



Caso clínico

Mandibular condyle dislocation into the middle cranial fossa with open reduction and reconstruction with glenoid fossa prosthesis. Unusual case report and literature review

Imanol Zubiate Illarramendi*, Ángel Martínez-Sahuquillo Rico, María Román Ramos and Ildefonso Martínez Lara

Servicio de Maxilofacial. Hospital Universitario Virgen de las Nieves. Granada, España

INFORMACIÓN DEL ARTÍCULO

Historia del artículo:

Recibido: 03 de septiembre de 2022

Aceptado: 25 de enero de 2023

Keywords:

Mandibular, condyle, dislocation, intracranial, prosthesis.

Palabras clave:

Dislocación condílea, prótesis, trauma facial.

A B S T R A C T

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.

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

R E S U M E N

La luxación del cóndilo mandibular hacia la fosa craneal media (DMCCF) es una lesión muy poco frecuente secundaria a un traumatismo facial. No existe consenso sobre cuál es la mejor forma de tratar estas fracturas, pero la reducción de estas impactaciones en la fosa media craneal puede ser abierta o cerrada dependiendo del tipo de fractura y la experiencia de los cirujanos. Se presenta el caso de una mujer de 17 años con luxación de cóndilo derecho a fosa craneal media, tratada con reducción abierta y reconstrucción con prótesis de fosa glenoidea.

*Autor para correspondencia:

Correo electrónico: imazubi7@gmail.com (Imanol Zubiate Illarramendi).

<http://dx.doi.org/10.20986/recom.2023.1392/2022>

1130-0558/© 2022 SECOM CyC. Publicado por Inspira Network. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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 unusual¹. 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^{1,2}. 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 injuries³.

Clinically, DMCCF includes anterior open bite with posterior early contact, limited mouth opening normally with less than 20 mm and restriction of mandibular movements⁴. Computerized tomography scans possess an increased sensitivity and specificity. Magnetic resonance imaging could be useful to diagnose injured soft tissues⁵.

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 algorithm⁶.

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.

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 (Figure 3).

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^{1,2}. 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

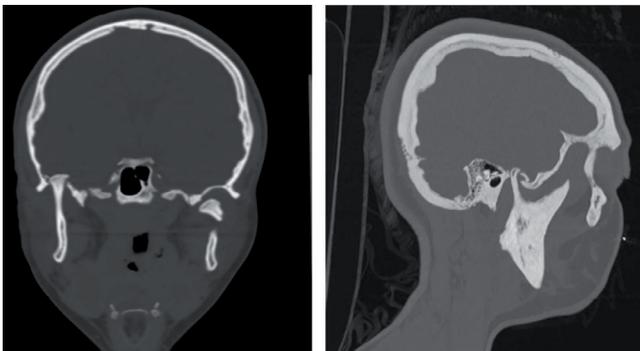


Figure 1. CT scan with coronal and sagittal cut. A fracture of the right glenoid fossa with impaction of the condyle in the middle cranial fossa and a fracture of the neck of the left condyle with posteromedial displacement is observed.

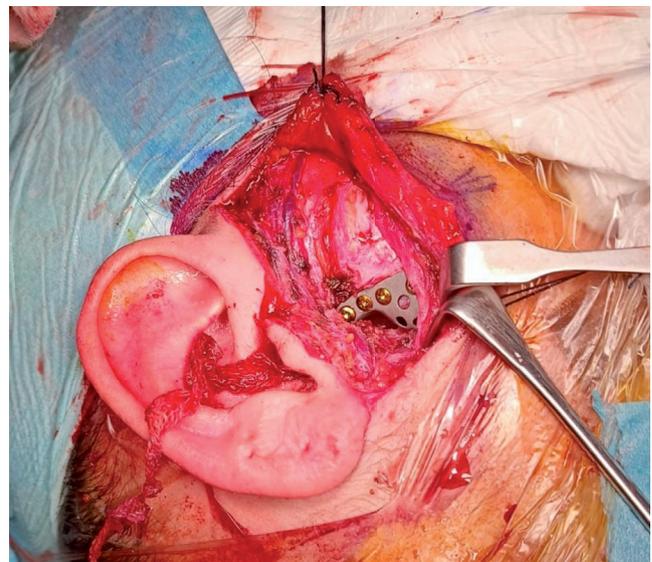


Figure 2. Intraoperative image of glenoid cavity reconstruction with glenoid fossa prosthesis.

