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Management of Mandibular Subcondylar Fracture – A Case Report and Literature Review

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Abstract*: Mandibular condyle fractures are one of the commonest fractures involving the mandible. In the past, closed reduction with concomitant active physical therapy conducted after a period of intermaxillary fixation during the recovery period had been mainly used, but in recent years, open treatment of condylar fractures with rigid internal fixation has become more common. However, the rigid fixation techniques of treating condyle fractures remain one of the controversial issues in maxillofacial trauma. Several techniques and plate types such as miniplates, minidynamic compression plates, delta plates, and two miniplates have been evaluated biomechanically in various experimental and clinical studies. The present case report is to evaluate the clinical use of titanium L-shaped miniplate in open reduction and internal fixation of subcondylar fracture.*
Keywords*: L-shaped miniplate, Open reduction,Subcondylar fracture, Osteosynthesis of condyle.*

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I. Introduction

Various studies have shown that the condylar fractures account for 15-52% to of all mandibular fractures.[1] Open reduction and rigid internal fixation (ORIF) of condylar fractures has gained popularity in recent times because of the various drawbacks associated with conservative treatment. This may be in part due to the considerable advancement in the development of osteosynthesis technique and the refinement of the surgical technique. Open reduction has advantages of the reduction of the displaced bony fragment to the most ideal anatomical form by a direct approach to the facture site thereby providing a superior functional clinical outcome.[2] To reach the condyle area, different approaches are used, e.g., the transoral approach or different extraoral approaches, such as the periangular, preauricular, retro- mandibular, transparotid and retroauricular.[3] The goals of ORIF in condyle fracture management are to restore function, re-establish normal anatomy, and provide fracture stability. This can be achieved by different fixation techniques. Various studies have shown that two miniplates (double-plate technique) are the most reliable because these neutralize tension and pressure forces best and produce greater stability.[4,5] Their application requires an extraoral surgical approach, which is associated with disadvantages, such as risk of facial nerve injury and visible scarring.[6] As an alternative to the two-miniplate technique, a single plate technique with specially designed plates, such as the delta plate, trapezoidal plate and A-shaped plates have been studied. Their biomechanical and clinical studies have confirmed that these plates allow for sufficient neutralization of strains as well as provide sufficient stabilization for ORIF of subcondylar and condylar neck fractures combined with the advantage of a smaller plate size. The present case report is to evaluate the clinical use of a single titanium L-shaped miniplate in open reduction and internal fixation of subcondylar fracture.

II. Case Report

A 65-year-old female patient reported with a chief complaint of swelling and pain on left side of the face since 1 week with an alleged history of self fall 1 week back. Patients had history of schizophrenia and hypothyroidism for which she was under medication. Her physical nutritional status was poor as well. The extraoral evaluation revealed asymmetry of the face, with deviation of the chin toward the left side and lacerated wound directly under the chin. TMJ evaluation showed restricted mouth opening (22 mm between the edges of the upper and lower incisors), with deviation of the midline toward the left and restricted TMJ movements. On palpation, tenderness was elicited on the left TMJ region. The intra oral examination revealed multiple missing posterior teeth and malocclusion: The lower midline was deviated toward the left, with ipsilateral crossbite and contralateral open bite. The panoramic radiograph (Figure 1) and computed tomography (CT) scans (Figure 2) confirmed the diagnosis of displaced left high subcondylar fracture of the mandible. Based on the positive medical history and clinical examination, open reduction and internal fixation of the subcondylar fracture was planned. General anesthesia was administered through naso- tracheal intubation. Retro mandibular(Hind's

modification) approach was used for the exposure of the fracture site(Figure 3). Facial nerve in this field was identified and protected (Figure 4). Displaced condylar segment was retrieved. Anatomical reduction of the fractured fragment was done and held in place till the completion of the miniplate fixation (Figure 5). Internal fixation was done with a 2.0 L-shaped miniplate (Figure 6). Hemostasis was achieved and layered closure of the surgical wound was done. A post- operative OPG was taken to confirm the position of the condyle and stability of fixation (Figure 7). Postoperative mouth opening was 38 mm and satisfactory occlusion was achieved, and thus no intermaxillary fixation was required. Patient was followed up for 6 months and no complications, such as facial nerve palsy, plate bending, plate fracture, screw loosing was encountered.

