Surgical treatment of chronic temporomandibular joint dislocation: A case report

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Abstract

Introduction Chronic dislocation of temporomandibular joint is usually treated with conservative approaches, but in some cases, surgery is needed to avoid recurrences. The present paper described a case report of a bilateral intervention for articular tubercle height augmentation by means of calvaria bone grafts.

Materials and Methods A 32-year-old woman attended the Department of Maxillofacial Surgery, University of Padova, Italy, in January 2007 seeking treatment for a bilateral recurrent temporomandibular joint dislocation. She was treated with a surgical procedure providing an antero-posterior osteotomy of the caudal portion of the articular eminence and the insertion of a calvaria bone graft, preserving the periosteum of the borders of the osteotomic beach. The newly remodeled articular eminence has an increased height, thus representing a barrier to condylar dislocation out of the glenoid fossa. No osteosynthesis fixation was provided, and physiotherapic rehabilitation was started in the immediate postoperative phases to help the patient gain a good jaw function as soon as possible.

Results Such a technique showed to be effective, as during an 8-month follow-up span, the patient referred no recurrences of joint dislocation. Jaw motion parameters maintained good over the entire follow-up period, and radiological assessments showed no signs of bone grafts reabsorption.

Conclusions The technique described in the present case report has some potential advantages over other surgical approaches to the treatment of recurrent temporomandibular joint dislocation that need to be assessed with future studies.

Keywords Recurrent dislocation · Temporomandibular joint · Mandible

Introduction

Chronic dislocation of the temporomandibular joint is characterized by the recurrent luxation of the mandibular condyle out of the glenoid fossa, anteriorly to the articular eminence [1]. This condition may cause damage to the joint ligaments, capsule, and disk due to the protective spasmodic contracture that is responsible for its maintenance [2].

Literature data suggest that the lifetime prevalence of chronic temporomandibular joint dislocation is about 3–7% in the general population [3], with a strong female representation within patients groups [4]. Bilateral chronic dislocation is more frequent than unilateral and is characterized by pain in the temporomandibular joint area and inability to close the mouth [5].

Many pathogenetic factors have been described for chronic TMJ dislocation, such as traumatic events, ligament and capsule degeneration, arthritic diseases, neuromuscular system diseases, systemic joint laxity, psychiatric disorders, and it has also been reported in mentally retarded patients [3, 6].

The selection of the correct therapeutic approach to such a condition is a debated issue in the literature [7]. Many conservative treatments have been described over the years to achieve pain relief, such as physiotherapeutic rehabilitation, cognitive–behavioral treatments, intra-articular injections of sclerosing agents [8]. All these approach are useful to control pain and to improve patients’ perception of the disorders, but do not reduce recurrence rates.
Therefore, some surgical techniques have been introduced as potentially definitive treatments by providing either a decrease in the articular eminence to ease reduction or an obstacle to condylar displacement.

The latter techniques adopted bone grafts to increase height of the articular tubercle or used titanium anchors to avoid condylar displacement.

The present paper is a case report of an intervention providing the insertion of a calvaria bone graft within an osteotomic line traced in the articular tubercle, to increase the height of its eminence and avoid condylar displacement.

Case report

A 32-year-old woman attended the Department of Maxillofacial Surgery, University of Padova, Italy, in January 2007 seeking treatment for a bilateral recurrent temporomandibular joint dislocation.

The patient had undergone a previous Köle dermal–epidermal flap surgery in the year 2001. At the time of the first visit, she underwent a clinical Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) assessment [9] and an ortopantomographic radiograph, which evidenced a bilateral flattening of the articular tubercle.

An intervention of bilateral augmentation of the eminence height was scheduled, and 3D computerized tomography (3D-TC) was requested to plan surgery.

An antero-posterior osteotomy of the caudal portion of the articular eminence, as described by Fernandez-Sanroman [10], was performed bilaterally.

The surgical procedure provided a “hockey-stick” preauricular incision and the preparation of a skin flap [11]. The preauricular incision was extended superiorly to the temporal region, taking care of avoiding damage to the superficial temporalis blood vessels (Fig. 1).

Such a technique allowed exposing and cutting the superficial temporalis fascia, thus gaining an insight to the deep temporalis fascia, under the temporalis muscle. The muscle was cut vertically and unstuck, thus exposing the calvaria to perform a bone graft to be used for eminence augmentation. A round burr was used to harvest the bone graft, which was extended to the medullary bone. A rectangular shape was obtained for the donor site, and a bone graft of about 1.5 × 1 cm was then performed with the use of osteotomes (Fig. 2).

The joint capsule and the periosteum of the zygomatic arch with the articular tubercle were then exposed by means of a smooth dissection. A lancet was used to cut and unstuck tissues overlying the most cranial portion of the articular tubercle, and a Lindemann burr was used to trace an osteotomic line within the tubercle. The osteotomy was completed by means of a chisel, paying attention to maintain the periosteum layer over the bone fragment including the zygomatic tubercle.

