



Clinical case

Bilateral traumatic anterior dislocation of temporomandibular joint causes zygomatic arch fracture. Case report and literature review

La luxación anterior traumática bilateral de la articulación temporomandibular causa fractura del arco cigomático. Reporte de caso y revisión de la literatura

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ABSTRACT

Traumatic bilateral anterior dislocation of the temporomandibular joint is a rare event and few cases are described in literature. Even less frequent is the association between dislocations of the mandibular condyle and zygomatic arch fracture. The case presented describes a traumatic bilateral anterior dislocation of the mandibular condyles after a car accident with the right zygomatic arch without presence of associated mandibular fractures; a discussion of the treatment, literature review and the possible causes of this unusual case followed.

Keywords: temporomandibular joint, dislocation, zygomatic arch, fracture.

RESUMEN

La luxación anterior bilateral traumática de la articulación temporomandibular es un acontecimiento poco frecuente y en la literatura se describen pocos casos. Aún menos frecuente es la asociación entre luxaciones del cóndilo mandibular y fractura del arco cigomático. El caso presentado describe una luxación anterior bilateral traumática de los cóndilos mandibulares tras un accidente de tráfico con el cóndilo mandibular derecho que causó una fractura del arco cigomático derecho sin presencia de fracturas mandibulares asociadas; a continuación se discute el tratamiento, se revisa la literatura y las posibles causas de este caso inusual.

Palabras clave: articulación temporomandibular, luxación, arco cigomático, fractura.

INTRODUCTION

Dislocation of the temporomandibular joint (TMJ) is a rare event, representing 3% of all dislocated joints

in the human body and occurs when the mandibular condyle moves beyond its articular surfaces and fixing points, which may be anterior, posterior, superior and lateral.¹ When the trauma is severe

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and great displacement occurs, the condyle may be displaced outside the capsule and may result in the disruption thereof.² The traumatic bilateral anterior dislocation is an unusual event with only four cases being reported,^{1,3-5} and even rarer is the association between dislocation of the mandibular condyle and zygomatic arch fracture with only two cases being reported.^{2,6} This is the first case reported where a zygomatic arch fracture is caused by traumatic bilateral anterior dislocation of TMJ with no evidence of other associated fractures.



Figure 2: Patient after six months shows good oral opening.

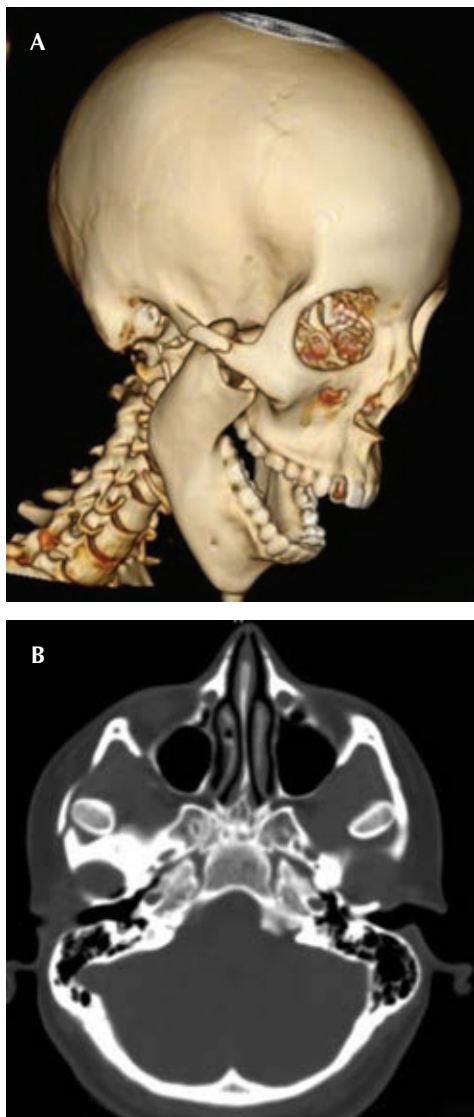


Figure 1: **A)** A 3D image obtained from CT scan shows mandibular right condyle luxation and fracture of zygomatic arch. **B)** CT scan image shows mandibular condyles in temporal fossa.

CLINICAL CASE

A 19 year old patient, involved in a frontal car crash accident, was taken by paramedics to the emergency room. The patient was sitting in the passenger's seat without seatbelt. The passenger's airbag did not pop out. Upon arrival, the patient was under the influence of alcohol. There was no loss of consciousness. Direct interrogation and of relatives did not report any significant past medical history. The patient reported symptoms of pain on both TMJ, pain on mandibular movement and normal occlusion difficulty. During physical examination, anterior open bite was observed, mandibular mobility was present but limited with no dental occlusion. There was a slight increase in volume at the right zygomatic, tender to palpation. Multiple skin abrasions in the mental region were observed; reporting also neck pain. The rest of the clinical examination was not important. CT scan images were obtained observing bilateral anterior dislocation of TMJ. Both mandibular condyles were under the zygomatic arches and the right zygomatic arch was fractured and displaced laterally (*Figure 1*). Dexamethasone 08 mg, cobamabida/tricolchisido 20 mg/4 mg and ketorolac 30 mg were administered intravenously to reduce pain and swelling. The findings were explained to the patient and relatives, making the decision to follow a conservative management therefore a reduction was performed in the emergency room. With the patient seated, a routine reduction was performed. The operator placed the thumbs on the lower molars, exercising traction downwards and backwards, instructing the patient to occlude. The maneuver was successful and the patient properly occluded. A bandage was placed around the skull and jaw to keep the mouth closed and it was maintained for 48