III. Discussion

The condylar fracture in adults can be treated by either closed or open reduction. The type of treatment must mainly be chosen on a case by case basis and the personal experience of each professional.[1,2] Mainstay of treatment of condylar fracture can be 1) a period of maxillomandibular fixation (MMF) followed by functional therapy; 2) functional therapy without a period of MMF; and, 3) open reduction with or without internal fixation.[6,7] Various factors must be taken into consideration before the choice of treatment is made for the condylar fractures in adult patients, such as: location and type of the fracture lines; unilateral or bilateral type of fractures; total or partial loss of teeth; influence of the affected TMJ(s) on mandibular movements; degree and direction of dislocation of the condyles; difficulty of surgical access; risk of facial nerve injury; risk of hypertrophic and/or cheloid scar; patient's general health status; presence of other maxillofacial fractures; possibility of performing physical therapy; neuromuscular adaptations.[8] The absolute indications for open treatment of condylar fractures are patient preference (when no absolute or relative contraindications co-exist) ,when manipulation and closed treatment cannot re-establish the pretraumatic occlusion; When rigid internal fixation is being used to address another facial fracture affecting the occlusion; When stability of the occlusion is limited (e.g., less than 3 teeth per quadrant, gross periodontal disease, skeletal abnormality); Displacement into the middle cranial fossa; Lateral extracapsular deviation; Open fracture with potential for fibrosis; Invasion by foreign body.[9] In our patient normal occlusion could not be established by closed method because of the multiple missing posterior teeth and poor periodontal condition of the rest of the dentition. Patient also had a positive medical history of a mental disorder (schizophrenia) and poor nutritional status. These factors lead to the decision of ORIF for the condylar fracture in this patient. Different methods of fixation have been used for condylar frature treatment. These includes fixation systems like single 4-hole mini adaptation plate, double fixation with the same plates, single 4-hole mini dynamic compression plate (DCP), Eckelt lag screw system, Wurzburg lag screw plate system and double 4-hole biodegradable miniplates made of poly L-lactide (PLLA).[10] Apart from these fixation systems, various modified single plate systems such as delta plate, trapezoidal plate and A-shaped plates have also been studied. Due to the permanent mediolateral bending of the condyle during function, a certain stiffness of the plate, a stronger plate, or two plates are recommended.[5]In our patient, the two miniplate technique could not be used because of lack of space for its placement. Since the accessibility to the modified 3D miniplates is limited in the market, we proceeded with the use of conventional 2mm L-shaped titanium miniplate without gap for the fixation of the condylar fracture. The plate adaptation and fixation was simple, easy and fast. Post operative complication such as screw loosening, miniplate fracture or bending was not encountered. Patient was able to get full range of mandibular movement and mouth opening during the immediate post operative period. We were also able to avoid intermaxillary fixation (IMF) during the post operative period. In addition, long-term complications such as pain, arthritis, malocclusion, deviation of the mandible on opening and closing movements, temporomandibular joint (TMJ) dysfunction, facial asymmetry, and ankylosis that might be associated in patients with condylar injuries treated in a closed manner may potentially be avoided.[1, 9]

IV. Conclusion

Mandibular condyle fractures represent one of the most controversial issues in the relevant literature, especially with regard to recommended treatment. There is a wide array of designs for the fixation system that can be used for ORIF of condylar fractures. Use of L- shaped miniplate seems to be a simple, effective and reliable alternative for condylar fracture management although this has to be further substantiated by a long term clinical and biomechanical studies.

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Conflict of Interest – nil
Acknowledgements – nil

Informed consent – Informed consent was obtained from each individual participant involved in this study.
Statement of Human Rights – This study was conducted in accordance with the 1964 Declaration of Helsinki and its subsequent amendments.

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FIGURE 1: Pre op OPG showing left subcondylar fracture.

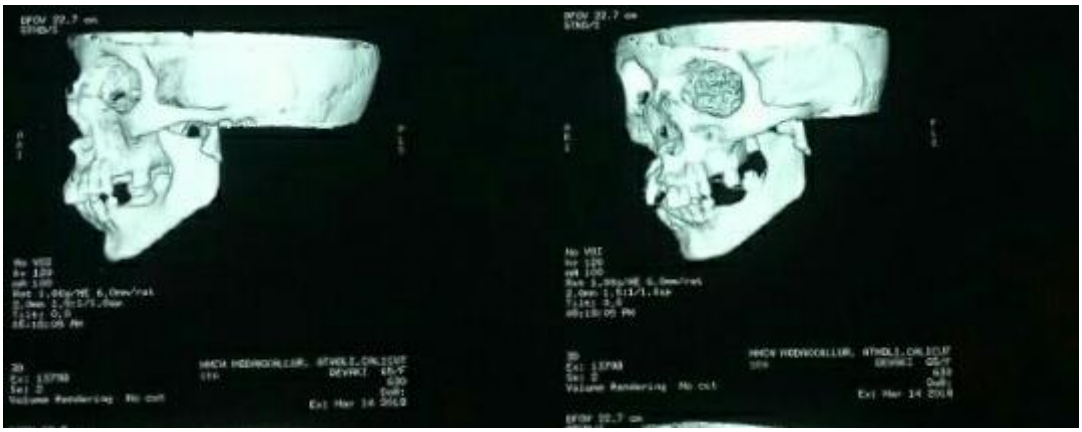

FIGURE 2: Pre op CT scan reconstruction showing displaced left subcondylar fracture.

FIGURE 3: Retromandibular approach

FIGURE 4: Identification of facial nerve branches in the surgical field.

FIGURE 5: Fracture reduction.

FIGURE 6: L-shaped titanium miniplate fixation

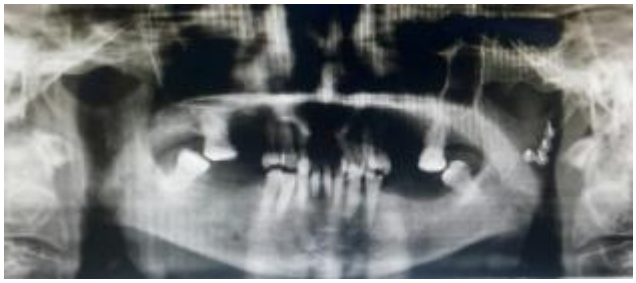

FIGURE 7: Post op OPG

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