract reports on the first two parts of the study protocol. Part one is a review on and a pilot implementation study of dysphagia screening tools. Part two is a pilot study to explore the topic guide of the qualitative study in part three.

Results: Part one: The SSA shows high sensitivity (94%) requires little training and no special equipment and is recommended by other researchers. However in the pilot implementation study nurses commented that SSA was difficult to use with some people with dementia. Part two: Thematic analysis of the two focus group discussions with nursing assistants and district nurses resulted in the following major themes: (1) use of informal techniques; (2) barriers for identification; (3) collaboration with other stakeholders; (4) need for adaptive interventions.

Conclusion: The results will contribute to the design and implementation of a multilevel screening tool in Dutch and Swedish practice.

ASSOCIATIONS BETWEEN OROPHARYNGEAL DYSPHAGIA AND MALNUTRITION IN DUTCH NURSING HOME RESIDENTS: RESULTS OF THE DUTCH NATIONAL PREVALENCE MEASUREMENT OF QUALITY OF CARE

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Introduction: Oropharyngeal dysphagia (OD) and malnutrition are common conditions in nursing home residents and are associated with detrimental physical- and mental health effects such as aspiration pneumonia dehydration and depression. Nursing in this multimorbid population is complex and differs between residents with dementia admitted to psychogeriatric wards and residents with physical diseases admitted to somatic wards in Dutch nursing homes.

Methods: The current study was conducted with data from the annual National Prevalence Measurement of Quality of Care (LPZ) in the Netherlands of 2016 and 2017. Nursing home residents that were 65 years of age or older and admitted to psychogeriatric- or somatic wards were included. Clinically relevant symptoms of OD (swallowing problems or sneeze/cough while swallowing) were assessed by means of a standardized questionnaire and anthropometric measurements were taken to determine the nutritional status (malnutrition). Descriptive statistics and prevalence ratios (PR) computed with Cox regression were used to assess the association between OD and malnutrition.

Results: Up to 12% of older nursing home residents suffered from symptoms of OD and 10% was malnourished. Approximately 17% of the residents that suffered from symptoms of OD were simultaneously malnourished. An increased risk for malnutrition was found in residents that suffered from symptoms of OD (PR 1.5 95% CI 1.2–1.9). Residents admitted to somatic wards revealed higher risks for malnutrition when suffering from symptoms of OD (PR 1.9 95% CI 1.3–2.8) as compared to residents from psychogeriatric wards that suffered from symptoms of OD (PR 1.4 95% CI 1.1–1.8).

Conclusion: Clinically relevant symptoms of oropharyngeal dysphagia are associated with an increased risk for malnutrition in somatic and psychogeriatric Dutch nursing home residents.

SARCOPENIA IS ASSOCIATED WITH THE PHARYNGEAL POST-SWALLOW RESIDUE BY ULTRASOUND EXAMINATION

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Introduction: Sarcopenia is recognized as the decrease of muscle mass and strength and it can also affect the swallowing muscles. The decrease of swallowing muscle mass and strength leads to swallowing disorder and dysphagia. The aim of this study is to investigate whether sarcopenia affects to swallowing function the pharyngeal post-swallow residue by ultrasound examination.

Materials and Methods: Elderly patients with symptoms of dysphagia are examined. Ultrasound examination was conducted by a portable ultrasound (M-Turbo; FUJIFILM SonoSite Tokyo Japan) with a linear and array transducer. During the examination patients are eating various consistent food with relaxed position. Patients were classified into sarcopenia group and non-sarcopenia group according to the Asian Working Group for Sarcopenia (AWGS). The difference in the prevalence rate of the pharyngeal post-swallow residue between sarcopenia and non-sarcopenia was investigated using the Chi squared test. The risk factors for pharyngeal post-swallow residue were analyzed by logistic regression analysis using pharyngeal post-swallow residue sarcopenic dysphagia as the dependent variable and age and sex as the independent variables.

Results: 20 elderly patients (10 males and 10 females) were investigated. The mean age of was 80.1 ± 7.0 years and the median of FILS was 7.0. Sarcopenia was 12 and non-sarcopenia was 8. The pharyngeal post-swallow residue was recognized in 10 patients (83%) with sarcopenia and 3 patients (37.5%) with non-sarcopenia. The prevalence of pharyngeal post-swallow residue in sarcopenia was significantly higher than in non-sarcopenia ($p = 0.035$). In the logistic regression analysis sarcopenia and age were independently associated with the pharyngeal post-swallow residue ($p = 0.04$).

