



# Temporomandibular Disorder: How Far Does Human Intervention Go

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## Abstract

Temporomandibular disorder (TMD) is a condition affecting the temporomandibular joint (TMJ), which connects your jaw to your skull. It can cause pain, stiffness, clicking or popping sounds, and difficulty with jaw movement. Human intervention can help manage TMD in several ways, but it's essential to understand the limitations and the range of interventions available:

**Self-Care Practices:** Simple self-care strategies can often provide relief. This includes avoiding hard or chewy foods, applying ice or heat packs to the jaw, practicing relaxation techniques to reduce stress, and gentle jaw exercises to improve flexibility.

**Medications:** Over-the-counter pain relievers like ibuprofen or acetaminophen can help alleviate pain and inflammation associated with TMD. In some cases, muscle relaxants or antidepressants may be prescribed to manage symptoms.

**Physical Therapy:** Physical therapy techniques such as jaw exercises, massage, and stretches can help improve jaw function and reduce pain. Therapists may also use techniques like ultrasound or electrical stimulation for symptom relief.

**Dental Treatments:** In cases where TMD is related to dental issues like teeth grinding or misalignment, interventions such as orthodontic treatment, dental splints or mouthguards, and dental adjustments may be recommended.

**Stress Management:** Stress and anxiety can exacerbate TMD symptoms. Techniques like cognitive-behavioral therapy (CBT), biofeedback, or relaxation techniques can help manage stress and reduce jaw tension.

**Surgical Interventions:** In severe cases of TMD that do not respond to conservative treatments, surgical interventions may be considered. These may include arthrocentesis (joint lavage), arthroscopy, or open-joint surgery to repair or replace the joint.

**Alternative Therapies:** Some people find relief from TMD symptoms through alternative therapies like acupuncture, chiropractic care, or herbal remedies. While these treatments may offer relief for some individuals, scientific evidence supporting their effectiveness for TMD is limited. However, it's important to note that the effectiveness of these interventions can vary from person to person, and there's no one-size-fits-all approach to managing TMD.

**Keywords:** Dental Research; Dentistry; Temporomandibular Disorder

**Abbreviations:** CBT: Cognitive-Behavioral Therapy; TMD: Temporomandibular Disorder; TMJ: Temporomandibular Joint; BTX: Botulinum Toxin.

## Introduction

According to Okeson JP [1], the area where the craniomandibular joint is located is called the temporomandibular joint (TMJ). The TMJ is certainly one of the most complex joints in the body; being considered both ginglymoidal (by providing hinge movements) and arthroidal (gliding movements).

The TMJ is the only synovial joint whose surfaces are covered by fibrocartilaginous tissue. It consists of the head of the mandible and temporal bone (glenoid fossa and articular eminence).

According to Barros JJ [2] dislocation is the total or partial loss of contact between two articular surfaces, on the other hand, the term subluxation is intended to designate condylar displacements that self-reduce without manual intervention.

In the case of the temporomandibular joint, dislocation occurs when the mandibular condyle exceeds the limits of the articular fossa and does not return to its normal position, which may be lateral, medial, anterior or posterior [3].

Its repetitive occurrence is generally associated with mandibular hypermobility and the degree of inclination of the Articular Eminence [4-6].

During dislocation, several clinical characteristics are observed, including the inability to close the mouth, protrusion of the chin, excessive salivation, difficulty speaking, pain of varying degrees, tension in the masticatory muscles, in addition to pre-auricular depression [7].

The etiological factors of mandibular displacement itself seem to be related to internal disorders of the TMJ, fragility of the capsular ligaments, dysfunction of the masticatory muscles, malocclusion, atrophy of the eminence, stress, trauma, in addition to other otorhinolaryngological problems [8].

Dislocation can be triggered by yawning, manipulation of the jaw during tooth extraction, prolonged dental treatment and excessive opening of the mouth in oral or pharyngeal surgeries under general anesthesia [9].

When this condition becomes recurrent, some definitive method of treatment must be chosen. This ranges from conservative treatments to complex surgical interventions [9].

