

Current Management of Subcondylar Fractures of the Mandible, Including Endoscopic Repair



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KEYWORDS

• Subcondylar • Trauma • Fracture • Endoscopic • Mandible

KEY POINTS

- When patients can be placed into their normal occlusion, closed management with elastic maxillo-mandibular fixation and physical therapy is likely sufficient treatment.
- Several studies have shown better outcomes for subcondylar fractures treated with open reduction, internal fixation compared with closed management. When the occlusion cannot be reduced, open treatment is advised.
- Endoscopic-assisted open reduction with or without fixation achieves the benefits of open repair while minimizing risk.

GENERAL OVERVIEW

Proper management of subcondylar fractures has been a subject of debate for many years. Access to the condyle is technically challenging with risks of serious side effects. In the past, this has led to a trend of treating these patients via a closed approach.¹ However, there is no general consensus about what the best treatment is for various fracture patterns.² Recently, paradigms have begun to shift with several studies suggesting that open reduction leads to better outcomes³⁻⁶ and advances in endoscopic technology are improving visualization and decreasing surgical risks.

Subcondylar fractures encompass 25% to 45% of all mandible fractures.⁷ Traditional mechanisms of injury include bicycle accidents, motor vehicle accidents, fall from standing, and assault. It is common for other concomitant facial trauma to

be present, including other mandible fractures. It is important to differentiate between condylar head, coronoid, condylar neck, subcondylar, and ramus fractures, as treatment options depend on fracture location. By definition, a subcondylar fracture extends from the mandibular notch to the posterior border of the ramus.⁸

IMAGING

Several imaging modalities can be used for adequate visualization of the mandible. The panorex is helpful to show fracture locations, as the entire mandible is imaged. Because of its 2 dimensions, it may be difficult to determine comminution and length of the proximal segment. Radiographic images have somewhat fallen out of favor. The Townes view (30° anteroposterior view) provides better visualization of the condyles and can show the mediolateral positioning of the condylar

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segments. Computed tomography (CT) scanning has become the new gold standard for imaging. With the advent of 3-dimensional (3D) reconstruction, CT images can be both informative and instructional for preoperative planning. Viewing the condyle can be challenging with radiograph or panorex because of the bony overlap. Three-view CT scans and 3D images provide the precise orientation and angle of the condyle, which is important to determine when deciphering what treatment is indicated.

METHODS OF TREATMENT

Treatment options for subcondylar fractures are generally divided into 2 groups: closed versus open management. Closed treatment involves some form of maxillomandibular fixation (MMF) with either rigid or elastic interdental fixation. There has been a trend toward using elastic fixation to encourage early temporomandibular joint mobilization and discourage long-term joint arthroses. Additionally, the use of elastics allows the occlusion to be retrained to a normal relationship. Typically, in closed management the fracture is not actually reduced; but it is possible to place patients in their normal occlusion without reduction. It is the authors' preference to use arch bars and elastic interdental fixation to retrain the musculature and guide normal occlusive relationships.

There are many different approaches that have been developed over the years for open treatment of subcondylar fractures. These approaches include retromandibular, submandibular, preauricular, and transoral incisions. With the advent of endoscopes, the transoral endoscopic approach to the condyle was developed. This method may be used with angled instruments or with transbuccal stab incisions to assist with rigid fixation.

In the past, most fractures were managed with closed treatment, which was mainly because of limitations in surgical access and risks associated with open procedures. It was thought that the risk of opening the area outweighed the benefits. Over time, paradigms began to shift with the idea that open management may achieve superior outcomes in some circumstances. Eckelt and colleagues³ multi-institutional prospective randomized controlled trial challenged the idea that open and closed management achieved similar results by assigning patients to one of 2 treatment arms: closed treatment with MMF versus open surgical treatment. This study was stopped early because of the clear benefit being seen in open procedures over closed procedures, specifically in relation to mandibular shortening, angulation,

protrusion, and maximal interincisal distance. There were more reported occlusal disturbances from both the patients' perspective and physician evaluation in the closed treatment group. There was also more pain reported at 6 months in the closed group. The study concluded that all condylar fractures with angulation and mandibular shortening should be repaired with open reduction, internal fixation. One caveat to Eckelt and colleagues's³ study is that experienced maxillofacial trauma surgeons were performing the procedures and complication rates in general were low. It is unclear if all cranio-maxillofacial trauma surgeons would achieve similar outcomes.

Zrounba and colleagues's⁴ study looked retrospectively at 5 years of data treating condylar and subcondylar fractures via an open approach. From the results, they supported open repair stating there is a low complication rate while achieving better reduction and secure placement of plates. Furthermore, a meta-analysis by Kyzas and colleagues⁵ showed that open reduction is as good as conservative management in all cases and may be the superior treatment option in select cases. This finding needs to be viewed in relation to a potential selection bias that would likely have shown an advantage for closed reduction.

There are no definitive recommendations for when endoscopic repair is indicated. In general, noncomminuted fractures with lateral override are considered easier to repair endoscopically than their counterparts. Bilateral fractures pose the additional challenge of reestablishing mandibular height. Edentulous patients also create the challenge of determining the height and position of the mandible without the guidance of the occlusion. High subcondylar or condylar head fractures are also challenging because of the difficulty plating these fractures.

Kokemueller and colleagues's⁶ prospective study compared closed treatment with endoscopic repair in patients with condylar neck fractures with or without dislocation. In the short-term, the patients treated with closed management reported less pain and dysfunction than the endoscopic group. However, at the 1-year follow-up, there were significantly fewer symptoms overall in the endoscopic group in regard to pain, occlusal disturbances, and articulation, suggesting that these patients benefit from endoscopic repair.

Endoscopic repair of subcondylar fractures has been described using both a transoral and a submandibular approach. Although the submandibular approach provides a more head-on view of the fracture, it the authors' preference to perform a transoral approach and, hence, avoid an external

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