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Technical Note
TMJ Disorders

Dautrey's procedure: an alternative for the treatment of recurrent mandibular dislocation in patients with pneumatization of the articular eminence

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Abstract. Temporomandibular joint (TMJ) dislocation is an involuntary forward movement of the mandible beyond the articular eminence with the condyle remaining stuck in the anterior-most position, leaving the patient unable to close their mouth. Conservative treatment for this condition includes the injection of sclerosing agents or the intramuscular administration of botulinum toxin type A, while surgical therapy requires either removal or augmentation of the articular eminence. Once the surgical treatment plan has been determined, pneumatization of the articular eminence may turn a relatively simple procedure into a great surgical challenge. We present herein the cases of two patients suffering from recurrent mandibular dislocation who happened to have pneumatization of the articular eminences. Both patients were treated with a down-fracture of the zygomatic arch, known as Dautrey's procedure, modified by the application of a miniplate connecting the displaced arch and the lateral portion of the articular eminence. Neither patient had suffered a new episode of dislocation at their most recent postsurgical visit.

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Introduction

Temporomandibular joint (TMJ) dislocation is an involuntary forward movement of the mandible beyond the articular eminence, with the condyle remaining stuck

in the anterior-most position. It occurs most frequently in young adults and is characterized by the inability to close the mouth, preauricular skin depression, excessive salivation, and a tense, spasmodic masticatory musculature.¹ Mandibular dislocation is

not self-reducible, and is referred to as habitual or recurrent dislocation as the frequency and severity of the episodes increase.¹

Non-surgical therapeutic strategies to address the condition include

intermaxillary fixation (IMF) or head bandages, intracapsular injection of sclerosing solutions or autologous blood, and intramuscular injection of botulinum toxin type A.²⁻⁴ Although promising and minimally invasive, these procedures are normally reserved for patients with significant comorbidities that render them unfit for surgery under general anaesthesia. Surgical procedures for the treatment of recurrent dislocation can be divided into two groups: (1) those that involve removal of the articular eminence, thereby allowing free mandibular movements, and (2) those that involve augmentation of the articular eminence, hence limiting the translation of the condyle.³ In the first group, the most common procedure is the removal of the articular eminence, allowing for free movement of the condyle.⁵ In the second group, the procedure proposed by Gosserez and Dautrey in 1967,⁶ which is usually referred to as 'Dautrey's procedure', involves a downward and forward oblique osteotomy of the zygomatic arch just in front of the articular eminence; the distal portion of the arch is then carefully mobilized and displaced caudally, which creates a mechanical obstruction in the condylar path. The application of conventional and modified miniplates to the eminence without down-fracturing of the arch has also been proposed.^{7,8}

Pneumatization is the development of air-filled cavities within a bone. Tremble⁹ found air cells in 10 different locations within the temporal bone, including the zygomatic process. Yavuz et al.¹⁰ analyzed the radiographs of 8107 individuals and found 83 (1.0%) cases of pneumatization of the articular eminence of the temporal bone (PAT). Miloglu et al.¹¹ conducted a retrospective study using sagittal and coronal cone beam computed tomography (CBCT) images of 514 patients. PAT was identified in a total of 41 (8.0%) patients, of whom 25 were female (61.0%) and 16 were male (39.0%). The same group reported that PAT facilitates the spread of various pathological processes into the joint, such as tumours, inflammation, and fractures, since the bone volume is reduced and bone resorption/fracture facilitated.¹¹ Although rare, pneumatization of the temporal bone may alert the surgeon to potential complications when surgical manipulation of the TMJ is contemplated,¹² since perforation can occur during simple manoeuvres such as firm dissection or forceful flap retraction.¹¹

We have recently seen two patients who needed treatment for recurrent mandibular dislocation and who were found to have