Helman J, et al. [10] reported that there are two types of surgical treatment for recurrent TMJ dislocation: one with the objective of restricting mouth opening (increasing the articular eminence with the use of a shield); and another with the purpose of promoting free mandibular movements (removal of the articular eminence), each with its advantages and disadvantages.

The objective of this work is to carry out an updated literature review regarding the various treatment techniques for recurrent dislocation of the temporomandibular joint (TMJ).

## Literature Review

The temporomandibular joint (TMJ) is the only synovial joint whose surfaces are covered by fibrocartilaginous tissue. It consists of the mandibular condyle and temporal bone (glenoid fossa and articular eminence). Between the condyle and the fossa, there is a dense, avascular fibrous tissue called the articular disc. This disc divides the joint into the supra-disc and infra-disc regions, which normally do not communicate with each other. The joint is circumscribed by the joint capsule and multiple ligaments that provide stability to movements, mainly laterally [11].

The pathophysiology of dislocation is through movement of the condylar process in front of the articular eminence and an inability to return to its normal position. It can be partial (subluxation) or complete (dislocation), bilateral or unilateral, acute and chronic, prolonged or chronic recurrent when the episodes become frequent and progressively worsen [12]. The most common is anterior dislocation. The other types, such as medial, lateral, superior to the middle and posterior cranial fossa, are rare and are mainly associated with trauma [13].

The etiological factors of TMJ dislocation are multiple and treatment ranges from conservative methods to complex surgical interventions. TMJ dislocation represents approximately 3% of all joint dislocations in the body. It is generally bilateral and prevalent in female patients, between 20 and 30 years old, patients with internal TMJ derangement, joint laxity, occlusal disorders, and loss of vertical dimension, neurological disorders or the result of trauma [14,15].

Its clinical characteristics are: inability to close the mouth, protrusion of the chin, salivation, difficulty speaking, pain of varying degrees and tension in the masticatory muscles. In cases of unilateral dislocation, there is a deviation of the chin to the opposite side [16].

The pathogenesis of recurrent TMJ dislocation is attributed to a combination of factors, including laxity of the Temporomandibular Joint ligaments, weakness of the joint

capsule, unusual size or projection of the articular eminence, hypertrophied or spread muscles, trauma, and abnormal chewing movements. That does not allow the condyle to move. Recurrent TMJ dislocation can cause injuries to the disc and ligaments, leading to progressive internal tearing of the TMJ [17,18].

Other etiological factors associated with TMJ dislocation are trauma, wide and sharp opening of the mouth during the act of yawning or laughing, vomiting, convulsions, dental treatments such as third molar extractions, use of antiemetics and phenothiazines, which produce extrapyramidal effects, systemic diseases such as rheumatoid arthritis, psychogenic and neurological disorders [7,19].

Clinical history and exams are the most important tools for diagnosing TMJ dislocation. Other diagnostic confirmations include panoramic radiographs, showing the location of the head of the mandible anterior to the articular eminence, and computed tomography scans with three-dimensional reconstruction, where, in acute cases, the anteriorization of the mandibular condyle and an increase in the interarticular space are noted [2].

Dislocation of the temporomandibular joint must be basically differentiated into two stages:

- acute, when the patient presents at that moment with dislocation and consequently inability to close their mouth;
- chronic, when there are reports of recurrent displacements in a short period of time [19].

Acute dislocation is a very painful clinical condition, but it is easy to manage. Conservative methods in its treatment include symptomatic pain relief with analgesics and manual reduction. The manual reduction method is performed by first pressing the mandible downwards, then backwards, and finally upwards [20].

From the moment that episodes of mandibular displacement become frequent (chronic), it becomes necessary to use devices to control this pathology, due to the great functional and social disorder generated [3].

Numerous methods for treating recurrent mandibular displacement have been described in the literature, ranging from conservative treatments to surgical interventions.

Among the conservative or minimally invasive treatment methods described over the years in the literature, we can mention:

- restriction of mandibular movements using bandages associated with the use of muscle relaxants, anti-inflammatories and maintenance of a soft diet [21];

- maxillomandibular block [15];
- muscular exercises [15];
- creation of occlusal guides and occlusal adjustments; [22];
- infiltration of local anesthetics [23];
- injection of botulinum toxin into the chewing muscles [24];
- injections of sclerosing substances into the intra and/or extracapsular regions [23].