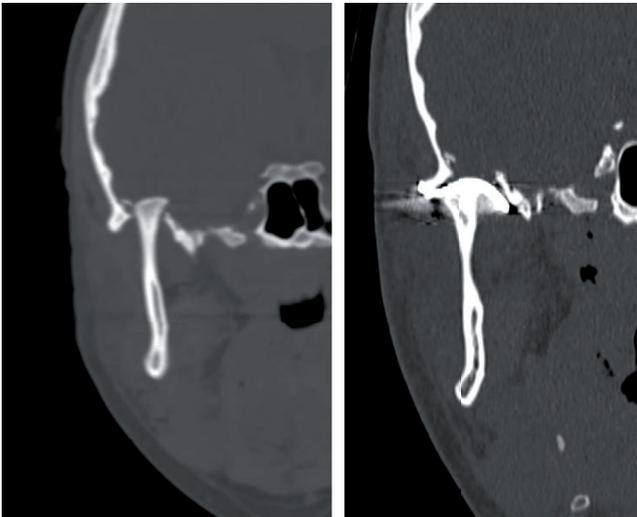


Figure 3. CT comparing the preoperative and postoperative image of the condyle, observing the correct reduction of the condyle in the glenoid neofossa.

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^{3,7}. 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 interfer-

ence 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 de glenoid fossa defect would be the temporoparietal fascia and the temporalis muscle flap^{8,9}.

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 prothesis, 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^{10,11}.

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®, Duragen®, Gore-tex®, and ear cartilage¹² (Figure 4).

We opted for open reduction because, through the preauricular approach and directly observing the disimpaction of the fracture, we could see if there was a cerebrospinal fluid fistula and injury to the dura mater. After disimpacting 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

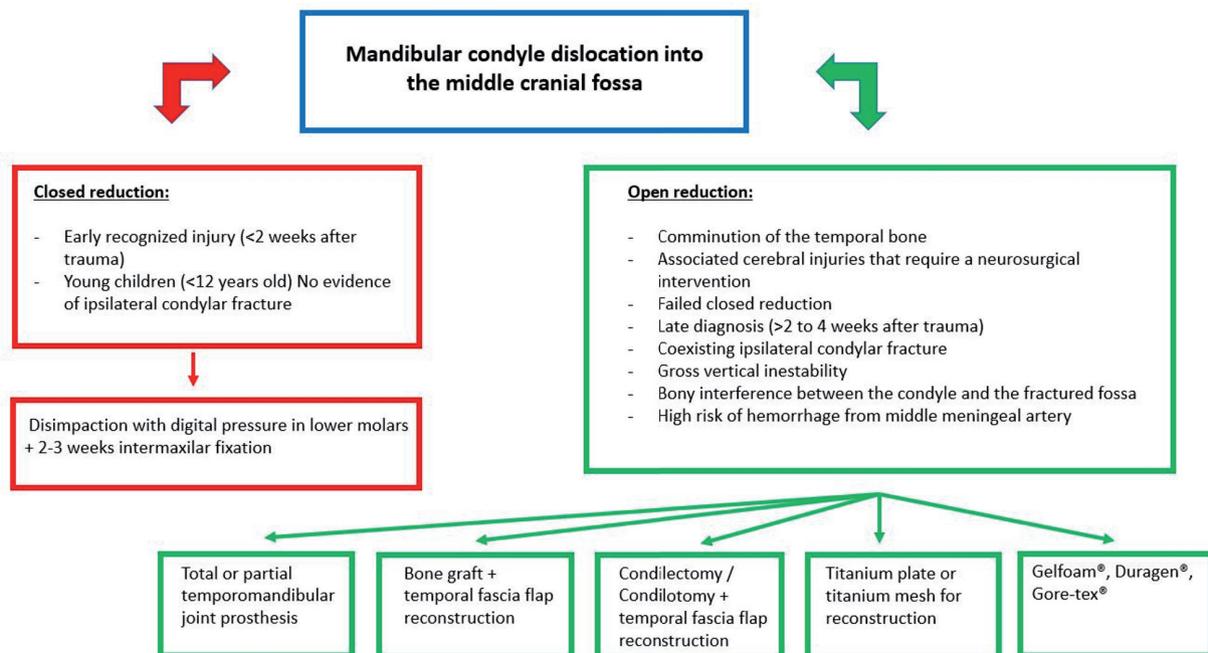


Figure 4. Diagram with a summary of the indications for open or closed reduction, as well as the different therapeutic options.

