



Nearthrosis in true long-standing temporomandibular joint dislocation; a report on pathogenesis and clinical features with review of literature



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ABSTRACT

The behavior and function of the condyle are not the same in every type of temporomandibular joint (TMJ) dislocation. Acute displacement or dislocation of the condyle is not a rare incident, and the treatment modalities have been well known by physicians for a long time. Chronic dislocation of the condyle is considered a relatively common entity for which treatment may indispensably be surgical intervention. Type of dislocation, duration and the number of episodes are taken into account while constructing the treatment plan.

Chronic dislocation that has been left untreated for a long time is a relatively less often encountered type exhibiting difficult clinical conditions for treatment. This type of dislocation is usually seen in elderly patients with poor general health conditions and can be classified as “long-standing dislocation.” In this clinical condition, after having some chronic dislocation episodes, the condyle leaves the original fossa, sits in the anterior part of the eminence permanently, creates a new fossa and never gets back to the original place again. Duration is the most important criterion in classifying long-standing dislocations and has a great effect on decisions regarding the type of management. The relevant literature includes few reports, most of which speculate upon “duration,” which varies on a large scale ranging from 5 weeks to 33 years. There has been neither an agreement on time span within which long-standing dislocation develops, nor a universally accepted definition for what “long-standing” is indeed meant to be. On the other hand, in some cases, the condition has been named “true long-standing dislocation” due to some permanent pathological changes that the TMJ undergoes, such as pseudoarticulation/nearthrosis/false joint/neo-joint.

In this paper, management of true long-standing/permanent dislocation in two patients, whose conditions lasted more than 1 year and resulted in permanent changes in TMJ anatomy, is presented. Due to the poor general health condition of the two elderly patients, they were treated in the most conservative way possible. In one of the patients, eminentomy and head-gear application were used to attain gradual relocation of the condyles. Rehabilitation of masticatory function of the other patient was improved prosthetically.

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1. Introduction

Temporomandibular joint (TMJ) dislocation is a condition in which the condyle is displaced from the articular fossa by an excessive movement and positioned beyond the articular

eminence. If the patient experiences this problem just once, it is called “acute” dislocation; if dislocation recurs, then the terms “chronic” or “chronic recurrent” can be used. Types of chronic or chronic recurrent dislocations and their treatment modalities have been discussed previously (Güven 2008, 2009).

Chronic dislocation which has not been treated for a long time is the rarest type and constitutes a serious clinical condition for treatment. In this clinical condition, after having some chronic dislocation episodes, the condyle leaves the original fossa, sits in the anterior part of the eminence permanently, creates a new fossa

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and never gets back to the original place. This type of dislocation is called as “long-standing dislocation.” It may occur either unilaterally or bilaterally. Long-standing dislocations are seen relatively more common in elderly, edentulous individuals and in those with poor general health conditions (DeBurgh and Bramley, 1990).

This phenomenon has been presented under various titles in the relevant literature, such as the following: unreduced dislocation (Jones, 1949), long-standing dislocation (Gottlieb, 1952), permanent dislocation (Ramon and Bomstein, 1962), prolonged dislocation (Hayward, 1965), protracted dislocation (Topazian and Gostich, 1967), irreducible dislocation (Smith and Johnson, 1994) and chronic persistent dislocation (Rattan et al., 2013). There is no agreement on the criteria for description, clinical course and treatment of long-standing dislocation. Meanwhile, duration is the most important criterion in classifying the pathology and predominantly affects the treatment modality and the success. The confusing point in this matter is that in most reports, “duration” varies on a large scale, ranging from 5 weeks to 33 years. The first report about surgical treatment of long-standing dislocation of 11 years was published by Harpman (1952). Disagreement on the time period for the development of long-standing dislocation raises an issue: how much time should elapse before a dislocation should be called a long-standing dislocation? There is no universally accepted definition as to the duration for a long-standing dislocation. On the other hand, pathological and permanent changes in TMJ anatomy may occur only during long time spans. A literature review revealed only four reports which presented neo-joint formation in conditions lasting 1 year or more (Adeyeye et al., 1976; Wijmenga et al., 1986; DeBurgh and Bramley, 1990; Marqués-Mateo et al., 2016). Therefore, it has been assumed that this clinical condition of 1 year or more was considered as “true long-standing dislocation” (Table 1). It is relevant that formation of a new joint was named pseudoarticulation (Caminiti and Weinberg, 1998) and nearthrosis (Adeyeye et al., 1976; Wijmenga et al., 1986; DeBurgh and Bramley, 1990). Divergence in description, classification and the techniques proposed for treatment makes this entity the most controversial type among TMJ disorders.