## Conservative Treatments

**Movement Limiting Devices:** These devices allow you to limit mouth opening, aiming to heal damaged joint ligaments [25]. This method is used as a temporary therapy in most cases while definitive treatment is planned [2].

Maxillomandibular block is recommended for a period of three to six weeks. However, the use of devices and blockade alone or concomitantly with the use of sclerosing agents have proven to be ineffective [25].

**Muscle Relaxants:** This approach consists of using relaxants to reduce muscle spasm. However, this technique has some limitations, such as: the form of oral administration, as it is difficult for the patient with the jaw immobilized to open the mouth, in addition to taking around 1 hour to start reducing muscle tone, and its effect may be insufficient for a manual reduction procedure. Although the muscle relaxant can be administered intravenously or intramuscularly, dental surgeons normally do not have the necessary material and experience to administer the medication via this route [26].

**Botulinum Toxin:** Since it was discovered as a therapeutic agent in 1977, botulinum toxin (BTX) has been labeled a versatile clinical tool for the treatment of muscular hyperfunction disorders [27]. Botulinum toxin is a potent selective neurotoxin of biological origin, obtained from the bacterium *Clostridium botulinum*, which acts on cholinergic nerve endings, where it prevents the release of acetylcholine (neurotransmitter responsible for carrying electrical messages from the brain to the muscles) and, as a result, the muscle does not receive the message to contract. Recent studies have demonstrated good results in the treatment of recurrent mandibular dislocation through injections of botulinum toxin type A into the lateral pterygoid muscle [24]. The biggest disadvantage of the technique is the need to repeat the procedure since the duration of the effect of botulinum toxin is 2 to 4 months. Its effect is influenced by the dosage, injection technique and size (mass) of the injected muscle [28].

BTX injection is invasive but a relatively conservative option. It is specifically indicated in patients for whom conservative

treatment of recurrent TMJ dislocation has failed and for whom surgery carries great risks. BTX injection therapy is also an option in patients who experience recurrent TMJ dislocation as a result of decreased muscle coordination for oromandibular dystonia, epilepsy and brainstem syndromes [24,28]. BTX treatment for recurrent TMJ dislocation after medical conditions such as anoxic encephalopathy and stroke or cerebrovascular accident has also been reported, which could lead to increased verbalization, chewing, and improved quality of life [28].

Martinez P, et al. [24] reported a series of three cases treated with botulinum toxin injections aided by electromyography in which they obtained satisfactory results after serial injections. In all cases, after the first injection, the dislocation recurred, requiring new injections.

Fu, et al. [29] reported a series of five elderly patients with neurological disorders who underwent injection of 25 to 50 units/muscle of botulinum toxin type A into the lateral pterygoid muscle to control dislocations. Patients were followed for periods varying from three months to two years without recurrence.

Adverse effects involve diffusion into adjacent tissues, transient dysphagia, nasal insufficiency, painful chewing and dysarthria. It is contraindicated in some conditions such as hypersensitivity to BTX and Myasthenia Gravis in pregnant and lactating women [30].

**Injection of Sclerosing Substances:** The injection of sclerosing substances into the TMJ as a treatment method for recurrent dislocation is a minimally invasive procedure that has been described in the literature over the years. Different substances are injected into the upper compartment, pericapsular region or bilaminar zone, with the aim of causing fibrosis and restricting mandibular translation movement [31]. Among the substances that have already been used, we can mention: alcohol, tincture of iodine, 5% sodium psylate (no longer used), Picibanil (a streptococcal derivative inactivated by penicillin G), sodium tetradecylsulfate (used for intravenous injection of varicose veins and hemorrhoids), cyclophosphamide, bleomycin, tetracycline and the patient's own blood [2,23].

