Methods: Databases were searched using keywords including "breastfeeding," "pain," "neck or back or upper extremity," "posture," "position" and "ergonomics." Studies investigating prevalence or risk of pain in the upper extremity or neck were included. Nipple pain or breast pain alone were not included. No publication date restrictions were used. Results were extracted and summarized.
Results: Six studies were retrieved from the databases CINAHL, PubMed, Google Scholar, and MEDLINE, including 4 prevalence studies, and 2 studies describing risk factors of upper quarter pain related to breastfeeding. Hand and wrist complaints during pregnancy include tendonitis, carpal tunnel syndrome, and cubital tunnel syndrome; one study found a prevalence of 20.9%, 10.2%, and .3% respectively for these conditions in pregnancy. The prevalence of postpartum primary neck and shoulder (including the superior part of the trapezium muscles) pain in Japanese women one month postpartum was 73.1%. First-time mothers were found to have increased rates of shoulder stiffness, back pain, and wrist pain at 1 month postpartum compared to younger mothers and mothers who had multiple children. The most common areas of pain in breastfeeding mothers in another study involved the neck (20.5%), followed by neck and shoulder (16.5%), and back and neck (12.6%). Older first-time mothers that breastfeed have been found to have a higher incidence of carpal tunnel syndrome. Researchers in Hong Kong found a nearly significant difference in new onset wrist pain in 259 mothers who breastfed versus those who did not breastfeed (OR = 2.58, p = .051); being a first-time mother was found to be significantly predictive of wrist pain in the early postpartum period (OR = 2.62, p = .01).
Conclusion: It has been established in the literature that breastfeeding mothers may experience pain in the wrist, shoulder and neck. Postural deficits as well as the repetitive nature of the activity may put mothers at risk of neuromusculoskeletal disorders in the upper quarter. Breastfeeding mothers may benefit from screening for these issues by health care professionals and may benefit from interventions for prevention and treatment of this pain. These interventions could include manual therapy, therapeutic exercise, splinting, posture re-education and use of ergonomic aids. An interdisciplinary approach may be beneficial. More research is needed to understand risk factors for this pain and the mechanisms of injury, prevalence in the United States, and interventions that may prevent or manage upper quarter pain associated with breastfeeding.

26

Aota Critically Appraised Paper Series Evidence Exchange *A Product of the American Occupational Therapy Association Evidence-Based Literature Review Project

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Purpose: Ultrasound and paraffin wax therapy are common treatment modalities that may be used by occupational therapists. This study focused on the efficacy of each modality, in combination with a wrist orthosis, in treating patients with carpal tunnel syndrome to relieve symptoms and improve function. Modalities and splints are preparatory methods that can decrease pain and promote healing, in preparation for occupational performance (American Occupational Therapy Association [AOTA], 2014). Physical agent modalities, if used, must be incorporated with occupational therapy interventions as a preparatory method for the purpose of regaining function for occupations (AOTA, 2014). The authors hypothesized that ultrasound therapy Would be more effective in treating carpal tunnel syndrome. The results determined that, when in combination with a wrist orthosis, ultrasound was more effective than paraffin therapy for improving functional status (as measured by the Boston Carpal Tunnel Syndrome Questionnaire) among patients with mild–moderate carpal tunnel syndrome.
- Compare the effectiveness of ultrasound versus paraffin wax, both in combination with a wrist orthosis, for patients with carpal tunnel syndrome, to determine which treatment method was the most effective for improving the patient's functional status
- Assess the patient's pain levels, symptom severity, sensitivity, palmar pinch strength, and motor activity of the median nerve

Methods:
DESIGN TYPE AND LEVEL OF EVIDENCE:

This was a randomized trial with no control group. The level of evidence is level two.

SAMPLE SELECTION
How were subjects recruited and selected to participate? Please describe.

Sixty individuals diagnosed with Carpal Tunnel Syndrome were recruited from the Department of Physical Medicine and Rehabilitation in one community hospital during 2010 and 2011.

