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Dislocacion de condilo mandibular a fosa media craneal con reduccion abierta y reconstruccion mediante protesis de fosa glenoidea. Reporte de caso inusual y revision de literatura / Mandibular condyle dislocation into the middle cranial fossa with open reduction and reconstruction with glenoid fossa prosthesis. Unusual case report and literature review.

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**MANDIBULAR CONDYLE DISLOCATION INTO THE MIDDLE CRANIAL FOSSA WITH  
OPEN REDUCTION AND RECONSTRUCTION WITH GLENOID FOSSA PROSTHESIS.  
UNUSUAL CASE REPORT AND LITERATURE REVIEW**

**DISLOCACIÓN DE CÓNDILO MANDIBULAR A FOSA MEDIA CRANEAL CON REDUCCIÓN  
ABIERTA Y RECONSTRUCCIÓN MEDIANTE PRÓTESIS DE FOSA GLENOIDEA. REPORTE  
DE CASO INUSUAL Y REVISIÓN DE LITERATURA**

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**ABSTRACT**

The dislocation of the mandibular condyle into the middle cranial fossa (DMCCF) is a very infrequent lesion resulting from facial trauma. There is not consensus in which is the best way to treat this fractures, but the reduction of these impaction in the cranial middle fossa could be open or closed depending on the type of fracture and the experience of the surgeons. A case report of a 17 years old female with right condyle dislocation into the middle cranial fossa is presented, treated with open reduction and reconstruction with glenoid fossa prosthesis.

**Key words:** Mandibular, condyle, dislocation, intracranial, prosthesis.

## **INTRODUCTION**

Dingman and Grabb were the first to describe the dislocation of the mandibular condyle into the middle cranial fossa (DMCCF) in 1963 as a very unusual<sup>1</sup>. The latest systematic review and meta-analysis about this kind of fractures, made by Diez-Suarez et al and published in 2021, described 72 cases reported in the English literature of DMCCF<sup>1,2</sup>. Most of the events took place in the young and female population, and this was more frequently associated with motor vehicle accidents (> 50 %) or bicycle injuries<sup>3</sup>.

Clinically, DMCCF includes anterior open bite with posterior early contact, limited mouth opening normally with less than 20 mm and restriction of mandibular movements<sup>4</sup>. Computerized tomography scans possess an increased sensitivity and specificity. Magnetic resonance imaging could be useful to diagnose injured soft tissues<sup>5</sup>.

Treatment of these injuries requires an interdisciplinary approach to evaluate the possible neurological injuries caused by the reduction of the intruded condyle from the middle cranial fossa. This reduction could be done by open reduction with preauricular approach, or closed reduction. Although there are case reports and reviews in the literature, none have documented a definitive clinical evaluation and treatment algorithm<sup>6</sup>.

## **CASE REPORT**

A 17-year-old patient came to the emergency room due to pain in both temporomandibular joints, anterior open bite with bilateral posterior premature contact and impossibility of mouth opening after suffering a car crash.

After making a CT SCAN, fracture of the right mandibular glenoid cavity with intracranial displacement of the right mandibular condyle located in the middle cranial fossa was described (Figure 1). Therefore, we decided to perform urgent surgery in the first 24 hours.

Under general anesthesia and nasotracheal intubation. First, a right preauricular approach was performed to reach the superior joint space, observing the impacted condyle in the middle cranial fossa with a fracture of the glenoid cavity. Using intraoral pressure in lower right molars, condyle disimpaction of the temporal fossa was achieved, observing the integrity of the dura mater and the absence of cerebrospinal fluid outflow. As the bone defect in the glenoid fossa was from 12 to 15mm, the reconstruction was performed with a stock Christensen TARMA n.º 11 glenoid fossa prosthesis of stock and fixation with six 5mm screws, with correct reconstruction and reduction of the condyle to a neofossa (Figure 2). In a second stage, a left preauricular and transparotid approach was performed with reduction and fixation with a delta-shaped plate and four 5 mm screws was performed (Figure 3). After a 12-month follow-up, the patient presents a 35 mm oral opening with correct occlusion like before the fracture. The posterior premature contact and anterior open bite were resolved after both fracture reduction. She has not presented infectious clinic in any fracture. She presented paresis of the frontal branch of the left facial nerve due to the surgical approach, resolved in 4 months with exercises and corticosteroids.

## **DISCUSSION**

To date 72 cases have been reported in the English literature in the latest systematic review. Most of the patients were female with an average age of 23.4 years. The main etiology of DMCCF was a motor vehicle accident. However, in more than half of the patients aged 18 years or younger, the etiology was attributed to falls or bicycle accidents<sup>1,2</sup>. In the case described in this article, the patient was female with 17 years old and suffered an accident while traveling in the back of a car without seat belt, suffering direct trauma to the mental area.