The purpose of this paper is to present two cases with this extremely rare clinical condition, true long-standing dislocation, and to discuss comparatively the pathogenesis, types and treatment modalities.

2. Materials and methods

2.1. Patient 1

An 85-year-old man was admitted to our department with difficulty eating. He was totally edentulous, wearing complete dentures and not able to close his mouth properly (Fig. 1). Maximum interincisal opening (MIO) was 26 mm. The patient's history revealed dementia and grand mal epilepsy. His daughter stated that this condition has been persisting for 18 months. The patient did



Fig. 1. Preoperative view. Anteriorly displaced condyles do not let the patient close the mouth (patient 1).

Table 1

Papers in the literature on true long-standing dislocation lasting 1 year and more.

Year	Authors	Sex/ Age	Duration of CD (Years)	Unilateral/ Bilateral	Pseudo- joint	Treatment	Result
1952	Harpman	M/16	11	Bilateral		Kostecka blind steotomy	Relaps/Open bite
1952	Gottlieb	F/24	➤ 1	Bilateral		Condylectomy	Success
1965	Hayward	F/22	➤ 1	Bilateral		Close reduction by wires	Success
1970	Rowe & Killey	F/78	33	Unilateral		Condylectomy	
1970	Rowe & Caldwell	M/27	6	Bilateral		Oblique ramus osteotomy	Relaps/Open bite
1973	Rawls et al.	F/31	➤ 1	Bilateral		L-shaped ramus osteotomy	Success
1976	Adeyeye et al.	M/25	1	Bilateral	Exist	L-shaped ramus osteotomy	Success
1981	Vero	F/53	5	Bilateral		Condylectomy	Success
1982	Blank et al.	M/37	➤ 1	Bilateral		Condylectomy, eminectomy, placement of Proplast-Vitallium condylar prosthesis	Success
1982	Tipps & Landis	F/50	➤ 1	Bilateral		Eminectomy, placement of Silastic blocks	Failure
1986	Hammersly	F/62	4	Bilateral		Med. pterygoid and masseter muscles stripped and Lat. Pterygoid muscle detached.	Success
1998	Caminiti & Weinberg	F/73	10	Bilateral	Exist	Pseudoarticulation disengaged, high condylectomy was done	Relaps
2016	Marqués-Mateo et al.	F/16	2	Unilateral		Close reduction under general anesthesia?	Success
		F/34	6	Unilateral		Condylotomy	Success

Arrows explain that the duration is longer than 1 year.

not complain about pain, and the major problem was difficulty eating.

Radiological examination revealed that both condyles were located anteriorly to both eminentias, and also the cause of persistence and disability in jaw movements; there was bilateral new fossa formation anterior to the eminentias (Fig. 2a,b). The patient was able to move the mandible only in the sagittal plane, and lateral movements were impaired.

It was stated that some physicians had tried to relocate the mandibular condyles to the proper locations under local anesthesia.

Bilateral eminectomy was performed (Fig. 3) in accordance with Myrhaug (1951) description. The purpose was to eliminate the pseudojoint (false joint) and to remove the barrier which obstructed correct excursions of the condyle. This enabled the condyles to get back to their former location. Because of the frail condition of the patient, bimaxillary fixation was not applied, and the jaw was supported by bandage, after which posterior-superior traction was applied to the mandible by a head–chin cap for 3 weeks (Fig. 4), during which better reduction was gradually attained. New dentures were placed 2 months later.