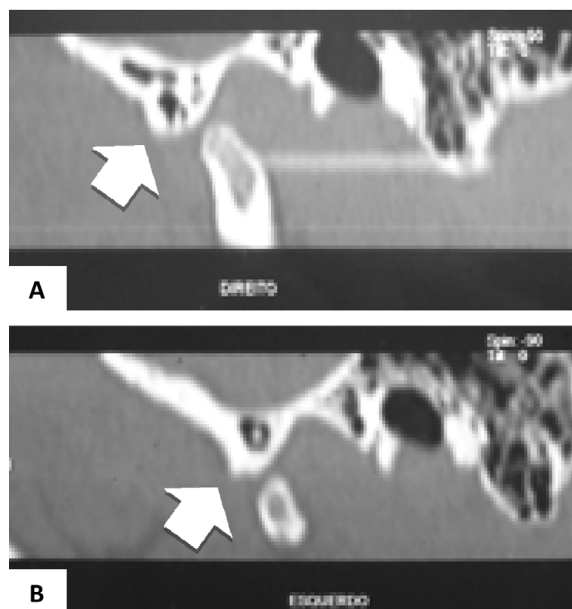


Fig. 1. Case 1, computed tomography showing the pneumatization of the articular eminence (arrows); (A) right side and (B) left side.

PAT. A brief description of the two cases and a discussion of the therapeutic choice made are presented below.

Case reports

Case 1

A 26-year-old female patient was first seen in the emergency room with bilateral TMJ dislocation. Reduction was easily achieved, and the patient was scheduled for re-evaluation on an outpatient basis. She had experienced the first luxation episode 3 years before, while yawning. During the following 2 years she had suffered 2 to 4 episodes per year, but complained of painful and increasingly frequent episodes in the last few months before consultation.

Upon physical examination of the TMJs, mandibular hypermobility was identified during mouth opening, while protrusion and lateral excursions were within the normal ranges. Other clinical findings included clicking of the left TMJ and subtle facial asymmetry. CT images showed radiolucent or hypodense areas at the articular eminences, bilaterally (Fig. 1). The patient chose surgical treatment over other conservative procedures, and there was no contraindication to surgery under general anaesthesia.

Since PAT may pose a problem both intraoperatively and postoperatively,¹³ Dautrey's procedure was chosen to address this patient's condition. Under general anaesthesia, the TMJ was

approached via a pre-auricular incision, as proposed by Ellis and Zide,¹⁴ for total exposure of the zygomatic arch. A downward and forward osteotomy was created in the zygomatic arch (Fig. 2A and B). With the aid of a Ballenger knife, the proximal segment was forced downward and medially (Fig. 2C and D), and fixed in its new position with an 'L'-shaped 1.5-mm microplate and four 4.0-mm monocortical screws (Fig. 2E and F).

Following layered suturing, a pressure dressing was applied. Postoperative care instructions were given, and the patient was discharged the day after the procedure with prescriptions for analgesics, non-steroidal anti-inflammatory drugs, and antibiotics.

One year after the procedure, the patient was pain-free and had not experienced any further episodes of TMJ dislocation. Maximum mouth opening was 48 mm, with lateral and protrusive mandibular movements within the normal ranges. The clicking sound on the left side did not resolve. There were no signs of early or late facial nerve dysfunction.

Case 2

A 23-year-old female attended the emergency room with signs of bilateral dislocation of the TMJ. Manual reduction was successfully achieved and the patient was scheduled for re-evaluation on an outpatient basis. She had first luxated the TMJ 3 years before, and the episodes were always associated with severe pain and

