Intraoral Approach for Treatment of Displaced Condylar Fractures: Case Report

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ABSTRACT

Dislocated subcondylar fractures often require open reduction and internal fixation. This treatment modality results in better anatomy, early function, and facilitated physical therapy. Ideal stable fixation is obtained by use of two miniplates to control the tension zone in the sigmoid notch area and stabilize the posterior border region or, if there is not enough space, one stronger plate. That is most frequently achieved through extraoral approaches. Recently new instruments have facilitated the use of an intraoral approach, which is used usually with the aid of an endoscope. However, it is possible to perform the procedure without the endoscope if proper instruments and clinical mirrors for checking the posterior border reduction and fixation are used. A case of reduction and fixation of a medially dislocated condylar fracture is presented and discussed.

KEYWORDS: Subcondylar fracture, intraoral, surgical approach

Fractures of the mandibular condyle are common and account for 9 to 45% of all mandibular fractures. Nondislocated mandibular condylar fractures and high fractures of the condyle can be successfully treated nonsurgically. However, dislocated condylar fractures managed by closed reduction using a period of maxillo-mandibular fixation succeeded by jaw exercise may cause malocclusion, restricted forward motion of the lower jaw, degenerative joint disease, facial asymmetries, or functional disabilities, especially in cases with bilateral or severely displaced fractures. The open reduction and rigid internal fixation of dislocated mandibular condylar fractures became more prevalent because it provides better reduction, gives adequate stability to the fracture, facilitates rapid fracture healing, allows early restoration of function, and avoids prolonged intermaxillary

fixation. Studies have shown that open reduction and rigid internal fixation of isolated unilateral condylar fractures provides similar or better functional outcome when compared with closed treatment.¹

When deciding upon surgical reduction, it is necessary to look for the best access to the temporomandibular joint (TMJ) by considering fracture location and degree of dislocation.² A variety of surgical techniques and fixation modalities have been advocated for repositioning and stabilization of the mandibular condylar fracture. The majority of surgeons prefer the extraoral approach, in contrast to the intraoral approach, because it gives a good visualization and ability to achieve a better alignment of the bony fragments. However, open reduction by an extraoral approach leaves a facial scar and has the potential to cause facial nerve

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injury. The intraoral approach minimizes the risk of facial nerve damage and facial scar and has been described in only a few reports and is solely recommended for treatment of low condylar fractures due to the restricted surgical field and limited access to the condylar neck.

This approach was first described by Silverman in 1925 and resulted in considerably reduced visualization and exposure of the fracture, as well as restrictions regarding the handling of the fragments. But at that time, there were several difficulties, such as lack of appropriate instruments for treating those fractures, especially through an intraoral route. Presently, special instruments (e.g., 90-degree angular screwdriver, endoscope) are available to facilitate the intraoral treatment, and new evaluations were published by several authors.³

Fritzemeier and Bechthold⁴ reported on cases treated via a purely intraoral approach. The development of a 90-degree angular screwdriver made such an approach possible. They studied 32 fractures of the mandibular condyle. Apart from two early failures, only minor deviations from the axis with no influence on TMJ function were found in radiological follow-ups.

Mokros and Erle⁵ reported on 48 displaced and shortened fractures of the mandibular condyle treated via an intraoral approach. With the exception of one buccal abscess, no significant intra- or postoperative complications were recorded. Reduction was successful in 74% of the fractures. In 90% of the patients, TMJ function was good, 43% were free of symptoms, and 47% reported minor dysfunction. The authors emphasized that the therapeutic success depended mainly on the fragments being correctly reduced.

Schön et al¹ compared intraoral versus extraoral approach for endoscopy-assisted treatment of condylar fractures. All 17 patients evaluated (nine submandibular, eight transoral approaches) showed adequate anatomic reduction achieved by the submandibular and transoral approaches using the endoscopy-assisted technique. The transoral approach proved to be a reliable surgical approach for fractures of the mandibular condyle, even when dislocation with lateral override was present.

Jensen et al (2006)⁶ evaluated retrospectively the long-term results obtained with open reduction and rigid internal fixation of mandibular condylar fractures by an intraoral approach in 15 patients with 24 mandibular condylar fractures. That study emphasized that optimal management of dislocated bilateral condylar injuries combined with other fractures of the facial skeleton constitute a challenging issue in maxillofacial trauma. Open reduction and rigid internal fixation of mandibular condylar fractures by intraoral approach is a technically demanding surgical procedure associated with a high risk of postoperative complications.

Schneider et al (2007)³ in a retrospective study reexamined 40 patients with displaced or dislocated

fractures of the mandibular condyle. In 20 patients (21 fractures), an intraoral approach was used, and in 20 others (24 fractures), an extraoral perimandibular approach was applied. The groups were compared by means of axiography and radiology as well as clinically with regard to function 6 months postoperatively. Results showed that almost all fractures were correctly reduced following application of the extraoral access, but reduction was correct in only 50% of the patients treated with the intraoral approach. Displacement and complications during osteosynthesis were the reasons. The group of patients treated via the intraoral approach showed less favorable results radiographically, clinically, and as judged by the patients' subjective feelings. Especially axiographical examination of the latter group revealed a restricted translation indicating that the fractures had not healed primarily. To avoid complications, the only fractures that should be treated intraorally are those that allow exact reduction even under the conditions of a limited view and that do not require extensive surgical manipulation for reduction. This applies in general to fractures of the mandibular condyle with a laterally displaced condyle and a shortened ascending ramus. For all other dislocated or displaced fractures, extraoral reduction is the method of choice.