2.2. Patient 2

An 80-year-old woman was referred to our department, looking for a remedy for her eating problem. Her medical history revealed that she had cardiovascular problems and she was presently under psychiatric care. She had been suffering from schizophrenia along with depression. She was totally edentulous and was not wearing dentures. During mouth opening, there was a slight deviation to the right side. The movements of an anteriorly dislocated condyle were almost visible. Her history was not clear and, due to the difficulty in getting sound information from the patient, the relevant information was received from her family members. The patient had been in this clinical condition for about 14 months.

X-rays showed an anteriorly located condyle and new fossa formation on the anterior wall of the articular eminentia (Fig. 5), imitating a neojoint.

On clinical examination, the patient was not able to perform lateral jaw movements.

Attempts at replacement of the dislocated condyle by conservative techniques under local anesthesia and sedation failed. Due to the impaired general health conditions of the patient, her family declined any further surgical intervention; therefore articulation was attained by complete dentures.

3. Results

In Patient 1, eminectomy in accordance with Myrhaug (1951) description and head-gear application were used to attain gradual

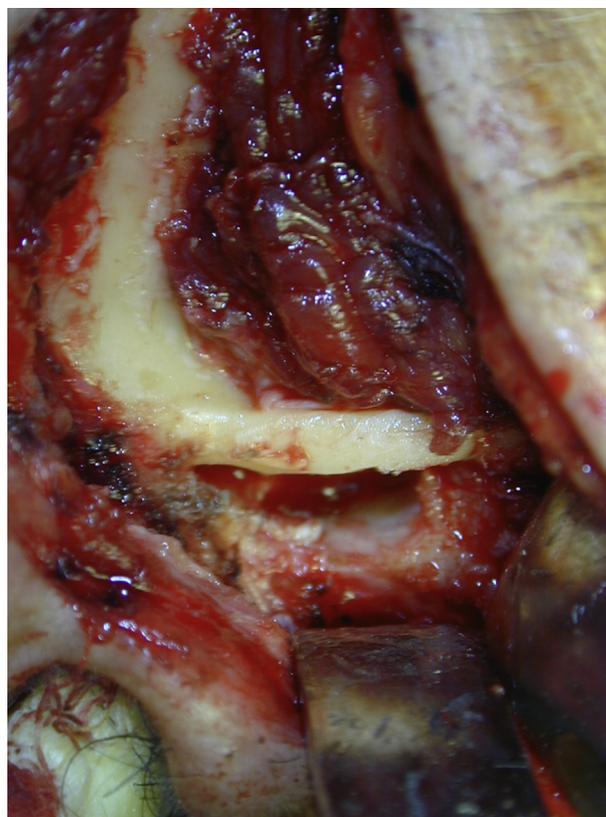


Fig. 3. Intraoperative view of eminectomy performed in accordance with Myrhaug (1951) description.

relocation of the condyles. Both patients were elderly, drowsy, and weak due to systemic health problems and had edentulous crests. Therefore, rehabilitation of the masticatory function of the patients was improved prosthetically.

4. Discussion

The first description of long-standing dislocation goes as far back as 1949, when Jones (1949) described a case with a time span of 11 years. This patient then underwent operation by another surgeon. Harpman (1952) applied condylectomy, left the condyles in forward position and repositioned the mandible. It was the first report in the literature which brought forward the evidence of anteriorly positioned, newly formed joint (nearthrosis/pseudoarticulation). Anterior open bite developed following the operation.

