

## MANAGEMENT OF DIACAPITULAR MANDIBULAR CONDYLE FRACTURE USING A SINGLE LAG SCREW FIXATION: CASE REPORT.

Manejo de fractura de cóndilo mandibular diacapitular mediante fijación con tornillo de tracción único: Reporte de caso.

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### ABSTRACT:

**Introduction:** Mandibular fractures are the most common facial fractures affecting various anatomical sites of the mandible. Among the various mandibular fractures, management of condylar fractures remains a challenging task for surgeons.

**Case Report:** We report the case of a 28 year old male patient who presented with pain in the chin and restricted mouth opening. Computed tomography revealed a sagittal fracture of the right condylar head with medial displacement of the fractured fragments. Management of diacapitular fractures includes open reduction and internal fixation of the right condyle using a single lag-screw.

**Results:** The postoperative outcomes were favorable, where normal mandibular movements, desired dental occlusion and exact positioning of the condyle with rigid fixation were established thereby maintaining the shape of the condyle.

**Conclusion:** Use of single lag screw fixation is highly recommended as it greatly supports the stabilized fracture fragments and also aid in prevention of fracture fragment rotation medially.

### KEYWORDS:

*Temporomandibular Joint; Mandibular Condyle; Fracturas Mandibulares; Fracture Fixation; Diacapitular fracture.*

## RESUMEN:

**Introducción:** Las fracturas mandibulares son las fracturas faciales más comunes que afectan a diversos sitios anatómicos de la mandíbula. Entre las diversas fracturas mandibulares, el manejo de las fracturas condilares sigue siendo una tarea desafiante para los cirujanos.

**Reporte del Caso:** Presentamos el caso de un paciente masculino de 28 años que consultó por dolor en el mentón y restricción de la apertura de la boca. La tomografía computarizada reveló una fractura sagital de la cabeza condilar derecha con desplazamiento medial de los fragmentos fracturados. El tratamiento de las fracturas diacapitulares incluye la reducción abierta y la fijación interna del cóndilo derecho con un solo tirafondo.

**Resultados:** Los resultados postoperatorios fueron favorables, donde se establecieron los movimientos mandibulares normales, la oclusión dentaria deseada y el posicionamiento exacto del cóndilo con fijación rígida manteniendo así la forma del cóndilo.

**Conclusión:** Se recomienda encarecidamente el uso de una fijación con un solo tornillo de tracción, ya que soporta en gran medida los fragmentos de fractura estabilizados y también ayuda a prevenir la rotación medial de los fragmentos de fractura.

## PALABRAS CLAVE:

*Actitud frente a la salud; Atención odontológica; Salud bucal; Autoinforme; Hábitos; Higiene bucal.*

## INTRODUCTION.

Diacapitular condylar fracture presents as a fracture line extending from the lateral side of the condylar surface to the medial side of the neck of the condyle.<sup>1</sup> The incidence of diacapitular fractures ranges from 18%-31% of all condylar fractures in adults.<sup>1</sup> Sagittal condylar fractures are otherwise referred to as type B intracapsular condyle fractures.<sup>2</sup>

Patients with diacapitular condyle fractures present with restricted mandibular movements and deranged occlusion, shortening of the mandibular ramus, and dislocated fractured fragments of the condyle. Various surgical techniques have been described by authors in the English literature.<sup>3</sup>

However, these techniques have numerous disadvantages such as technical complications during fracture reduction and the instability of the

rigid internal fixation.<sup>2</sup>

In this case report, the authors have described a surgical treatment modality for the management of diacapitular fracture of the right condyle using lag screw fixation.

## CASE REPORT.

A 28 year old male patient reported with pain in the chin region and while opening the mouth. History revealed that he skidded off a bike five days before presentation, which caused a direct trauma to the mandibular symphysis region (Figure 1).

Extra-oral examination showed soft tissue laceration in the symphysis region with restricted mandibular movements and deviation of the mandible to the affected side (right side) while opening the mouth.

The inter-incisal distance was about 20mm. Intra

oral examination revealed tenderness over the vestibule of the anterior mandible with significant step deformity, deranged occlusion, open bite on the unaffected side, and decreased posterior ramus height.

Computed tomography showed a sagittal fracture of the right condylar head and medial displacement of the fracture fragments (Figure 2). Surgical management was planned for open reduction and internal fixation of the right condyle using a single lag-screw.

### Surgical Procedure

The temporal regions of the scalp and beard were shaved. Under naso-endotracheal intubation general anesthesia was administered. Standard preparation and draping were done to ensure a sterile surgical procedure.

### Endaural approach

The markings were placed for the commencement of endaural incision. Local anesthesia (2% lidocaine

hydrochloride with 1 in 80,000 concentration of adrenaline) was infiltrated beneath the incision line. The incision was placed at the temporal region along the length of the pinna above the ear which is then carried backwards and downwards behind the temporal vessels, progressing anteriorly to reach the tragus and endaurally.