There is no adequate consensus for the treatment of this type of fracture. Arya V et al in 2016 after a literature review, indicate that closed reduction is the chosen treatment option when the injury is recognized early, usually within 2 weeks after trauma, in younger children (< 12 years old) and in patients with no evidence of

ipsilateral condylar fracture<sup>3,7</sup>. On the other hand, open reduction could be chosen when there is a comminution of the temporal bone with associated cerebral injuries that require a neurosurgical intervention, in cases of failed closed reduction, in patients with late diagnosis (> 2 to 4 weeks after trauma), the presence of coexisting ipsilateral condylar fracture, gross vertical instability, bony interference between the condyle and the fractured fossa, or high risk of hemorrhage from middle meningeal artery that can be caused by sharp bone fragments during manipulation. Another described options to close the glenoid fossa defect would be the temporoparietal fascia and the temporalis muscle flap<sup>8,9</sup>.

In the published 72 cases, reconstruction was performed in 28 cases. Only two of them (Rikhotso and Bobat in 2016 and Lindell and Thor in 2017) were reconstructed using a TMJ prosthesis, and both were total alloplastic reconstruction, using a condyle and glenoid fossa prosthesis with good results in a long term follow up. Our case is the first to use a partial TMJ prosthesis, reconstructing only the glenoid fossa and maintaining the condyle that had not been fractured, with good results in a follow up of 12 months<sup>10,11</sup>.

In some other cases in which open treatment was performed, condyle reduction was not possible, and arthroplasty procedures were performed by means of condylectomy, condylotomy or ankylotic bloc removal. Bone grafts alone were used to reconstruct the glenoid fossa defect in two cases, in association with a temporalis muscle flap in four, with a titanium plate in one, and with a titanium mesh in one case. Other materials used alone were fascia lata, Gelfoam<sup>®</sup>, Duragen<sup>®</sup>, Gore-tex<sup>®</sup>, and ear cartilage<sup>12</sup> (Figure 4).

We opted for open reduction because, through the preauricular approach and directly observing the displacement of the fracture, we could see if there was a cerebrospinal fluid fistula and injury to the dura mater. After displacing the condyle of the cranial middle fossa, the complete integrity of the dura mater and the absence of a cerebrospinal fluid fistula were observed, so it was decided to reconstruct the glenoid cavity with a glenoid fossa prosthesis, because of the future possibility of a new displacement of the condyle into the middle cranial fossa, as well as the big diameter (12-15 mm) of the cranial base defect. We opted for a stock prosthesis due to the

immediate need of the material to reduce the fracture in the first 24 h. A customized prosthesis could be used but it would delay the surgery until the planning is made and the costs would increment. Subsequently, the correct oral opening of the patient with correct occlusion and proper functioning of both temporomandibular joints was verified.

## CONCLUSION

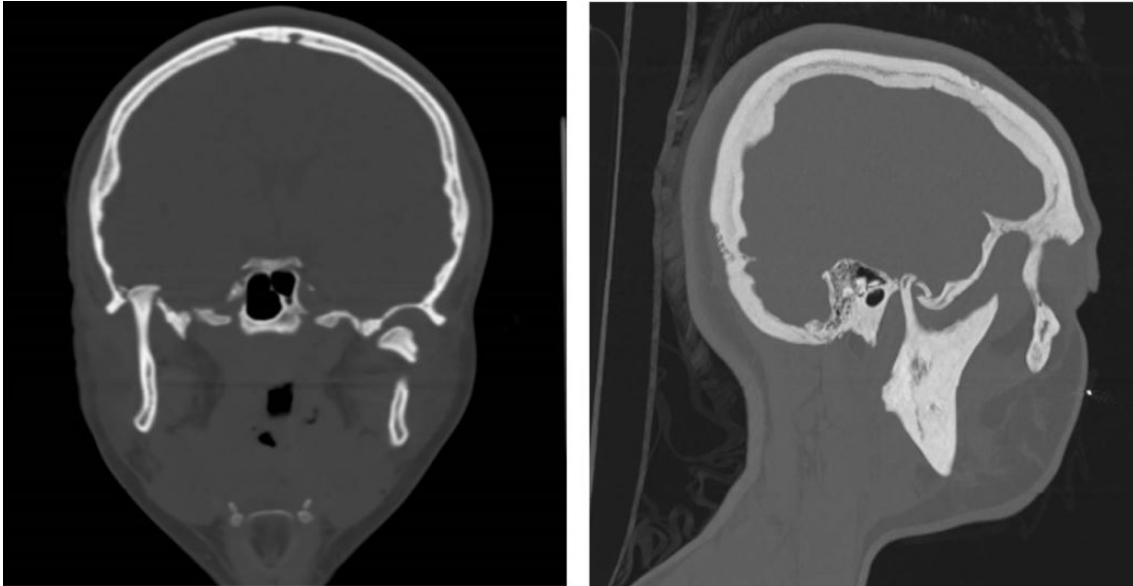
The election of a glenoid fossa prosthesis to treat a glenoid fossa fracture with dislocation of the condyle to the middle cranial fossa and thus avoid its recurrence is a valid option, with satisfactory results and no complications in a 12-month follow-up. However, new studies should be carried out with a larger number of patients.