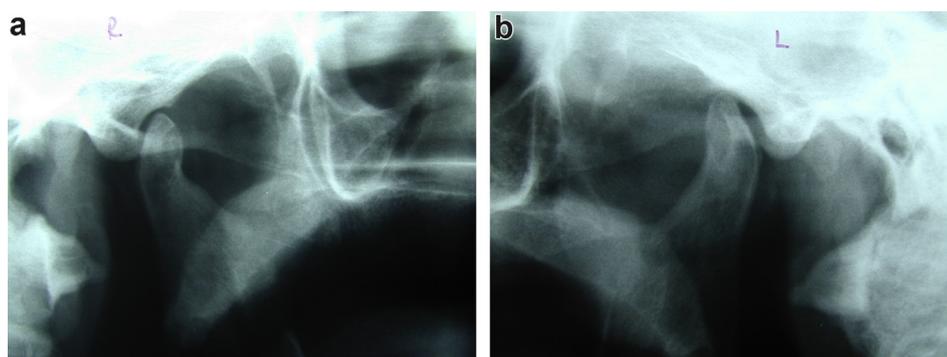


Fig. 2. (a and b) X-rays reveal new fossa formation and relation with the condyle at both sides.



Fig. 4. Posterior-superior traction of the mandible using head–chin cap.

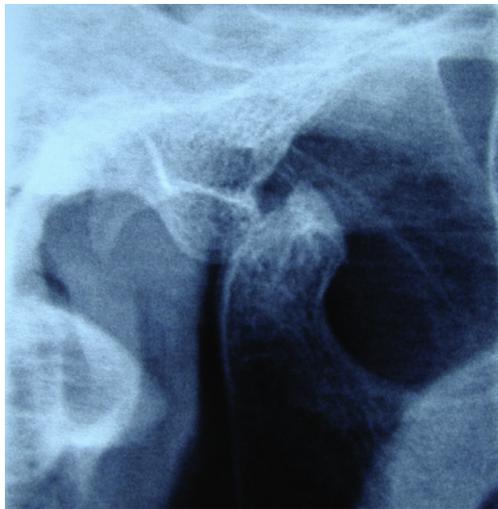


Fig. 5. X-ray shows subsidence at the anterior part of the eminence and new fossa formation (patient 2).

In the same year, [Gottlieb \(1952\)](#) reported a case in which the condition of long-standing dislocation lasted about 1 year and was treated successfully by condylectomy. Articular eminentia was filled with dense fibrous tissue in the glenoid fossa and periarticular adhesions. These observations were supported by [Hayward \(1965\)](#), [Rowe and Caldwell \(1970\)](#), and [Rawls et al. \(1973\)](#). [Hayward \(1965\)](#) successfully treated a 22-year-old patient with a longstanding dislocation of more than 1 year by close reduction.

In 1970, [Rowe and Killey \(1970\)](#) reported the longest time span (33 years) for a chronic dislocation. It was unilateral, and condylectomy was performed to replace the mandible. In the same year, [Rowe and Caldwell \(1970\)](#), reported the treatment of a 6-year-lasting dislocation by oblique ramus osteotomy; however, the treatment failed. Then, [Rawls et al. \(1973\)](#) presented a case of a 31 year-old patient with long-standing dislocation lasting more than 1 year, under the name of “permanently dislocated mandible.” They performed condylotomy and left the condyles in the infratemporal fossa. Following condylectomy, the mandibular position was corrected with L-shaped osteotomy. Three years later, [Adeyeye et al. \(1976\)](#) reported “nearthrosis” formation in a true long-standing dislocation and mandibular movements. They first described the mandibular movements in the relevant patients; these patients could move their mandible only in the sagittal plane, and lateral movements were impaired. Following replacement of condyles, L-shaped ramus osteotomies were achieved to correct occlusion. Unfortunately, the authors did not provide information on the postoperative mandibular excursions. [Blank et al. \(1982\)](#) reported a case of bilateral long-standing dislocation which lasted 18 months. In this study, treatment comprised bilateral eminectomies, condylectomies and insertion of a proplast-covered vitallum prosthesis to retain posterior vertical distance. In the same year, an attempt at eminectomy by [Tipps and Landis \(1982\)](#) failed. They placed Silastic implants in the former joint space. [Hammersley \(1986\)](#) reported the treatment of a 62-year-old woman with a long-standing dislocation of 4 years and emphasized the importance of the removal of dense fibrous adhesions and connective tissue in the glenoid fossa. Medial pterygoid and masseter muscles were stripped, and lateral pterygoid insertions into the neck of the condyle were detached.