This procedure, as it is painful, is more suitable for patients for whom there is some limitation in carrying out surgical treatment and the use of these substances can cause degeneration or ankylosis of the TMJ, pain, occlusal disharmony, paresthesias and excessive salivation, being, for example, Therefore, its indication is quite restricted [7,25].

**Use of Autogenous Blood:** The use of autogenous blood was initially described by Brachmann F [32] who successfully

treated 60 patients by injections of autogenous blood into the temporomandibular joints. Some articles were published in the following years, such as Schulz S [33] and Jacobi HE, et al. [34], all with results considered satisfactory.

Schulz S [33] performed, in 16 patients, 2 weekly applications of autogenous blood over a period of three weeks, associated with maxillomandibular block for four weeks. After 12 months of follow-up, 10 patients remained free of new dislocations, 7 after 24 months and 5 patients after 60 months.

Jacobi HE, et al. [34] published his results with a sample of 19 patients, in which he applied 1 injection of autogenous blood in each joint associated with maxillomandibular block for 14 days. After 18 months of follow-up, 17 patients were free of their symptoms and had reduced mouth opening.

Theoretically, the injected blood promotes an initial inflammatory reaction, which induces the formation of fibrosis and adhesions in the upper joint space and pericapsular region. A facial bandage is used in the first weeks after treatment in order to limit mandibular movements and allow the maturation of the newly formed fibrous tissue [2,23].

The technique, which consisted of injections of autogenous blood into the superior joint space and pericapsular region, was performed on 25 patients with chronic TMJ dislocation and subluxation. After a minimum follow-up of 12 months, it was observed that 20 patients (80% of the sample) did not present new episodes of displacement and only 5 patients were referred for surgical treatment). The mean postoperative maximum mouth opening was 35 mm (range, 31-41 mm) and there were no postoperative complications. The only reported disadvantage of this technique is severe restriction in the range of mandibular movement [31,35].

The possibility of recommending a simple, quick and predictable procedure to the patient makes the use of autogenous blood an attractive form of treatment. If recurrence occurs, a new attempt can be made before opting for more invasive procedures [31].

### Surgical Treatments

As for surgical treatments, these are classified, according to Wolford LM, et al. [11], into five categories:

- Removal of mechanical obstacles;
- Creation of barriers to condylar translation movement;
- Soft tissue procedures;
- Use of anchors to restrict movement;
- Mandibular osteotomies.

Eminectomy can be classified according to the removal of obstacles allowing free mandibular movement based on the volumetric reduction of the articular eminence. The creation of obstacles includes fracture of the zygomatic arch and displacement below the articular eminence, bone grafts and metallic implants positioned in the articular eminence. Soft tissue procedures include lateral pterygoid muscle myotomy, temporalis muscle myotomy, and plication of the TMJ capsule and ligaments. The anchor ligation technique is performed using a non-absorbable suture that connects the root of the zygomatic arch to the condyle, controlling its movement. Mandibular osteotomy procedures include condylotomy, vertical osteotomy of the mandibular rami and high condylectomy [7,11,19].

**Eminectomy:** Eminectomy, first described by Myrhaug H [16], is a surgical approach, which consists of removing the articular eminence by ostectomy, with the use of rotating instruments associated or not with scolps. Since then, it has been widely used with satisfactory results and proven effectiveness in the literature.

It is currently the most effective and definitive therapeutic method, with regard to recurrent TMJ dislocation, as it presents a lower risk of adhesion and interference with the opening during condylar translation [36].

Removal of the eminence will facilitate the return of the condyle without any interference with the glenoid fossa [16].

The idea that the removal of the articular eminence could lead to hypermobility of the jaw, causing degeneration of the TMJ, and excessive opening of the mouth does not arise, as the presence of fibrosis derived from the surgical procedure seems to prevent this from happening to occur [12,37].

It is considered a relatively simple technique for experienced professionals, which allows the preservation of normal functional movements and the direct visualization of the movement of the condyle-disc complex during surgery [5].

One of the most frequent complications after eminectomy is a TMJ noise. Post-operative noises from the TMJ can be caused by the remaining part of the eminence and the remodeling of the new surface, which causes roughness [38,39].