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.

PUBLICATION ETHICS

The authors confirm that they the informed consent of the patient.

CONFLICTS OF INTEREST

None.

REFERENCES

- Dingman RO, Grabb WC. Mandibular laterognathism. *Plast Reconstr Surg.* 1963;31:563-75. DOI: 10.1097/00006534-196306000-00008.
- Díez-Suárez L, Paredes-Farrera GF. Dislocation of the mandibular condyle into the middle cranial fossa. A case of temporomandibular joint arthroplasty with resorbable fixation system and temporalis myofascial flap: systematic review and meta-analysis. *Br J Oral Maxillofac Surg.* 2021;59(4):389-97. DOI: 10.1016/j.bjoms.2020.08.039.
- Kanno C, Hasegawa H, Kaneko T, Endo M, Yamazaki M, Akimoto T, et al. Traumatic dislocation of the mandibular condyle into the middle cranial fossa: A case of cranial base reconstruction and review of the literature. *J Oral Maxillofac Surgery, Med Pathol.* 2016;28(6):541-5. DOI: 10.1016/j.ajoms.2016.07.003.
- Chen I, Chang CM, Yuan-Chien Chen M, Chen KJ. Traumatic dislocation of the mandibular condyle into the middle cranial fossa treated by an intraoral approach. *J Formos Med Assoc.* 2019;118(7):1161-5. DOI: 10.1016/j.jfma.2018.12.025.
- Tutela JP, Verbist DE, Kelishadi S, Little JA. Traumatic dislocation of the mandibular condyle into the middle cranial fossa in an elderly patient. *J Craniofac Surg.* 2013;24(5):1703-5. DOI: 10.1097/SCS.0b013e31828a76b1.
- Dwivedi AN, Tripathi R, Gupta PK, Tripathi S, Garg S. Magnetic resonance imaging evaluation of temporomandibular joint and associated soft tissue changes following acute condylar injury. *J Oral Maxillofac Surg.* 2012;70(12):2829-34. DOI: 10.1016/j.joms.2012.08.026.
- Arya V, Chigurupati R. Treatment Algorithm for Intracranial Intrusion Injuries of the Mandibular Condyle. *J Oral Maxillofac Surg.* 2016;74(3):569-81. DOI: 10.1016/j.joms.2015.09.033.
- Kim SM, Park JM, Kim JH, Kwon KJ, Park YW, Lee JH, et al. Temporomandibular joint ankylosis caused by chondroid hyperplasia from the callus of condylar neck fracture. *J Craniofac Surg.* 2009;20(1):240-2. DOI: 10.1097/SCS.0b013e318191d023.
- Struwer J, Kiriazidis I, Figiel J, Dukatz T, Frangen T, Ziring E. Dislocation of the mandibular condyle into the middle cranial fossa causing an epidural haematoma. *J Craniomaxillofac Surg.* 2012;40(5):396-9. DOI: 10.1016/j.jcms.2011.07.006.
- Rikhotso ER, Bobat MA. Total Alloplastic Joint Reconstruction in a Patient With Temporomandibular Joint Ankylosis Following Condylar Dislocation Into the Middle Cranial Fossa. *J Oral Maxillofac Surg.* 2016;74(12):2378.e1-2378.e5. DOI: 10.1016/j.joms.2016.07.020.
- Lindell B, Thor A. A Case of Glenoid Fossa Fracture, Progressive Ankylosis, Total Joint Reconstruction with Alloplastic Prosthesis to Normalized Function Including Evaluation with F18-PET/CT-a Four Year Follow-up. *Craniomaxillofac Trauma Reconstr.* 2017;10(1):60-5. DOI: 10.1055/s-0036-1572493.
- Monteiro JLG, de Arruda JAA, de Melo ARS, Barbosa RJV, Carneiro SCAS, Vasconcelos BCDE. Updated Review of Traumatic Dislocation of the Mandibular Condyle Into the Middle Cranial Fossa. *J Oral Maxillofac Surg.* 2019;77(1):132.e1-132.e16. DOI: 10.1016/j.joms.2018.09.011.