hours. A Hirtz projection was requested for zygomatic arches where appropriate reduction of the fracture of the right zygomatic arch was evident; the decision was made to handle fracture conservatively. Anti-inflammatory and analgesic drugs were prescribed as well as a liquefied diet, for 48 hours, progressing to a soft diet on the third day for seven days after the accident. A week later the patient was reevaluated referring, at the time of interrogation, moderate pain in both TMJ on mouth opening and lateral mandibular movements. The mouth opening was 12 mm. It was then urged to make exercises of mandibular opening and closing and to progress to an unrestricted diet as far as the patient tolerated it. The patient was reevaluated each month, showing gradual clinical improvement of symptoms and mouth opening. Six months after the accident, the mouth opening was 32 mm (*Figure 2*), the patient was asymptomatic, with no limitations in jaw movements and no detection of temporomandibular joint noises.

CONCLUSIONS

This report presents an unusual fracture of the right zygomatic arch caused by bilateral anterior dislocation of TMJ. Allen and Young⁷ classified the lateral dislocation of mandibular condyle as type I (sub-lateral dislocation) when the condyle is laterally dislocated out of the fossa, and type II (complete dislocation), when the mandibular condyle is forced laterally in first instance and then superiorly. Satoh et al⁸ subclassified type II as type IIA, when the condyle is not locked over the zygomatic arch; type IIB, when the condyle is stuck above the zygomatic arch; and type IIC when the condyle is locked below the zygomatic arch which is fractured. According to this classification, this case is type IIC. Based on the observations of the CT scan images and the data obtained from the patient, the author (Altamiranda-Avendaño) presumed this fracture was caused by the sudden anterior displacement of both condyles and by forced entry of the right mandibular condyle under the right zygomatic arch, exerting pressure on the side between the inner wall of the zygomatic arch and the temporal bone. Some authors have reported that the morphology of the mandibular condylar neck operates as a security mechanism to prevent the top and back mandibular condyle dislocation.⁴ In this case, the right condyle penetrated under the zygomatic arch, moving it laterally thus causing its fracture, but it was not a fracture of the mandibular condyle or

condylar neck. The author (Altamiranda-Avendaño) proposes the involvement of several factors. The patient had no seatbelt fastened and the passenger airbag did not pop out at impact (frontal car crash as the patient referred) so the patient suddenly moved forward, hitting the mental region against the dashboard, pushing the chin's patient downwards and backwards, causing a sudden and forced mouth opening, while the mandibular condyles were pushed into the temporal fossa, probably coupled with sudden muscle spasm of the temporalis, masseter and medial pterygoid muscles, forcing the entry of both condyles under the zygomatic arches, thus causing the fracture of the right zygomatic arch. The strength and direction of the blow was enough to produce both bilateral joint dislocation and fracture of the right zygomatic arch but insufficient to cause a mandibular fracture. Prabhakar and Singla¹ report a case with bilateral dislocation and the entry of both condyles into the temporal fossa; both condyles remained under the zygomatic arch without fracturing it. The patient presented at the Hospital 45 days later, after a decline of public transport, referring having received a blow to the chin. There was no associated mandibular fracture. The reduction required surgical approaches on temporomandibular joints, eminectomy, condylectomy and coronoidectomy to achieve reduction due patient's time evolution. There is another report where the mandibular condyle penetrated under the zygomatic arch fracturing it; case reported by Worthington² in 1982 where the patient had penetration of intact mandibular condyle under the left zygomatic arch combined with condylar neck fracture on the right side and mandibular symphysis fracture. Cheng et al³ reported in 2009 a bilateral traumatic anterior dislocation where the mandibular was impacted against the maxilla with no associated fractures. Another report by Hynes et al⁴ described a bilateral mandibular dislocation with impaction, also against the maxilla, associated with multiple dentoalveolar fractures where midline mandibulotomy was required for disimpaction.

Other types of dislocations have also been observed associated with fracture of the zygomatic arch. Such is the case described by Li Z et al⁶ who reported a zygomatic arch fracture associated with lateral dislocation of mandibular condyle which is also very rare and is associated with mandibular fractures. Manual and closed reduction is the treatment of choice for condylar dislocation because

it is the simplest, least traumatic and safest,⁹ and was the treatment used in this case, despite having an associated fracture of the right zygomatic arch, which was expected to reduce when carrying the mandibular condyles to the appropriate position. The decision to make the reduction manually in the emergency room, only under the effect of anti-inflammatory and analgesic drugs, was made based on mandibular mobility and CT scan data, which made believe that the mandible had not impacted against other bony structures, and also the short time elapsed between the accident and the medical care received, approximately two hours. Although some authors have recommended intermaxillary fixation for 2 weeks after reducing temporomandibular dislocation,⁹ disruption of the capsule present in the condylar joint dislocation can cause hemarthrosis, which can lead to temporomandibular joint ankylosis.¹⁰ Therefore the patient was encouraged to perform mandibular opening exercises and to advance progressively, from the first week after the trauma and the following months, to an unrestricted diet.

To summarize, bilateral traumatic anterior dislocation of the temporomandibular joint associated with fracture of the zygomatic arch is a rare event. This is a very particular case where a series of events met causing an unusual fracture. The reduction

was made conservatively and was combined with early physical therapy in order to prevent normal mandibular mobility limitations.

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