[Caminiti and Weinberg \(1998\)](#) published a very important study in which they presented a case of true long-standing dislocation, discussing in detail the difficulties encountered during the course of treatment. The importance of this study should be emphasized, since it is the first detailed presentation in this regard, to show the pseudoarticulation anterior to the articular eminence of the temporal bone. The duration of the described clinical condition in the mentioned report was 10 years. It was observed that the condyle had been enveloped by dense fibrous connective tissue. This connective tissue was then excised, pseudoarticulation disengaged, and the condyle reduced to normal position. Bimaxillary fixation was not applied, and the jaw was supported by a bandage because of the impaired general health condition of the aged patient. The following day, dislocation recurred and the patient did not accept any further treatment. The second case, presented by the same authors ([Caminiti and Weinberg, 1998](#)), was that of a 16-year-old patient with a dislocation of 2 years. Close reduction under general anesthesia and bimaxillary fixation were applied, and the result was successful. Recently, [Marqués-Mateo et al. \(2016\)](#) reported a case of a 34-year-old patient who had a unilateral dislocation for 6 years. The authors stated that they performed condylotomy for treatment.

Adverse systemic conditions such as some connective tissue diseases and psychological disorders, neurodegenerative, neurodysfunctional diseases such as Huntington disease, epilepsy, Parkinson disease, multiple sclerosis, and muscle dystrophies and dystonias are the predisposing factors for chronic recurrent and long-standing dislocations. Frequently, true long-standing dislocation is encountered in elderly rather than in young and dentate individuals. Although it may be a sequel to any of the above-mentioned factors; intubation/laryngoscopy, dental, ear, nose and throat procedures, gastrointestinal endoscopies and prolonged postanesthetic vomiting are the predisposing factors in formation of true long-standing dislocation ([Hammersley, 1986](#); [Shakya et al.](#),

2010; Shah et al., 2018). Psychiatric crises have also been reported as one of the etiologic factors (Myrhaug, 1951; Shakya et al., 2010). As to the possible causes of the condition in patient 2, it may well be suggested that a psychiatric condition might have played a role in permanent dislocation (ie, long-standing dislocation).

Treatment of chronic/long-standing dislocation in patients with reasonable general health conditions starts with an attempt at reduction by traditional methods. In case this method fails, manipulation can be carried out under sedation or general anesthesia. If there is still no success, then an operative reduction becomes inevitable. The exposure of the mandibular angle is accomplished through a very small incision. A hole is drilled and traction is applied (Jones, 1949). If this attempt fails, a technique called the Fink method can be applied, whereby a hook is introduced over the coronoid notch and force is applied in downward and backward directions in an effort to disimpact the condyle (Hammersley, 1986). Hammersley (1986) reported a patient with a 2-month long-standing dislocation retracted by this technique. Later, Huang et al. (2011) reported replacement of condyles by hook retraction in a 33-year-old patient with a 3-month long-standing dislocation. Despite the relatively short time span for both cases presented, the disorder was still called a long-standing dislocation. There are also some reports, although not many, which present cases that last for a few months with no nearthrosis formation, which is a circumstance that makes controversial the definition of true long-standing dislocation. The success in treatment of dislocations has a close relationship with age, state of dentition, general health condition, number of past episodes, number of the attempts at reduction, and on top of all, duration of dislocation. Disagreement in type, chronicity of the clinical condition, patient age, and the general health status of the presented cases creates confusion and leads to contradictions in treatment preferences of true long-standing dislocation.