Undt, et al. [39] used eminectomy to treat 14 patients who presented recurrent mandibular dislocation, whether unilateral or bilateral. After follow-up, which ranged from 7 months to 5 years, 13 patients did not present recurrences or complications inherent to the procedure.

**Titanium Mini-Plate:** With the evolution of available materials and the development of more delicate mini

titanium plates, Buckley MJ, et al. [40] created a method, in the early 1980s, which recommended the installation of the mini titanium plate on the lateral surface of the zygomatic arch with a segment shaped medially, just below the articular eminence. Compared to eminectomy, the authors considered the technique to be less invasive and reversible, if necessary. The disadvantage is the reduction in maximum mouth opening, however, this is clinically insignificant when compared to eminectomy.

Buckley MJ, et al. [40] reported that since 1981 they had been using mini plates on the articular eminence, with the aim of restricting condylar movement in recurrent TMJ dislocation. The authors described two cases treated by the mini plate technique and maintained for an average period of four years. They concluded that the use of this technique showed significant advantages over traditional surgical procedures, as the mini plates were easily shaped and positioned, thus avoiding the need for more complex surgeries using bone grafts or osteotomies. They recommended the use of mini plates as an alternative treatment modality for cases of recurrent dislocation or subluxation, especially in uncooperative or mentally retarded patients.

**Arthroscopic Eminoplasty:** More recently, Segami N, et al. [38] introduced a technique called arthroscopic eminoplasty, similar to conventional eminectomy, which involves removing part of the eminence to allow the condyle to move freely and with the tendency to be less invasive, due to the assistance of an arthroscope.

Seeking this proof, Sato J, et al. [41] carried out a comparative study in which they evaluated the effectiveness of arthroscopic eminoplasty and eminectomy in patients with recurrent dislocation.

The 2 procedures produced the same quality of clinical outcome in terms of dislocation recurrence rate and complications.

Although arthroscopic eminoplasty has some advantages over traditional eminectomy, it requires superior triangulation techniques for safe intracapsular manipulations, requiring learning course to perform this technique and the high cost, limiting its use [38].

**Joint Reconstruction by Bone Graft:** In order to correct joint displacement by creating mechanical barriers, increasing the height of the articular eminence and limiting mandibular excursion movement, Fernandez SJ [18] was one of the first authors to publish results on the use of calvarial bone for augmentation of the articular eminence. After 18 months of monitoring the use of interpositional grafts, he observed that none of the eight operated patients presented new episodes

of displacement or complications inherent to the technique used.

The use of bone grafts from different donor areas has been described, such as: zygomatic arch, mastoid process, iliac bone and skullcap. These grafts are fixed using screws or plates to the articular tubercle [42].

Perrott DH, et al. [43] and Lindquist C, et al. [44] said that graft treatment brought acceptable results, but there are also documented disadvantages associated with autogenous grafts, including donor site, site morbidity, and variability in graft behavior (resorption, ankylosis, or excessive growth).

**Mitek anchors:** The Mitek mini anchor technique can be applied for surgical correction of chronic mandibular displacement with a normally positioned articular disc or with articular displacement of the disc in relation to the condyle. The use of two “Mitek” mini anchors and two Ethibond No. 2 sutures provides a method of control for mandibular translation, while also effectively preventing TMJ dislocation. The technique also has the advantage of controlling displacement of the condyle without altering the natural joint anatomy in that the upper and lower joint spaces are not surgically violated unless simultaneous disc repositioning is indicated.

Suture anchors were developed for orthopedic surgery procedures to provide a method for reconnecting tendons and ligaments to bone and were only later adapted for use in temporomandibular joint disc stabilization and TMJ dislocation treatment.

The Mitek mini anchor is made from a titanium alloy shaft and has a pair of super elastic nickel-titanium arches. The anchor has a body diameter of 1.8 mm and a length of 5.0 mm [11].

**Joint Prostheses:** The ideal total joint reconstruction, autogenous or alloplastic, is one that mimics the form and function of the replaced joint, being capable of sustaining the same forces experienced by the normal joint, and reproducing its functional movements [45].