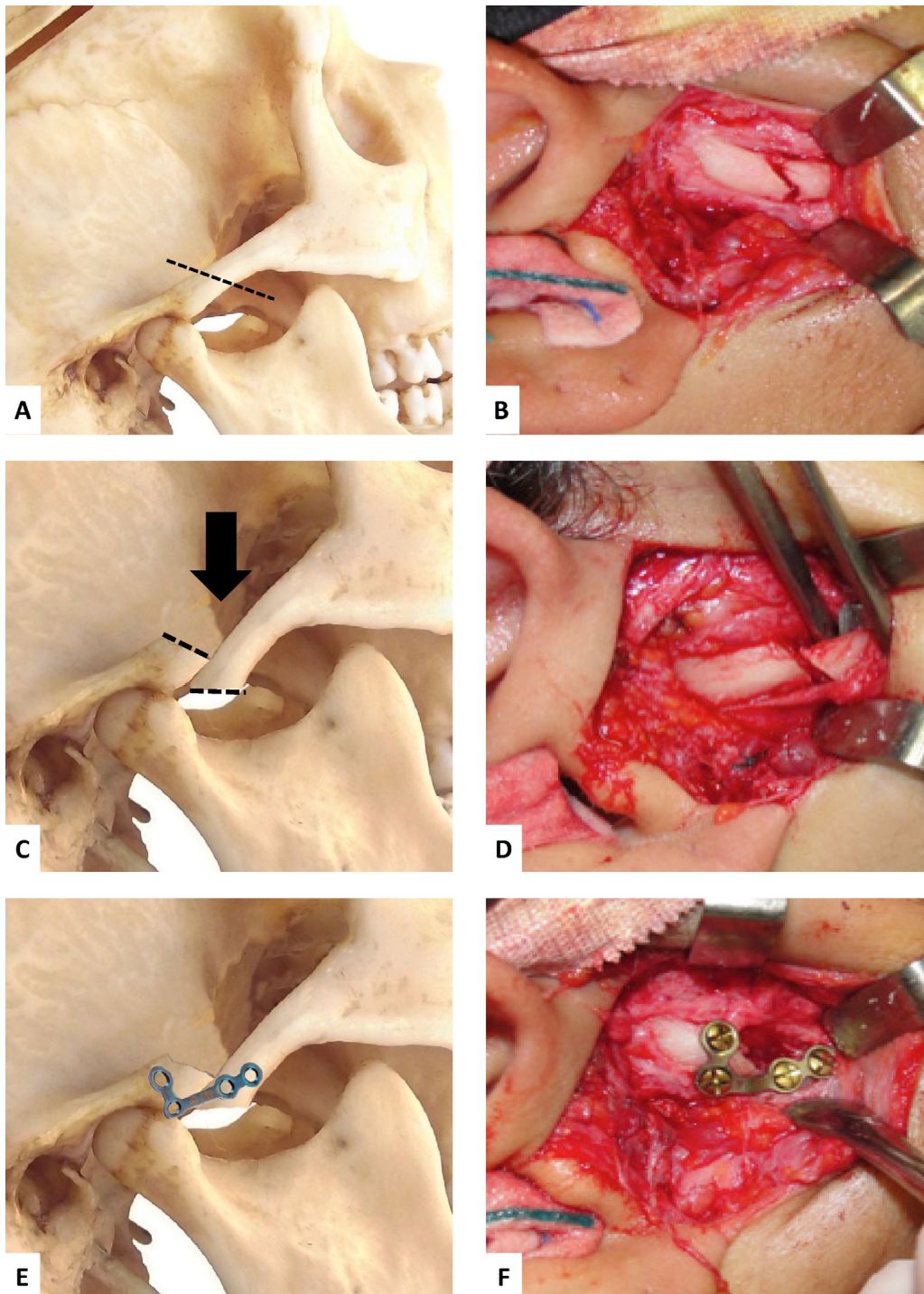


Fig. 2. Case 1, oblique osteotomy (A and B), caudal displacement of the distal segment of the zygomatic arch (C and D), and fixation with microplates (E and F).

limitations in mandibular function. The patient kept avoiding wide mandibular movements and reported being constantly afraid of a new dislocation episode. The year before this consultation, the frequency of TMJ luxation had averaged two episodes per month.

During functional examinations, the patient reported bilateral discomfort with

subluxation and pain during forced mouth opening. The CT showed radiolucent or hypodense areas at the articular eminences, bilaterally (Fig. 3). The patient chose surgical treatment over other conservative procedures, and there was no contraindication to surgery under general anaesthesia. Again, Dautrey's procedure was proposed to address the recurrent

luxation and was performed as described above.