Conclusion: Sarcopenia was identified as an independent factor for the pharyngeal post-swallow residue. The decrease of swallowing muscle strength due to sarcopenia may lead to the pharyngeal post-swallow residue.

IMPORTANCE OF IDENTIFYING RISK FACTORS FOR SWALLOWING DISORDERS THROUGHOUT AGING. A SAMPLE SURVEY

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Objectives: Early identification and management of swallowing disorders in the independent living elderly is important in preventing dysphagia related-comorbidities. Previous studies have shown conflicting findings regarding the prevalence of swallowing disorders in the healthy non-institutionalized population. It is also unclear which potential risk factors impact the swallowing function and in turn predict dysphagia. This study assesses the prevalence and association of swallowing disorders with potential risk factors in 17- to 98-year-old healthy adults.

Methods: A sample survey was performed in 8 general practitioners with 380 questionnaires. The questionnaire consists of questions regarding self-reported standardized screenings for dysphagia (EAT-10) malnutrition (SNAQ) and dyspnea (MRC).

Results: The survey's response rate was 231 (62.17%) and showed a dysphagia prevalence of 37 (16.23%). After exclusion of persons with neurological diseases and head or neck cancer a prevalence of 20 (10.2%) for dysphagia remained (Fig. 1). In this group malnutrition ($p \leq 0.000$) polypharmacy ($p \leq 0.035$) chewing problems ($p \leq 0.005$) and dyspnea ($p \leq 0.045$) were significantly associated with dysphagia and can be considered as risk factors.

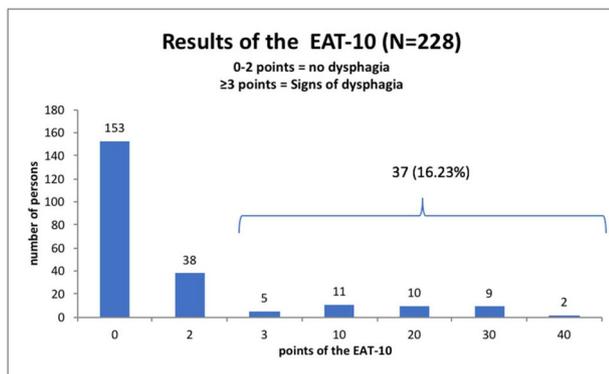


Fig. 1: 37 people indicated swallowing problems. After exclusion of persons with neurological diseases and with head or neck cancer 20 (10.2%) remained.

Conclusion: The prevalence of swallowing disorders in a healthy population is high in all age categories. Risk factors like malnutrition polypharmacy chewing problems and dyspnea should be diagnosed as early as possible to prevent further comorbidities and a development of oropharyngeal dysphagia.

RELATIONSHIP BETWEEN SARCOPENIA EAT-10 AND TONGUE PRESSURE IN JAPANESE ELDERLY

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Introduction: The extension of healthy life expectancy is important in super-aged society. Frailty is the previous step of the condition of need for long-term care and seemed to be deteriorated by malnutrition. Deterioration of oral function is the one of malnutrition's causes. The purpose of this study was see the relationship between general condition and oral function in Japanese elderly who lived independently and had stable mastication with their natural teeth and prosthesis.

Materials and Methods: Forty subjects (19 men, 21 women; 68–90 years) were invited from the public. The systemic diseases drugs MMSE EAT-10 MNA-SF etc. were asked. Water swallowing test measurements of oral dryness occlusal force chewing function and tongue pressure by JMS tongue pressure device were conducted. Ability of sequential five times rising from the chair hand grip

walking speed and knee extension muscle strength were measured. Nutritional questionnaire and body composition analyzing by INBODY were conducted. Mann-Whitney U-test spearman's rank correlation coefficient and Chi square test were performed.

Results: No subject met frailty standard but 8 subjects (2 men, 6 women) were in suspicions of malnutrition and 7 subjects (3 men, 4 women) had sarcopenia level in algorithm of sarcopenia diagnosis by AWGS. However these subjects didn't have lower tongue pressure and the score over 3 in EAT-10. The relationship between the less than 20 kPa in tongue pressure and the EAT-10 item "swallowing pills takes extra effort" ($p < 0.05$). Tongue pressure and knee extension muscle strength were correlated ($p < 0.05$) in women.