For any joint reconstruction with an alloplastic material system to be successful in the long term, it is necessary to pay attention to stability from the moment of fixation; the compatibility of the materials used to manufacture the device with the surrounding tissues; the design of the prosthesis that must have been made to sustain the loads received by the joint over time; careful assessment of the indication and asepsis of the surgery [46].

One of the problems to be faced in joint reconstruction is the fact that many patients indicated for total prosthetic replacement of the TMJ have distorted anatomy resulting from countless previously performed ineffective surgical procedures, making reconstruction significantly difficult [45].

Indications for total TMJ reconstruction include: inflammatory arthritis, recurrent fibrosis or ankylosis, failed tissue graft procedure, failed alloplastic reconstruction and loss of vertical mandibular height and/or occlusal alteration generated by bone resorption, trauma, developmental abnormality or pathological lesion. Partial or total reconstruction with autogenous or alloplastic material has been used to treat joints that present painful symptoms, those that are anatomically mutilated and those that are dysfunctional due to the failure of the surgical procedures performed. The indication is also recommended for patients who have undergone multiple unsuccessful TMJ surgeries, infections, chronic inflammation or pathological resorption of the TMJ, autoimmune diseases and collagen diseases (rheumatoid arthritis, psoriatic arthritis, Sjögren’s syndrome, lupus, ankylosing spondylitis), ankyloses, sequelae of trauma, congenital deformities (hemifacial microsomia) and tumors in the TMJ region [45,47].

## Methodology

### Databases

The bibliographical research consisted of consulting two databases PubMed ([www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)), and Scielo ([www.scielo.org/php/index.php](http://www.scielo.org/php/index.php)).

### Descriptors/Keywords

Terms such as: “temporomandibular joint” were used; “temporomandibular joint eminectomy”; “temporomandibular joint disorder”; “treatment of temporomandibular joint disorders”

### Search Limits

Articles from the last 10 years.

### Inclusion Criteria

- Literature review covering the concept, epidemiology, treatments and classification of recurrent dislocation of the temporomandibular joint.
- Classic scientific articles on the topic in English and Portuguese.
- Clinical case reports on dislocation of the temporomandibular joint in adult patients of both sexes aged between 18 and 65 years.

## Exclusion Criteria

Specific articles for subluxation.

## Discussion

Historically, the treatment of recurrent TMJ dislocation using the surgical technique of eminectomy has been described with excellent results and with success rates reported in the literature above 85% [9]. Despite the statistical numbers in favor of this technique, it is still an invasive procedure, requiring hospitalization and carried out through an extra-oral incision, with risks of damage to the facial nerve and hypertrophic scars. Even though frequently performed with rotating instruments, irregular areas and bone spicules may inadvertently not be removed and cause joint crepitus or recurrence [39].

The placement of mini titanium plates has also shown good results in controlling mandibular translation movement during recurrent TMJ dislocation in the literature. According to Shorey CW, et al. [7] the use of metallic implants, including mini plates, had a 95% success rate.

However, as a disadvantage, some authors such as Puelacher WC, et al. [48] cite the reduction in maximum opening after surgery, which varied between 4.0 and 8.0 mm, but the use of mini-plates is still an easy to perform, reversible technique, extra-articular and with predictable results.

Cardoso AB, et al. [5] compared the techniques of eminectomy and the use of a mini-plate in the articular eminence, in a retrospective cohort study, in which he found that the maximum mouth opening was greater in patients operated using the eminectomy technique, and this was also more effective in relation to variable joint crepitus and joint pain. He considered that both methods proved to be efficient for the treatment of recurrent dislocation of the temporomandibular joint and there was no recurrence.

Vasconcelos BCE, et al. [5] also carried out a comparison between eminectomy and the use of mini-plates and came to the conclusion that eminectomy had a lower chance of recurrence of the dislocation without creating joint damage and with the use of mini-plates, the chance of recurrence has increased because there is always the possibility of fracturing the mini plate, requiring a new operation to remove the device and choose a new treatment. Thus, eminectomy proved to be more efficient in the treatment of chronic mandibular displacements than the use of mini plates in relation to ABM in the postoperative period, recurrence, and joint function.