DeBurgh and Bramley (1990) stated that failure to re-establish normal TMJ anatomy might be the result of muscle contraction; however, it may be more likely to be a sequel to interpositioning adjacent tissues, meniscal wedging, exuberant and irregular or specular callus and fibrous adhesions, with nearthrosis or even fibro-osseous ankylosis between the caput and articular eminence. In some cases, condylectomy and arthroplasty may be required. The foreshortened coronoid-temporalis mechanism may best be managed by either tenotomy or coronoidotomy.

Nearthrosis refers to false joint and bone which move like a joint does (Adeyeye et al., 1976; Wijmenga et al., 1986; DeBurgh and Bramley, 1990). According to basic orthopedics, the normal joint is composed of two congruent bony structures covered with hyaline cartilage and surrounded by joint capsule, anatomically. In pseudoarticulation or false joint, hyaline cartilage on joint surface gradually diminishes. Formation of a false joint is not rare in the human skeleton; surfaces are incongruent, and there is surrounding fibrous tissue, like capsule; however, this capsule is not as strong as with normal anatomy (How et al., 2018; Shah et al., 2018). The ability of neo-joint or a neocondyle formation in TMJ exists in humans, particularly in growing individuals (Poswillo, 1972; Güven, 2017, 2018). Pseudoarthrosis in congenital dislocation of the hip and insufficient fixation of fractured bones are common pathological conditions in orthopedics. On the other hand, false joint in TMJ is extremely rare and creates difficulty in lateral excursions of the mandible. The number of relevant reports referring to formation of nearthrosis/false joint/neo-joint in TMJ is only four. While Adeyeye et al. (1976), DeBurgh and Bramley (1990), Caminiti and Weinberg (1998) and Marqués-Mateo et al. (2016) called attention to the formation of “false joint” in true long-standing dislocation, only two of these author groups (Adeyeye et al., 1976; Caminiti and Weinberg, 1998) presented their cases and shared

their experience regarding pathogenesis, clinical features and treatment of this biomechanical phenomenon.

The treatment of true long-standing dislocation which lasts 1 year or more has been the most challenging issue in TMJ management. The longer the mandible remains dislocated, the more difficult the management of the condition. Although various techniques have been proposed for treatment of chronic recurrent and long-standing dislocations (Myrhaug, 1951; Findlay, 1964; Xu, 1992; Moore and Wood, 1997), none of them produced uniformly successful results.

The treatment of patient 1 included bilateral eminectomy followed by head gear application to attain gradual relocation of the condyles. Myrhaug (1951), whose purpose was to facilitate the return of the condyle to the glenoid fossa, was the first to report eminectomy. In elderly patients with poor general health condition, this technique can be carried out with less surgical impact.

5. Conclusion

Despite the increasing number of studies on this issue in recent years, it is still rather difficult to find sufficient information about the pathogenesis, clinical behavior and treatment of true long-standing dislocation.

Describing the pathology and naming the clinical condition as “long standing” is closely related to duration. Chronic dislocations lasting 1 year or more give rise to a change in the normal anatomy of the TMJ and induce formation of neo-joint (false joint/nearthrosis/pseudoarticulation). This phenomenon has adverse effects on treatment policies by causing difficulty in the application of conservative techniques.

True long-standing dislocation is a very rarely encountered clinical condition; therefore experience build-up in this regard cannot be expected. Controversy in describing the pathology, diagnosis and divergence of recommended techniques for the management all make it very difficult to determine a specific solution to this issue. Some surgical techniques which have been proposed so far are mainly those for patients with reasonable health conditions. On the other hand, difficulties to provide remedies for aged patients with poor health conditions and true long-standing dislocation still persist. In order to manage this type of dislocation, chronicity, age, physiological status and general health conditions of the patients should be taken into account.

Further studies with proper diagnosis of true long-standing dislocation and evidence-based reports on management of this clinical condition will provide better outcomes in the future.

Declarations of interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jcms.2019.02.013>.

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