Conclusions: The elderly who had malnutrition sarcopenia and deteriorated tongue pressure existed even though they were not in frailty and had confidence in their health condition. Their knowledge about nutrition and exercise were poor and this fact revealed the problems for making the extension of health life expectancy in Japan.

Session 13. Poster session 13 K: Other 2

EVALUATION OF POST-GRADUATE TRAINING FOR SPEECH AND LANGUAGE THERAPISTS IN PAEDIATRIC FEEDING EATING DRINKING AND SWALLOWING DISORDERS (FEDS)—AN ALL-IRELAND INITIATIVE

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Background: The SLT department are involved in ongoing post-graduate training for SLTs in feeding and swallowing disorders. A shortfall was evident in knowledge and skills in non-acute services where patients were being transferred on discharge. At times patients were refused follow up citing lack of training/expertise in the local area. This increased SLT outpatient reviews delayed discharge and increased burden for families. A 2 day training course for SLTs was developed. The content included areas identified as required knowledge and skills to ensure safe transfer of patients to local services including medical complexities feeding tubes assessment management oral skills training aversion videofluoroscopy respiratory issues aspiration.

Methods: Three courses held in OLCHC, May 2016, Oct 2016, Oct 2017. Evaluation forms for both days asked participants to rate standard of slides resources speakers relevance to practice indicate if practice would change future training courses desired. An additional course hosted in Belfast in Feb 2018 was evaluated separately.

Results: For OLCHC courses a total of 131 SLTs attended. Over both days use of slides was rated excellent (76%) or very good (22%) resources were excellent (84%) or very good (9.6%) speakers were excellent (86%) or very good (12%) relevance to practice excellent (71%) or very good (16%). 98% of Day 1 participants and 99% of Day 2 participants indicated they would change practice. Belfast participants ($N = 46$) 82% indicated they were very satisfied 60% rated excellent 40% very good 100% said it met the stated objectives and would recommend it.

Discussion: Course participants were satisfied with teaching resources and content delivered. 98% indicated practice would change. This should benefit patients transferred to local SLTs who have upskilled. Further training needs in a range of areas have been identified. The impact on OLCHC SLT outpatient review lists needs to be audited.

FORESTIER SYNDROME—A RARE CAUSE OF DYSPHAGIA

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Introduction: Oropharyngeal dysphagia is defined as the difficulty in effectively mobilizing the alimentary bolus from the mouth to the esophagus. It is a highly prevalent symptom affecting 13% of the total population aged 65 years and older—age range in which sensorimotor causes prevail. Nevertheless in the diagnostic workup it is important to exclude mechanical/structural causes which can eventually motivate surgical treatment.

Materials and Methods: The aim of this article is to report a case that illustrates the importance of a careful differential diagnosis of these patients.

Results and Conclusions: A 66-year-old female patient was referred from the Gastroenterology department due to the impossibility of performing Upper Gastrointestinal Endoscopy. The patient presented progressive dysphagia for solids associated with foreign body sensation in the throat. After a physical examination a videofluoroscopic swallowing study revealed exuberant osteophytes at C2–C4 with continuous calcification of the anterior longitudinal ligament without other degenerative changes of the cervical spine-findings consistent with Forestier syndrome. Diffuse idiopathic hyperostosis or Forestier syndrome primarily involves the anterior longitudinal ligament with increasing incidence and extent of involvement after the fifth decade of life. Ossification processes can culminate in osteophytes that in rare cases arise in the upper cervical region. The limited mobility of this segment means that this process can have an important clinical translation. Notwithstanding the possibility of long-term recurrence surgical resection through an anterior cervical approach is recommended for significant dysphagia. Despite the associated life-threatening consequences oropharyngeal dysphagia is often precipitously categorised as presbyphagia neglecting a careful investigation and sometimes an appropriate treatment.

EFFECTIVENESS OF A DYSPHAGIA E-LEARNING AMONG NURSES: A RANDOMIZED CONTROLLED TRIAL

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Introduction: The need for more specialized nursing staff in the field of paramedical healthcare has increased over the last years. It is essential for the quality of healthcare and for patient safety that nursing and caring staff continuously receive supplementary training to increase the level of knowledge on dysphagia. The current randomized controlled trial aimed to test the effectiveness of a newly developed e-learning about swallowing disorders for nurses. The goal of this e-learning was to increase the knowledge level regarding dysphagia of the nursing staff at 'Hoogstraat Revalidatie'.