Segami N, et al. [38] compared the two conventional open surgical methods that involve removing a part of the

articular eminence of the condyle to move freely, which are conventional eminectomy and arthroscopic eminoplasty. The author noted that in general the time required to perform the surgical procedure in eminoplasty arthroscopic eminectomy was less than in conventional eminectomy, as was blood loss and concluded that arthroscopic eminoplasty was a valid alternative technique, with results as predictable as eminectomy.

These results are in line with those found in the research by Sato J, et al. [41] who also compared the clinical courses of patients with habitual dislocation who were operated using conventional open eminectomy or arthroscopic eminoplasty techniques. The 2 procedures produced the same quality of clinical outcome in terms of dislocation recurrence rate and complications.

In conclusion, for the treatment of habitual dislocation, arthroscopic eminectomy appears to be less invasive than conventional eminectomy and its use may allow reduction of the eminence as effectively as the use of open surgery. However, the technique requires skill in the three-dimensional manipulation of intra-capsular structures in a safe way, requiring specific learning to perform this technique and also has a high cost, limiting its use [38].

Speaking of the use of skull bone grafts to increase the height of the articular eminence in the treatment of recurrent TMJ dislocation. Guarda NL, et al. [42] reported that the technique using grafts proved to be an effective technique where no recurrence of the dislocation was observed and in the radiographic evaluation no signs of bone resorption were observed, therefore bone graft reconstruction proved to be a method with acceptable results.

As a treatment method for chronic mandibular displacement Wolford LM, et al. [11] suggested a new form of treatment that consisted of the use of two Mitek anchors, with osseointegration potential. One anchor was positioned at the lateral pole of the mandibular condyle while the other was fixed to the posterior root of the zygomatic arch. These were joined by a strong non-resorbable suture that controlled mandibular translation. According to the author, the technique has the advantages of providing controlled mandibular translocation while preventing dislocation of the mandibular condyle, it effectively eliminates condylar dislocation without altering the articular anatomy of the joint and in addition to being a relatively straightforward technique with predictable results.

The implantation of joint prostheses for joint reconstruction has also demonstrated value in the literature for the treatment of mandibular dislocation. Authors such as Mercuri LG, et al. [49] reported results in placing prostheses in more than 363

joints with only 17 failures.

And Mercuri LG, et al. [49] also reported a study of 56 patients with 100 joint reconstructions using alloplastic prostheses where 63% had a good result and only seventeen of the patients received further operations due to heterotopic bone formation, fibrosis, calcification, inflammation and/or pain. The author also stated that complications occurred more frequently in patients who had previously had an implant. Therefore, the implantation of joint prostheses in the joint proved to be a method validated by many authors and which has evolved with new technologies.

As a conservative treatment method, the injection of autogenous blood demonstrated success rates of 80% in the work of Machon V, et al. [31] the technique proved to be a less invasive procedure, performed on an outpatient basis, quickly, with low cost and minimal possibility of complications. It is used as an initial attempt to treat patients with recurrent mandibular displacement. If there is a new dislocation during follow-up, a second attempt is made before a surgical procedure is indicated [50,51].

## Conclusion

Recurrent dislocation of the temporomandibular joint is a rare condition that predominantly affects females. It occurs when the mandibular condyle goes beyond the limits of the articular fossa and does not return to its correct position. It is frequently characterized by symptoms such as lack of mouth closure, protrusion of the chin, masticatory muscle tension and spasms, sialorrhoea, difficulty speaking and pain in the TMJ region, and this certainly negatively affects the individual with the dislocation, leading them to seek some professional help. There is several treatment modalities well described in the literature and with good results, ranging from conservative methods that are less invasive and result in symptom relief, but there may generally be some recurrence of the dislocation, which may lead to the choice of surgical methods that are more invasive but much more effective. However, due to the complexity and unpredictability of the dislocation, it is necessary to evaluate each clinical situation individually in relation to its symptoms and etiology to choose the ideal treatment, which will depend on the clinician's experience in evaluating the risks and benefits of each therapeutic approach.

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