Chisels and millers were also used to remodelate the osteotomic breach, and two calvaria bone fragments were then adapted and inserted (Fig. 3).

Once the margins of the bone grafts were smoothed, periosteum and overlying tissues were sutured.

During the postoperatory phase and over an 8-month follow-up period, the patient had no complications, and recurrence of temporomandibular joint dislocation has not been observed.

At the first postoperatory appointment, performed 15 days after surgery, the patient referred no pain at either side of the jaw, but a moderate restriction in jaw motion skills was recorded (maximum unassisted mouth opening: 36 mm; maximum assisted mouth opening: 38 mm; protrusion: 3 mm; right laterotrusion: 3 mm; left laterotrusion: 6 mm); thus the patient was suggested to start performing vigorous physiotherapy.
The patient underwent follow-up assessments twice a month for the first 3 months and then once a month. At the 3-month follow-up appointment, jaw motion values were in line with baseline values: maximum unassisted mouth opening, 43 mm; maximum assisted mouth opening, 45 mm; protrusion, 5 mm; right laterotrusion, 5 mm; left laterotrusion, 7 mm. Those values were then maintained over the 8-month follow-up period, and a control 3D-TC showed the integration of both grafts (Figs. 4 and 5).

**Discussion**

Numerous therapeutic approaches to recurrent temporomandibular joint dislocation have been described in the literature, ranging from conservative solutions such as intracapsular injections of sclerosing agents, intramuscular injections of botulinum toxin, and physiotherapy [8] to more invasive surgical treatments [12].

Surgical interventions can be divided into two groups according to their main target: some procedures aim at facilitating reduction of the dislocated condyle by decreasing the height of the articular tubercle, but most part of surgical treatments has the objective of putting a barrier to condyle dislocation.

Among these interventions, both techniques limiting condylar translation by an anchorage to the glenoid fossa and the posterior attachment and avoiding condylar dislocation by an increase of the articular eminence height have been described.

An obstacle to condylar dislocation may be created with titanium plates [13, 14], silastic implants [15], partial fossa prostheses [16], titanium anchors [3], and screws [17].

Another technique providing the osteotomy and down-fracture of the zygomatic arch, which can be put below the articular eminence, has been successfully adopted in some studies [18, 19]. Nonetheless, a number of potential complications have been associated with such technique, among which are the recurrence of dislocation through a gap within the medial part of the articular eminence, the fracture of the distal part of the zygomatic arch, the negative remodelling of both the zygomatic arch, and the articular eminence [20, 21].

In the attempt to achieve an increase of the articular eminence height, bone grafts from different donor sites, such as zygomatic arch [22], mastoid process [23], hip bone [23], and skull bone [10], have also been performed by many authors. These grafts were anchored on the tubercle with screws or plates.

In the case under description, calvaria bone grafts have been put and fitted within an osteotomic line traced in the articular tubercle. Such a technique has been previously described by Fernandez-Sanroman [10], who described an antero-posterior osteotomy of the caudal portion of the articular eminence in a series of eight patients with monolateral recurrent temporomandibular joint dislocation; to our knowledge, the present study is the first report on a bilateral intervention.
Obviously, there is a need for investigations with longer follow-up of patients before such technique can be claimed effective in bilateral cases as well. Also, standardization of measurements for bone integration and/or reabsorption has to be achieved in the next future.

Nonetheless, the technique here presented has some potential advantages over the other surgical procedures, the first of which being represented by its extra-articular approach. Such an extra-articular procedure allows keeping the articular structures intact, so being mostly indicated when a pre-intervention physiological disk–condyle relationship exists and has to be preserved.

Moreover, this skull bone graft has a number of other advantages over grafts from other donor sites: the single surgical access and the easiness of bone drawing due to the strict anatomical relationship between the donor and receiving sites; the availability of a high-quality and good-quality bone tissue in the donor site, thus decreasing the risk for reabsorption; the low postoperative discomfort, with a single scar in the region of the surgical access; the good postoperative recovery thanks to the possibility of a quite immediately starting a functional rehabilitation due to the absence of a rigid intermaxillary fixation.

The bone graft has to be inserted within the osteotomic breach after conserving the peristeum of the receiving site, thus allowing achieving a good and rapid integration and avoiding graft dislocation during forced jaw movements. Such technique does not provide the need for osteosynthetic substances or alloplastic materials, thus reducing risks for complications and having low costs with respect to other surgical procedures.

Conclusions

The present paper described a case report of a bilateral intervention for the augmentation of articular eminence height to treat recurrent temporomandibular joint dislocation. Skull bone grafts have been inserted within the articular tubercle, and results at 8 months appear to be encouraging. Future studies need to be performed to support the efficacy of such technique and the low risk for complications associated with its adoption.

References