Inclusion Criteria

Patients were required to have subjective symptoms (pain and/or numbness in the median nerve distribution of the digits or nocturnal pain). Patients were required to have either a positive Phalen's sign or a positive Tinel's sign along with electrophysiological evidence of Carpal Tunnel Syndrome.

Exclusion Criteria

Patients were excluded if 1) They were younger than 18 years of age 2) Had any underlying medical disorders, such as diabetes mellitus, renal failure, autoimmune disease or hypothyroidism, and 3) Pregnancy, or previous wrist trauma or surgeries.

SAMPLE CHARACTERISTICS

N= (Number of participants taking part in the study)		**60 allocated to groups, 47 completed**	
#/ (%) Male	5 (10.6%)	#/ (%) Female	42 (89.4%)
Ethnicity		NR; study completed in Taiwan	
Disease/disability diagnosis		Carpal Tunnel Syndrome	

INTERVENTION(S) AND CONTROL GROUPS
Add groups if necessary
Group 1

Brief description of the intervention	Paraffin therapy group: Patients wore custom-fabricated neutral wrist orthoses at night for eight weeks. The patients wore the orthoses for eight weeks. The paraffin wax treatment was performed in the hospital twice a week for eight weeks. A dip-and-wrap method was used, which included dipping the affected extremity into a wax bath that was fifty-five degrees Celsius five times. The extremity was covered with plastic wrap and a towel for twenty minutes before the wax was removed from the extremity.
How many participants in the group?	There were 23 participants in the paraffin therapy treatment group.
Where did the intervention take place?	Department of Physical Medicine and Rehabilitation at the Taipei Tzuchi Hospital
Who Delivered?	Physical Therapists
How often?	Twice per week
For how long?	8 weeks

Group 2

Brief description of the intervention	Ultrasound therapy group: Patients wore custom-fabricated neutral wrist orthoses at night for eight weeks. The patients wore the orthoses for eight weeks. The ultrasound therapy was performed in the hospital twice a week for eight weeks. The ultrasound therapy was administered for five minutes every session. A stroking method of application was used. The ultrasound machine was set to (1:4) pulsed mode with 1 MHz frequency, 1.0 W/cm^{2}intensity, and a 5 cm^2 transducer. The couplant used was Aquasonic gel. The sonation coverage area was 25 cm^{2}from the "wrist crease to the palmar region" (5 times the size of the transducer).
How many participants in the group?	There were 24 participants in the ultrasound therapy treatment group.
Where did the intervention take place?	Department of Physical Medicine and Rehabilitation at the Taipei Tzuchi Hospital
Who Delivered?	Physical Therapists
How often?	Twice per week
For how long?	8 weeks

Intervention Biases: *Check yes, no, or NR and explain, if needed.*

Contamination:

YES ☐	*Comment: No one in group 1 received the same treatment as group 2*
NO ☒	*and no one in group 2 received the same treatment as group 1.*
NR ☐	

Co-intervention:

YES ☒	*Comment: Participant in both groups receivedcustom-made neutral*
NO ☐	*wrist orthoses to wear at night. The participants in each group wore the*
NR ☐	*orthoses for the same amount of time (8 weeks).*

Timing:

YES ☒	*Comment: Duration of paraffin treatment was 20 minutes; duration of*
NO ☐	*ultrasound treatment was 5 minutes. The authors evaluated only short*
NR ☐	*term outcomes with no long term follow up.*

Site:

YES ☐	*Comment: The study was performed in the Department of Physical*
NO ☒	*Medicine and Rehabilitation at the Taipei Tzuchi Hospital.*
NR ☐	

Use of different therapists to provide intervention:

YES ☐	*Comment: The information on which Physical Therapists treated each*
NO ☐	*group was not provided.*
NR ☒	

MEASURES AND OUTCOMES

Complete for each measure relevant to occupational therapy:

Measure 1:

Name/type of measure used:	Boston CTS (Carpal Tunnel Syndrome) questionnaire
What outcome was measured?	The Boston CTS (Carpal Tunnel Syndrome) questionnaire focuses on an individual's ability to complete daily tasks. It measures the severity of the patient's symptoms (11 questions) and the patient's functional status (8 questions) by scoring all answers from 1-5 following the patient's condition (1 meant no symptoms and 5 meant most severe symptoms). The symptoms severity scale focused on pain, duration of pain, numbness, tingling, weakness and difficulty grasping. The functional status scale focused on the occupations of bathing and dressing, buttoning clothes, holding a book, writing, gripping a telephone, opening a jar, carrying groceries, and performing household chores.
Is the measure reliable?	YES ☒ NO ☐ NR ☐
Is the measure valid?	YES ☒ NO ☐ NR ☐
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measure 2:

Name/type of measure used:	Palmar Pinch Power Test
What outcome was measured?	Pinch strength is a client factor needed to perform many daily occupations (AOTA, 2014) The palmar pinch strength was measured by pressing the thumb and the index finger tip against a standard dynamometer. This was repeated 3 times and a mean score was obtained.
Is the measure reliable?	YES ☐ NO ☐ NR ☒
Is the measure valid?	YES ☐ NO ☐ NR ☒
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measure 3:

Name/type of measure used:	Semmes-Weinstein Monofilament sensory test
What outcome was measured?	Sensory function is a client factor contributing to occupational performance (AOTA, 2014). This test measures sensation in the fingertips by applying pressure from the nylon filaments with the wrist in a neutral supine position. Each filament is pressed perpendicularly on the fingertips until the filament has a bend in it. The test is positive if the patient can address which digit the monofilament was touching with their eyes occluded. Semmes- Weinstein was scored on a 5-point scale, depending on which monofilament the patient could feel.
Is the measure reliable?	YES ☐ NO ☐ NR ☒
Is the measure valid?	YES ☐ NO ☐ NR ☒
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measure 4:

Name/type of measure used:	Tinel's test
What outcome was measured?	Tinel's test evaluates the regeneration of body structures (nerve axons), which are required to engage in occupations (AOTA, 2014). A positive sign was a tingling sensation or shooting pain in the median nerve distribution of the hand elicited by carefully tapping the median nerve at the wrist level.
Is the measure reliable?	YES ☐ NO ☐ NR ☒
Is the measure valid?	YES ☐ NO ☐ NR ☒
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measure 5:

Name/type of measure used:	Phalen's test
What outcome was measured?	Phalen's test evaluates median nerve function, which is required to effectively participate in occupations (AOTA, 2014). Symptoms of numbness and tingling in the median nerve distribution elicited by active full wrist flexion for 60 seconds.
Is the measure reliable?	YES ☐ NO ☐ NR ☒
Is the measure valid?	YES ☐ NO ☐ NR ☒
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measure 6:

Name/type of measure used:	Pain scale/Visual analog scale
What outcome was measured?	The pain scale/visual analog scale evaluates the individual's level of pain, which is a client factor that can adversely impact occupational performance (AOTA, 2014).
Is the measure reliable?	YES ☐ NO ☐ NR ☒
Is the measure valid?	YES ☐ NO ☐ NR ☒
When is the measure used?	Before treatment and at eight weeks, after treatment.

Measurement Biases

Were the evaluators blind to treatment status? *Check yes, no, or NR, and if* ***no****, explain.*

YES ☒ *Comment: The article states that the assessors were blinded to which*
NO ☐ *patients were in each group.*
NR ☐

Recall or memory bias.*Check yes, no, or NR, and if* ***yes,*** *explain.*

YES ☒ *Comment: The Boston scales and the pain scale both are self-report*
NO ☐ *measures which would require recall of symptoms/functional status.*
NR ☐

Results: List key findings based on study objectives
Include statistical significance where appropriate ($p<0.05$)
Include effect size if reported