Materials and Methods: A pre-test/post-test design was used whereby 64 nurses (20–64 years old) were randomly assigned to either the e-learning group ($n = 32$) or a control group ($n = 32$) that did not receive the e-learning. Nurses' knowledge levels regarding dysphagia were assessed at pre-test ($n = 64$) and post-test ($n = 39$; e-learning = 17 and ncontrol = 22) to examine the extent to which the

e-learning could increase their knowledge about dysphagia. The control group also received the e-learning after finishing the study.

Results: The present study revealed equal improvements in dysphagia knowledge levels over time in both groups with a large effect size. Unexpectedly no differences were found between both groups.

Conclusions: As the current results did not show a stronger increase in dysphagia knowledge in the e-learning group compared to the control group further research is needed to investigate what factors could have influenced this equal increase in knowledge. Factors that should be carefully considered in future research are the size of the participant group and the potentially high impact of contamination issues. Although the current study did not show an advantageous effect of the e-learning group over the control group the whole group still did show a significant increase in dysphagia knowledge. Therefore this e-learning can be recommended to be used in a clinical environment to increase dysphagia knowledge among nurses.

POLYSUBSTANCE ABUSE & DYSPHAGIA- CASE REPORTS & A REVIEW OF THE LITERATURE

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Introduction: Substance misuse is widespread across Ireland partially illustrated by increasing numbers of patients referred to the Speech & Language Therapist (SLT) with dysphagia on a background of alcohol or drug misuse. Oesophageal dysphagia is commonly reported in this cohort (Kraichely, Arora, and Murray 2010) however there is a paucity of research documenting the direct relationship between substance abuse and oropharyngeal dysphagia. Dysphagia is highlighted here as a severe complication of substance misuse secondary to the ingestion of carcinogens from alcohol or illicit drugs or from long-term use of prescribed medications. It is crucial that the SLT in acute and community settings is aware of the complexities arising from substance abuse and the multifactorial impact this has on the swallow.

Methodology:

- Literature review conducted
- Liaison with pharmacy colleague regarding impact of commonly prescribed medications
- Retrospective analysis of 2 complex cases where polysubstance abuse is a predominant feature
- Presented at Dysphagia SIG study day April 2018

Results

- 5 main themes identified allowed for further discussion of dysphagia in the presence of alcoholic liver disease encephalopathy alcohol withdrawal syndrome alcoholic polyneuropathy neuroleptics and oesophageal symptoms
- The severity of dysphagia is illustrated by 2 cases. Initial presentation of moderate-severe dysphagia resulted in a highly modified diet in case 1 and a period of time NPO in case 2 with intensive dysphagia rehabilitation in both

Conclusion: Polysubstance abuse has a multifactorial effect on the swallow. Focused collaborative SLT input is vital to achieve optimum clinical outcomes. There is currently no classification of dysphagia as a result of polysubstance abuse. Creation of a specific subtype would be advantageous in generating clearer pathways for patients and in establishing clearer diagnoses and prognostication for patients in this cohort.



SWALLOWING PROBLEMS IN PATIENTS WITH A MITOCHONDRIAL DISEASE

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Introduction: Dysphagia for solid food is mentioned in patients with a mitochondrial disease [1]. In 2017 the Test of Mastication and Swallowing Solids (TOMASS) was published a test to quantitatively assess solid bolus ingestion [2]. The aim of the current study was to objectify the problems of solid food ingestion in patients with a mitochondrial disease due to the m.3243A > G mutation using the TOMASS.

Materials and Methods: 60 patients (17 men and 43 women range 19–67 years) carrying the m.3243A > G mutation were included. Sex age body mass index and heteroplasmy percentage of the mutation were gathered as personal characteristics. Patients were asked to eat a standardized cracker (Albert Heijn BasicTM) following the protocol. The number of bites masticatory cycles swallows and total time were scored from videotape. For reliability measurements Intra Class Correlation Coefficients (ICC) were calculated. Three speech language therapy students scored 10 videos for inter-rater reliability. After 2 weeks the same videos were scored again for intra-rater reliability. Data were compared with (Dutch) normal values using independent t-tests. Multiple linear regression analyses (on the normally distributed factor total time) and MANOVA (on number of bites masticatory cycles and swallows) were used to test the influence of personal characteristics.