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**Figure 1. CT scan with coronal and sagittal cut. A fracture of the right glenoid fossa with impaction of the condyle in the middle cranial fossa and a fracture of the neck of the left condyle with posteromedial displacement is observed.**

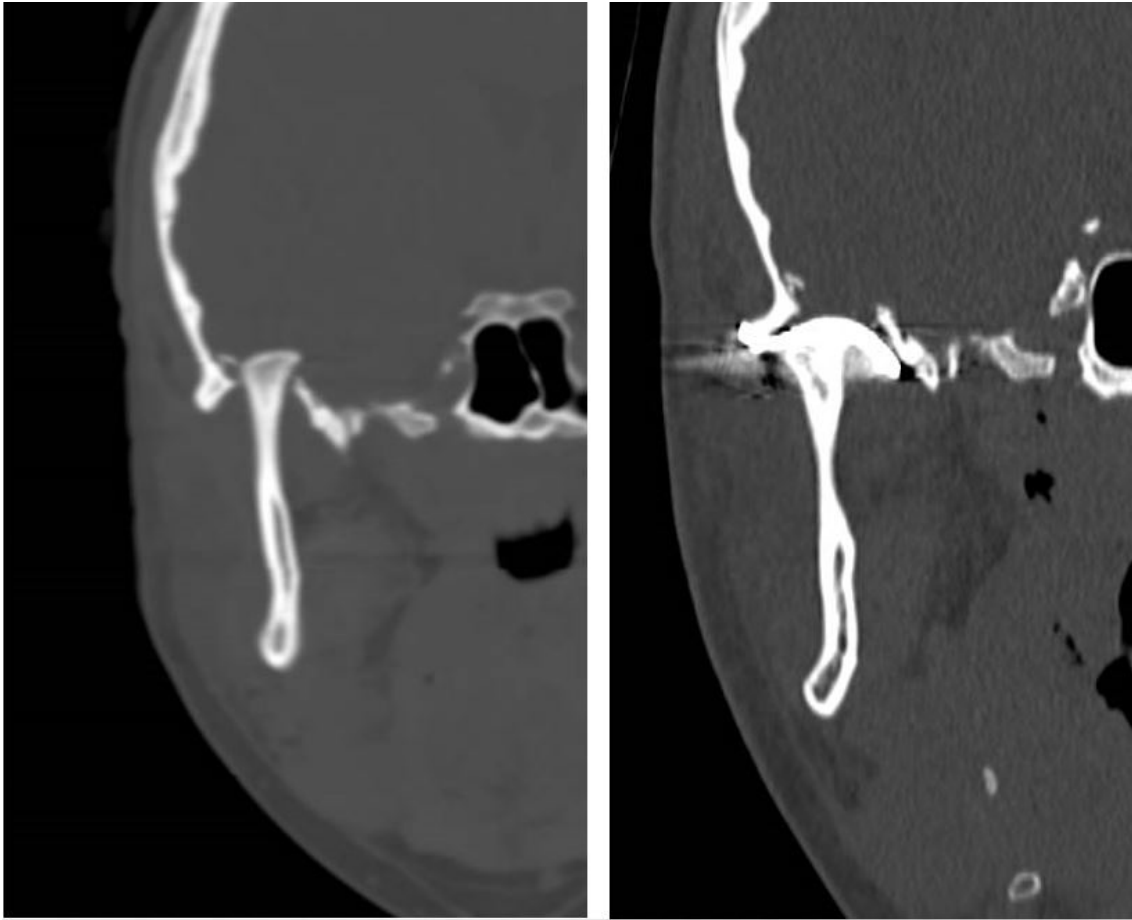




**Figure 2. Intraoperative image of glenoid cavity reconstruction with glenoid fossa prosthesis.**



**Figure 3. CT comparing the preoperative and postoperative image of the condyle, observing the correct reduction of the condyle in the glenoid neofossa.**



**Figure 4. Diagram with a summary of the indications for open or closed reduction, as well as the different therapeutic options.**