An effect size from 0.3-0.8 is considered a "moderate" effect.
Functional status score: The between group P value was 0.04 (statistically significant in favor of the ultrasound group); the effect size for the paraffin group was 0.17 (low effect) and the effect size for the ultrasound group was 0.38 (moderate effect).
Symptom severity score: The between group P value was 0.51; the effect size for the paraffin group was 0.63 (moderate effect) and the effect size for the ultrasound group was 0.63 (moderate effect).
Pain scale: The between group P value was 0.81; the effect size for the paraffin group was 0.27 (low effect) and the effect size for the ultrasound group was 0.74 (moderate effect).
Monofilament test: The between group P value was 0.95
Palmar pinch power: The between group P value was 0.34
Distal motor latency of the median nerve: The between group P value was 0.06
Distal sensory latency of the median nerve: The between group P value was 0.83

Was this study adequately powered (large enough to show a difference)? *Check yes, no, or NR, and if* ***no****, explain.*

YES ☐ *Comment: The A priori power analysis showed that they needed at least*
NO ☒ *26 participants in each group, however they didn't due to higher than*
NR ☐ *expected drop out rates.*

Were appropriate analytic methods used? *Check yes, no, or NR, and if* ***no****, explain.*

YES ☒ *Comment:*
NO ☐
NR ☐

Were statistics appropriately reported (in written or table format) *Check yes or no, and if* ***no****, explain.*

YES ☒ *Comment: Information on effect sizes in Table 3 would have been*
NO ☐ *preferred, however everything that was recorded in written or table format was appropriately reported.*

Was the percent/number of subjects/participants who dropped out of the study reported?
YES ☒
NO ☐

Limitations:
What are the overall study limitations?

1. Due to a high dropout rate, the study may have been underpowered.
2. The participants in this study mainly experienced mild to moderate symptoms, therefore these findings may not be valid for an individual with severe symptoms.
3. Orthoses were used in both treatment groups, which may have had an impact on the overall effect of the treatment in both groups, apart from paraffin or ultrasound. A third orthosis control group may be appropriate.

Conclusion: State the authors' conclusions related to the research objectives.

The researchers found that use of a wrist orthosis in conjunction with ultrasound therapy may be more effective than wrist orthosis and paraffin wax therapy when treating CTS patients. However, the only statistically significant difference found between the groups was in functional status scores.

27

Title: Functional Outcome Using Early Controlled Active Motion in Rehabilitation of a Replanted Hand: A Case Report

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Purpose: To illustrate the use of early active motion after hand replantation, and to recommend further research in this area. While bone shortening is an integral part of replantation surgery, it has not influenced replantation rehabilitation protocols, with many still delaying active motion until 3 or 4 weeks after surgery.
Methods: This is a retrospective case study which details the rehabilitation and excellent functional outcome of a young man who sustained a complete avulsion amputation of his dominant upper limb at the level of the distal forearm. His hand was replanted with 2cm bone shortening and he was referred to Occupational Therapy for early controlled active motion on day six. The patient had 65 sessions of Occupational Therapy in the first year which included but was not limited to, early A/PROM, many custom-molded orthoses, occupation-based intervention and sensory re-education. No additional reconstructive procedures were performed.
Results: One year after surgery, the patient had excellent range of motion, with almost full flexion and extension of the digits, ability to oppose thumb to all fingers, good intrinsic return, 32% power grip strength, protective sensation, and mildly impaired coordination (30 seconds on 9 Hole Peg Test). Subjectively, the patient was highly satisfied and was managing well at work.
Conclusion: This case achieved a favorable functional outcome following a complete hand replantation. The following therapeutic interventions were considered important contributors: early controlled active motion, the inclusion of occupation-based intervention, and many custom-molded orthoses. The initiation of early active motion appears uncommon after hand replantation. Despite bone shortening being an integral part of replantation surgery, this has not influenced rehabilitation protocols. Research is required to determine if bone shortening reduces tendon repair tension, allowing for early active ROM and thereby contributing to favorable results. Further research with a significant number of patients or a randomized controlled trial is essential to investigate the value of forearm shortening with early controlled active motion in distal forearm replantation.