

4 **Surgical treatment of chronic temporomandibular**
5 **joint dislocation: A case report**6 **Luca Guarda-Nardini · Bernadette Palumbo ·**
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12 **Abstract**13 *Introduction* Chronic dislocation of temporomandibular
14 joint is usually treated with conservative approaches, but
15 in some cases, surgery is needed to avoid recurrences. The
16 present paper described a case report of a bilateral
17 intervention for articular tubercle height augmentation by
18 means of calvaria bone grafts.19 *Materials and Methods* A 32-year-old woman attended the
20 Department of Maxillofacial Surgery, University of Padova,
21 Italy, in January 2007 seeking treatment for a bilateral
22 recurrent temporomandibular joint dislocation. She was
23 treated with a surgical procedure providing an antero-
24 posterior osteotomy of the caudal portion of the articular
25 eminence and the insertion of a calvaria bone graft,
26 preserving the periosteum of the borders of the osteotomic
27 beach. The newly remodeled articular eminence has an
28 increased height, thus representing a barrier to condylar
29 dislocation out of the glenoid fossa. No osteosynthesis
30 fixation was provided, and physiotherapeutic rehabilitation
31 was started in the immediate postoperative phases to help
32 the patient gain a good jaw function as soon as possible.33 *Results* Such a technique showed to be effective, as during
34 an 8-month follow-up span, the patient referred no recurren-
35 cies of joint dislocation. Jaw motion parameters maintained
36 good over the entire follow-up period, and radiological
37 assessments showed no signs of bone grafts reabsorption.38 *Conclusions* The technique described in the present case
39 report has some potential advantages over other surgicalapproaches to the treatment of recurrent temporomandibular 40
joint dislocation that need to be assessed with future studies. 41**Keywords** Recurrent dislocation · 42
Temporomandibular joint · Mandible 43**Introduction** 44Chronic dislocation of the temporomandibular joint is 45
characterized by the recurrent luxation of the mandibular 46
condyle out of the glenoid fossa, anteriorly to the articular 47
eminence [1]. This condition may cause damage to the joint 48
ligaments, capsule, and disk due to the protective spasmodic 49
contracture that is responsible for its maintenance [2]. 50Literature data suggest that the lifetime prevalence of 51
chronic temporomandibular joint dislocation is about 3–7% 52
in the general population [3], with a strong female repre- 53
sentation within patients groups [4]. 54Bilateral chronic dislocation is more frequent than 55
unilateral and is characterized by pain in the temporoman- 56
dibular joint area and inability to close the mouth [5]. 57Many pathogenetic factors have been described for chronic 58
TMJ dislocation, such as traumatic events, ligament and 59
capsule degeneration, arthritic diseases, neuromuscular sys- 60
tem diseases, systemic joint laxity, psychiatric disorders, and it 61
has also been reported in mentally retarded patients [3, 6]. 62The selection of the correct therapeutic approach to such 63
a condition is a debated issue in the literature [7]. Many 64
conservative treatments have been described over the years 65
to achieve pain relief, such as physiotherapeutic rehabilitation, 66
cognitive-behavioral treatments, intra-articular injections of 67
sclerosing agents [8]. All these approach are useful to 68
control pain and to improve patients' perception of the 69
disorders, but do not reduce recurrency rates. 70L. Guarda-Nardini · B. Palumbo · D. Manfredini (✉) ·
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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 postoperative phase and over an 8-month follow-up period, the patient had no complications, and recurrency of temporomandibular joint dislocation has not been observed.

At the first postoperative 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.