Results: Patients need more mastication cycles ($p = 0.00$) more swallows ($p = 0.01$) and more time ($p = 0.00$) for the cracker. Inter-rater reliability was excellent to good: 1.00 (bites) 0.969 (masticatory cycles) 0.976 (time) 0.741 (swallows). Intra-rater reliability was also excellent to good: 1.00 (bites) 0.970 (masticatory cycles) 0.964 (time) 0.798 (swallows). There were no statistically significant influencing personal characteristics.

Conclusion: The TOMASS objectified dysphagia for solid food in patients with a mitochondrial disease. Assessment and management should be considered in this group.

A ROBOTIC SIMULATION OF THE PHARYNGEAL PHASE OF SWALLOWING (SWALL-E)

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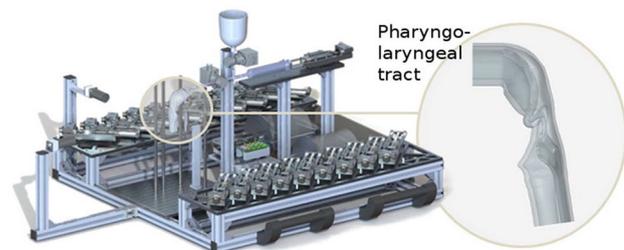
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Introduction: Currently research on the swallowing function relies on medical imagery such as videofluoroscopy and nasofibroscope from healthy subjects and dysphagic patients. However these methods are invasive; their use solely for research purposes can raise ethical questions. As an alternative reports exist of observations based on robotic reproduction of oral and esophageal phases of swallowing. At best of our knowledge reproduction of pharyngeal phase of swallowing both anatomical and physiological has not been reported yet.

Materials and Methods: From CT scans a 3D reproduction of a pharyngo-laryngeal tract is produced in transparent polymer. 17 actuators integrated around this synthetic tract (cf. Figure) enable the mechanical mimicking of key physiological swallowing mechanisms such as vocal fold closure laryngeal elevation or epiglottis tilt. Respiratory airflow is simulated by pneumatic pistons. The associated computer interface controls these mechanisms with a spatio-temporal accuracy of 0.025 mm and 20 ms respectively. Implemented metric data describing healthy swallowing conditions were obtained from literature. Functional results are validated with 10 mL of thick bolus using Penetration Aspiration Scale (PAS).

Results: Swallowing tests based on timings and amplitudes corresponding to healthy conditions resulted in swallowing simulations without any penetration and aspiration (PAS = 1) in less than 1 s. Furthermore the settings outside these standards of healthy swallowing induce as expected aspirations (PAS = 8).

Conclusions: A robotic system that can simulate normal and abnormal pharyngeal phase of swallowing is presented. A more extensive analysis of the fidelity level of this robotic simulation in relation to human swallowing is in progress in order to validate this model for medical as well as modified food research for dysphagic patients.



A COMPUTER-ASSISTED SELF-ADMINISTERED ADJUSTED DSWAL-QOL QUESTIONNAIRE: DEVELOPMENT AND EVALUATION OF ITS FEASIBILITY

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Introduction: An adjusted version of the Dutch SWAL-QoL Questionnaire (aDSWAL-QoL) has been developed and validated using classical test theory and item analysis by the Rasch model to be used in dysphagic patients with additional language and/or cognitive impairment (DysLC). The pen-and-paper version of the aDSWAL-QoL still presents some challenges such as needing a third party for assistance completing the questionnaire increasing the tendency to compliantly agree with others and introducing social desirability bias. Therefore the study aimed to convert the aDSWAL-QoL into a computer-assisted format (CAF) and evaluate its feasibility compared to the pen-and-paper format.

Materials and Methods: Based on previous validation studies the aDSWAL-QoL was adapted (e.g. adjustments of several items and of the rating scale structure). The adapted version was then transformed into a CAF which includes both audio and visual instructions. Feasibility was assessed using two pilot studies. The first study comprised data from 15 patients using a qualitative interviewing analysis; the second documented the required assistance for completing both

formats in 20 patients equally distributed between patients suffering only from dysphagia (Dys) versus a DysLC group.

Results: The results showed that the CAF was a feasible instrument: patients reported a low burden to complete the questionnaire and instructions response categories and overall structure were clear. The DysLC group required less assistance ($p = 0.018$) in completing the CAF compared to the traditional format; there was no significant difference in assistance for the Dys group ($p = 0.753$) between both questionnaires.

Conclusions: A new computer-assisted aDSWAL-QoL showed potential value to reduce patient reliance on other people for assistance. This increases the independence in self-reporting. However further validation of such a format is required.

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