Two years postoperatively, the patient presented with optimal healing of the skin incisions and absence of pain, and no further episodes of dislocation had occurred postsurgery. Facial nerve function was preserved bilaterally. Microplates were in place and there was no

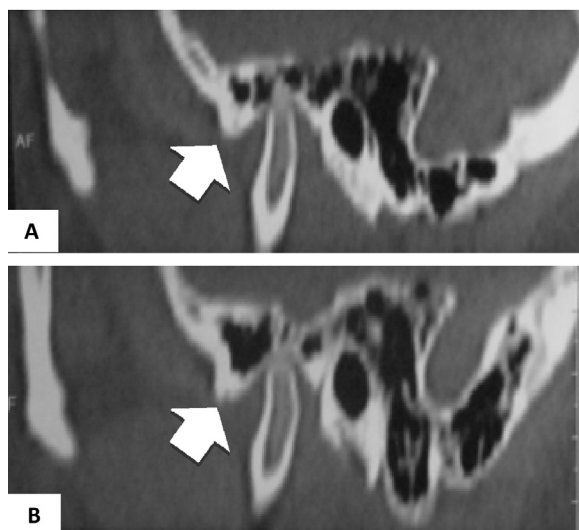


Fig. 3. Case 2, computed tomography showing the pneumatization of the articular eminence (arrows); (A) right side and (B) left side.

radiographic sign of loosening (Fig. 4A). Maximum mouth opening was 45 mm (Fig. 4B), with lateral and protrusive mandibular movements within the normal ranges.

Discussion

The mechanism of TMJ dislocation depends on the type of dislocation. Dislocations can be regarded as acute, chronic protracted, or chronic recurrent.¹⁵ Anterior dislocations are the most common and usually occur secondary to an interruption in the normal sequence of muscle action when the mouth closes from extremely wide opening.¹⁶ In such a situation, the masseter and temporalis muscles elevate the mandible before the lateral pterygoid muscle relaxes, resulting in the mandibular condyle being pulled out of the glenoid fossa and anterior to the bony eminence. The spasmodic masseter, temporalis, and pterygoid muscles cause trismus and

prevent the condyle from returning into the glenoid fossa.¹⁶

PAT is a hindrance to surgical procedures such as eminectomy. The risk of exposing an air-filled cavity near the brain is a major concern, as an infection or violation of the middle cranial fossa could have catastrophic consequences. Also, if a bone cavity is created during the eminectomy of a pneumatized eminence, condylar movement could be greatly stalled, leaving the patient with yet another TMJ problem.¹³

If a patient suffering from recurrent mandibular dislocation presents for treatment, a thorough imaging investigation should be conducted in order to reveal the existence of PAT. CT far exceeds the diagnostic accuracy of plain radiographs in the evaluation of temporal air spaces, with CBCT being the best modality presently available.¹⁰ When pneumatization exists, non-surgical, conservative approaches are available that may

improve the patient's quality of life. Dautrey's procedure, which was used to treat the patients presented here, is a surgical alternative approach for the management of mandibular dislocation. Since it does not invade the joint capsule,¹⁷ the procedure carries less morbidity than other surgical strategies such as eminectomy and disc or capsule plication. Also, the technique appears reliable when it comes to facial nerve preservation, which is a concern for surgeons despite the low incidence of serious facial nerve damage following surgical TMJ procedures.¹⁸ Disadvantages are nonetheless present, such as the possibility of an unfavourable fracture with instability of the distal segment of the zygomatic arch, resorption of the down-fractured segment, postoperative TMJ symptoms (pain and clicking/crepitus), and recurrence.¹⁷

Reliable data on postsurgical relapse are missing for the technique presented here; fortunately, our patients have shown no recurrence so far. By employing miniplates, we believe we have stabilized the down-fractured segment spatially so that if an unfavourable fracture were to occur and go unnoticed, the risk of recurrence due to fragment 'backlash' or resorption could be somewhat diminished.

In summary, we have presented two cases of recurrent TMJ dislocation concurrent with PAT that was treated with Dautrey's procedure, with stable results and without significant complications.

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None.

Competing interests

None declared.

Ethical approval

Not required.

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Fig. 4. Case 2, microplates in position (A) and maximum mouth opening (B) at 2 years after surgery.

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