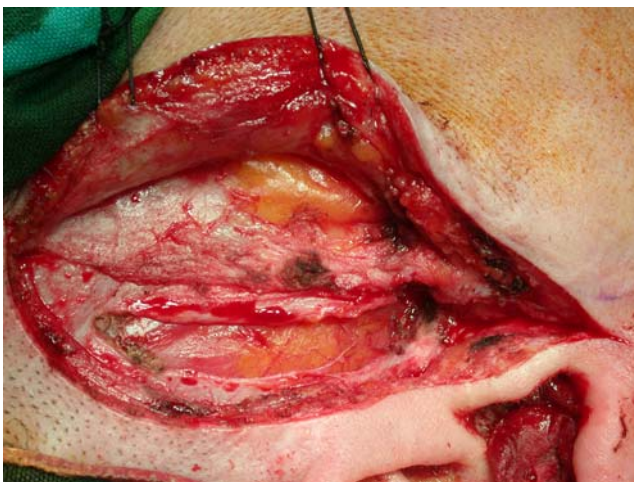


Fig. 1 Preauricular incision

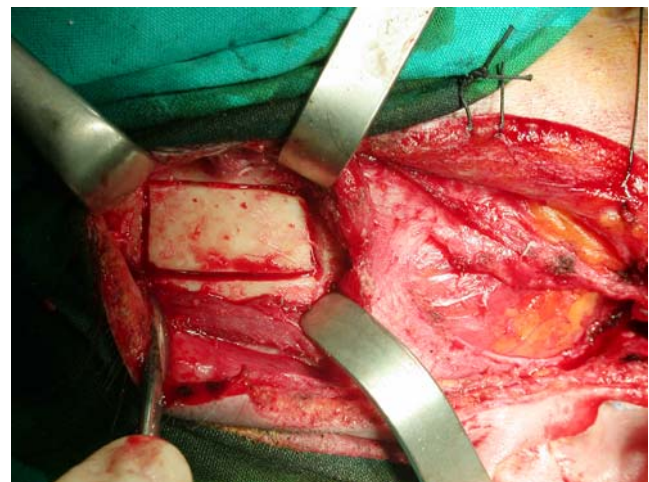


Fig. 2 Bone graft shaped from the calvaria donor site

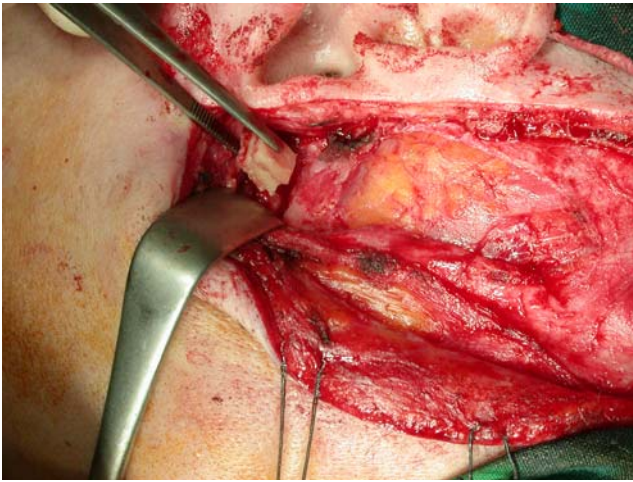


Fig. 3 Two calvaria fragments inserted into the osteotomic line created within the tubercle

140 The patient underwent follow-up assessments twice a
 141 month for the first 3 months and then once a month. At the
 142 3-month follow-up appointment, jaw motion values were in
 143 line with baseline values: maximum unassisted mouth
 144 opening, 43 mm; maximum assisted mouth opening,
 145 45 mm; protrusion, 5 mm; right laterotrusion, 5 mm; left
 146 laterotrusion, 7 mm. Those values were then maintained
 147 over the 8-month follow-up period, and a control 3D-TC
 148 showed the integration of both grafts (Figs. 4 and 5).

149 Discussion

150 Numerous therapeutic approaches to recurrent tempo-
 151 mandibular joint dislocation have been described in the
 152 literature, ranging from conservative solutions such as
 153 intracapsular injections of sclerosing agents, intramuscular
 154 injections of botulinum toxin, and physiotherapy [8] to
 155 more invasive surgical treatments [12].

156 Surgical interventions can be divided into two groups
 157 according to their main target: some procedures aim at

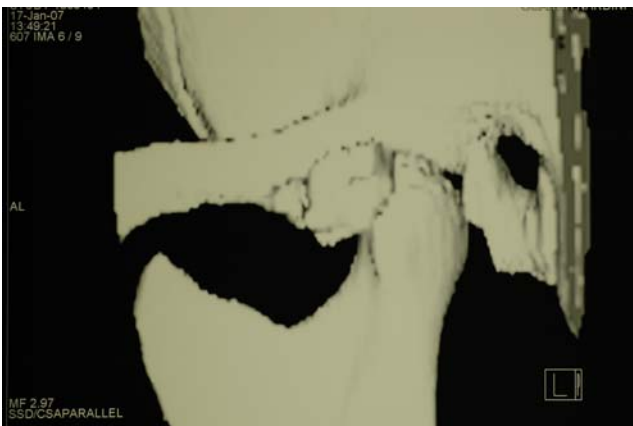


Fig. 4 3D-computerized tomography 8 months after surgery (left side)

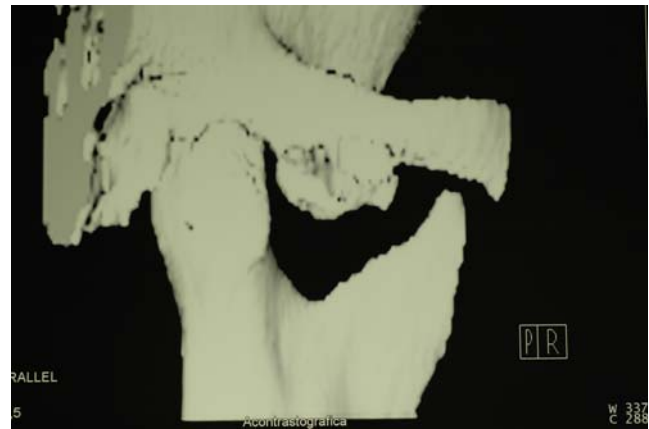


Fig. 5 3D-Computerized tomography 8 months after surgery (right side)

158 facilitating reduction of the dislocated condyle by decreas-
 159 ing the height of the articular tubercle, but most part of
 160 surgical treatments has the objective of putting a barrier to
 161 condyle dislocation.

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

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

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

180 In the attempt to achieve an increase of the articular
 181 eminence height, bone grafts from different donor sites,
 182 such as zygomatic arch [22], mastoid process [23], hip bone
 183 [23], and skull bone [10], have also been performed by
 184 many authors. These grafts were anchored on the tubercle
 185 with screws or plates.

186 In the case under description, calvaria bone grafts have
 187 been put and fitted within an osteotomic line traced in the
 188 articular tubercle. Such a technique has been previously
 189 described by Fernandez-Sanroman [10], who described an
 190 antero-posterior osteotomy of the caudal portion of the
 191 articular eminence in a series of eight patients with
 192 monolateral recurrent temporomandibular joint dislocation;
 193 to our knowledge, the present study is the first report on a
 194 bilateral intervention.

195 Obviously, there is a need for investigations with longer
196 follow-up of patients before such technique can be claimed
197 effective in bilateral cases as well. Also, standardization of
198 measurements for bone integration and/or reabsorption has
199 to be achieved in the next future.

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

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

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

226 Conclusions

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

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