Veras et al⁷ investigated 25 (21 male, 4 female) consecutive patients with condylar fractures that were reduced through exclusively intraoral surgical approach by means of radiographic and functional evaluation. Results showed a mean postoperative mouth opening of 48 mm (standard deviation [SD], 9), right mandibular laterotrusion of 11 mm (SD, 3.8), left laterotrusion of 10 mm (SD, 4.5), and protrusion of 5.83 mm (SD, 3). No joint clicking, weakness of the facial nerve, or joint or muscular pain was observed. The conclusion was that reduction achieved by this technique allows reconstruction of anatomic ramus height in combination with excellent functional results.

CASE REPORT

A 60-year-old woman, victim of a domestic accident, went to the Oral-, Maxillofacial and Plastic-Facial Surgery Department of Frankfurt Medical Center with a condylar fracture on the right side with medial displacement observed in the radiograph (Figs. 1 and 2), extraoral hematoma in the same side, and malocclusion. She presented no significant systemic problems and was submitted to surgery under general anesthesia with nasotracheal intubation.

Intermaxillary fixation was installed using four screws during reduction, two in the anterior part of the maxilla and two in anterior mandibular region. Articaine with 1:100,000 epinephrine was infiltrated in the posterior part of the right vestibular fold. An ~4-cm mucoperiosteal incision was made. The mucoperiosteal flap

Figure 1 Preoperative orthopantomography view.

was elevated and retracted with a long Langenbeck retractor and an optic light retractor in the angular region until adequate visualization of the condylar fracture was possible. The fracture was reduced with the assistance of longer clamps, the reduction was verified by direct visualization, and the posterior border was inspected with assistance of a dental clinical mirror. After that two 2.0-mm system plates and screws (Synthes-Paoli, West Chester, PA) were used for fixation with help of a 90-degree angled screwdriver (Medartis, Basel, Switzerland). The first plate was installed in the posterior border and the second in the anterior border. After this, the mouth was open, the

occlusion was checked, and the wound was closed with a Vicryl 3-0 (Ethicon, Livingston, Scotland). The patient was kept 14 days in maxillomandibular fixation with elastics to guide the occlusion (Figs. 3 and 4).

DISCUSSION

Several surgical approaches have been reported in the literature for treatment of condylar fractures. The retro-mandibular and submandibular approaches are the most commonly used to expose such fractures. The intraoral or transoral approach was initially suggested for treatment of subcondylar and condylar neck fractures that were not dislocated. Presently, those approaches are also used for treatment of displaced condylar fractures, even those dislocated medially, by many surgeons.

The fracture reported in the present case was not severely displaced. Although there was considerable medial displacement that would have indicated the use of endoscopic assistance, it was successfully treated without the endoscope.

A few articles compare the intraoral versus the extraoral approach. Good and also poor results are described in those articles for the intraoral route. Review of the literature that evaluates the effect of using intraoral or transoral approach on the final result shows differences between the two modalities. We agree with Mokros and Erle,⁵ who emphasized that the therapeutic success in intraoral approach treatment for condylar fractures depended mainly on the possibility of the fragments being correctly reduced.

Special instruments, such as reduction forceps, angled elevators, long periosteal elevators and retractors, modified nerve hooks, angulated drills and screwdrivers, and endoscope, have been used to facilitate the fracture reduction and osteosynthesis. Those instruments have made the intraoral approach more feasible in the treatment of mandibular condylar fractures (Figs. 5 and 6).

Figure 2 Preoperative Towne view.

Figure 3 Postoperative orthopantomography view.

Figure 4 Postoperative Towne view.

Figure 5 Ninety-degree angulated drill operation handout.

Figure 6 Ninety-degree angulated screwdriver operation handout.

Another problem when treating a condylar fracture by the intraoral approach is that previous clinical and biomechanical studies have recommended using two miniplates for fixation.⁵ That construct requires a certain size of the proximal condyle fragment and thus is not applicable in several cases involving low fractures. Instead of two plates, either a trapezoid plate or a compression miniplate can be used. In this case, it was possible to use two 2.0-mm miniplates.

The literature shows reports that have evaluated the long-term outcome after open reduction and rigid internal fixation of mandibular condylar fractures by the intraoral approach. In some, the endoscopic-assisted procedures were used, and in others, only an angulated screwdriver and clinical mirrors were used. In the first case, the authors reported that the use of the endoscope allowed superior visibility of the condylar area, overcoming the problem of limited exposure through limited incisions.³ Others reported no difference between of the two techniques.¹ For both, a learning curve with intensive training is necessary before the treatment of condylar fractures can be performed consistently by the intraoral approach.

In our opinion, the intraoral approach offers two great advantages that minimize the risks of visible scars and facial nerve injury. Also, it often allows adequate reduction without the endoscope. One should be aware of bilateral condylar fractures combined with additional fractures of the mandible or midface. In those cases, the

literature showed occurrence of persistent minor post-operative malocclusion.

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