At this juncture, the line of incision was carried between the tragus and helix posterolaterally along the anterior wall of the tragus to the external auditory meatus. It then traverses inferior to external auditory meatus parallel to tragus till it reaches the crease of skin in front of the ear lobe. The depth of dissection is incised till the cartilage of external auditory meatus and periosteum of the temporal region.

Further, sharp and blunt dissections progressed through superficial fascia and preauricular fascia which was then raised as a portion of the skin flap. At the zygomatic arch the temporal fascia was

**Figure 1.** Preoperative image showing soft tissue laceration in the dorsum of the nose and chin region.



**Figure 2.** Preoperative computed tomographic image showing a diacapitular fracture of the right condyle.



**Figure 3.** The fractured fragments of the right condyle were reduced and fixed in anatomical position using a 2mmx14mm lag screw.



**Figure 4.** Postoperative tomographic image showing an exact positioning of the right condyle with lag screw fixation maintaining the shape of the condyle



identified and the periosteum present deep to the zygomatic arch was incised with care and raised as a single flap.

The temporal branch of the facial nerve was identified and protected within the flap of soft tissue through layer-wise dissection. The condylar fracture site is now exposed through endaural approach. The fracture fragments were reduced in anatomical position by downward traction of the mandible.

The dislocated medial fragment was then stabilized and fixed using 2x14mm single lag screw (Figure 3). The surgical site was then closed in layers using 4-0 Vicryl and Ethicon sutures.

## RESULTS.

The patient was reviewed immediately and 3 months post-surgery. On the immediate postoperative day the patient was subjected to tomographic imaging, which revealed an exact

positioning of the condyle with rigid fixation maintaining the shape of the condyle (Figure 4).

Clinically, mouth opening of 26mm was obtained on the immediate postoperative day and guiding elastics were placed to obtain a desired dental occlusion.

Once the desired occlusion was achieved, the patient was advised to do mouth opening exercises. After a follow up period of 3 months, the patient showed a satisfactory improvement in the mouth opening with 36mm and functionally restored dental occlusion. The postoperative surgical site had healed satisfactorily.

## DISCUSSION.

The current case report describes a diacapitular fracture of the condylar head treated using a single lag screw. The choice of treatment in the management of condylar fractures remains controversial. Neff et al,<sup>4</sup> proposed a protocol

based on the diagnostic process which clearly defines the best treatment objective. The option of surgery is completely determined by various factors such as profile of the patient, function and other associated fractures. Moreover, the conservative approach is widely practiced which can be employed in pediatric patients and undisplaced fractures. In concern to diacapitular condylar fractures, an open surgical method is commonly preferred as it may prevent or reduce the chances of temporomandibular joint ankylosis, osteoarthritis and internal derangement of the temporomandibular joint.

Neff et al,<sup>5</sup> evaluated the postoperative results after fixation of the condylar head fracture using small fragment positional screw osteosynthesis over a period of five years. They report a stable and functional result, but on the other hand had encountered a significant complication of facial nerve injury and unaesthetic scar. The necessity for the surgical approach in our case is primarily due to the characteristics exhibited by the patient and also because literature supports surgical treatment for the management of diacapitular fracture. The advantages of surgery include anatomical repositioning of the articular disc and lowering the risk of internal derangement.<sup>6</sup>

In this present case report a case of medial fracture of the condylar head has been discussed which was addressed using a single lag screw fixation by approximating and stabilizing the reduced fracture fragments and traction of the mandible inferiorly by insertion of a wire at the ramus of the mandible thereby increasing the articular space, which eventually provide better visualization of the medially displaced fracture

fragment, reduction and maintenance of the segments in its anatomic position while fixation of lag screw.<sup>5</sup> Fixation of two lag screws parallel to each other have also been evaluated to produce dual benefits by Raghani et al,<sup>7</sup> one which prevents the rotation of the fractured fragments during mandibular function and other had increased the stability of the rigid internal fixation.

The use of single lag screw fixation offers the following benefits:

1. Single lag screw fixation in such a narrow space of the condylar head was adequate to stabilize the fracture segments in its anatomical position.
2. Due to the spongy nature of the condyle, single lag screw fixation was used to avoid the further fracture of the condylar head.
3. Single lag screw fixation renders superior biomechanics of the condyle and it also prevents the de-rotation/displacement of the fixed condylar fragment caused by the pull of the lateral pterygoid muscle.

## CONCLUSION.

Although surgical treatments may present with multiple complications, surgical management of diacapitular condylar fractures has various functional, occlusal and aesthetic benefits compared with non-surgical treatments.

Use of single lag screw fixation was successful in this case as it supports the stabilized fracture fragments and also aids in preventing fracture fragment rotation medially. Good functional and clinical outcomes were achieved without any significant complaints associated with the temporomandibular joint.



**Conflict of interests:**

The authors declare that they have no conflict of interest.

**Ethics approval:**

The authors certify that they have obtained written informed patient consent for images and other clinical information to be reported in the journal with an understanding that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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**Authors' contributions:**

KP Karthik: designed the study, conducted research, provided required materials, collected and organized the necessary data.

V Ashwin and R Balamurugan: analyzed and interpreted the data.

R Balamurugan: drafted the initial and final manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content of the manuscript.

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