



Open Versus Closed, Mandibular Condyle Fractures
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Summary

Open versus Closed, Mandibular condyle fractures

Chapter 2 describes the closed treatment modality.

In chapter 2.1, a systematic review provides an overview of the studies exclusively pertaining to closed treatment published to date and summarizes the existing closed treatment modalities and their clinical outcomes. A systematic search identified 16 studies with a total of 1535 patients with mandibular condyle fractures. The most frequently described outcome measures were occlusion, mouth opening, range of motion of the mandible (ROM) and pain. In these studies, 89% of patients had no occlusal disturbances by the end of the follow-up period. The presence of some form of malocclusion ranged from 0 to 24%. Overall, in these studies, the final review reported 'good opening' of the mouth in 86% of cases and an unlimited range of motion of the mandible in 84%. No cases of ankylosis were reported. The reported incidences of pain at rest ranged from 0 to 16%. Ninety-two percent of patients were free of pain. However, because of the heterogeneity of the study groups, high rates of loss to follow-up, poor descriptions of the different treatments given, and variability in the methods used to measure the outcome, no clear association between the treatments applied in the studies and outcomes could be determined. The present research confirms that there is currently no uniform standard for closed treatment of condylar fractures that ensures good clinical results, mainly because of a low level of evidence. Establishment of such a standard could potentially improve treatment outcomes.

In [chapter 2.2](#), an alternative non-surgical procedure for managing malocclusion complications associated with closed treatment of condylar fractures is presented. Four patients with post-traumatic malocclusion following conservative treatment were referred to our center in 2013 and 2014 and treated with hypomochlions or occlusal stops to modulate the feedback mechanism that had developed in these patients.

After removal of the occlusal stops and a period of physiotherapy to restore proprioception, stable functional occlusion was achieved within 6 weeks in all patients. This result indicates that post-traumatic malocclusion complications following conservative (closed) treatments can be successfully resolved without the need for further invasive surgical procedures.

Chapter 3 focuses on the open treatment modality.

In [chapter 3.1](#), the systematic review on open treatment provides an overview of the studies published exclusively on open treatment and summarizes the existing open treatment modalities and their clinical outcomes. Seventy studies were selected for detailed analysis. Most studies reported good results with regard to outcome measures. Surgical complications including hematoma, wound infection, weakness of the facial nerve, sialocele, salivary fistula, sensory disturbance of the great auricular nerve, unsatisfactory scarring, and fixation failure were reported. This review suggests a high level of methodologic variance in the relevant studies published to date, such that no evidence-based conclusions or guidelines can be formulated with regard to the most appropriate open treatment at present. Establishment of such standards could potentially improve treatment outcomes.

Chapter 3.2 focuses on the approach used in the open treatment modality and provides an overview of the complications of extraoral approaches to condylar fractures. Given the diversity in fractures, approaches, and surgical techniques, it is difficult to objectively compare the surgical techniques used for condylar fractures and their complications. The literature suggests that there is no preference in terms of the skin incision but that a transparotid approach is advocated.

Chapter 4 discusses the 'open versus closed' controversy. The outcomes of a cross-sectional study are presented. The outcomes of the treatment of condylar fractures according to responses on the MFIQ for (subjective) self-reported mandibular function, the Diagnostic Criteria for Temporomandibular Disorders for TMD complaints and jaw dysfunction (chapter 4.1), mixing ability test for masticatory performance (chapter 4.2), and cone beam computed tomography scans (chapter 4.3) were used to compare the open and closed treatment modalities. In total, 74 of 171 patients participated in this study. The mean MFIQ score was 10.70 (standard error 2.9) in the open group and 4.96 (standard error 1.3) in the closed group ($P = 0.013$), and thus an outcome in favor of the closed treatment group. Examination according to the Diagnostic Criteria for Temporomandibular Disorders did not reveal a significant prevalence of TMD complaints. The correlation between objective masticatory performance and self-reported mandibular function was positive ($r = 0.250$; $P = 0.033$). Patients who were male, received physiotherapy, had no other mandibular fractures, and/or had satisfactory self-perceived occlusion were found to better masticatory performance. No significant difference in the Mixing Ability Index (MAI) was found between open and closed treatment.

No significant difference in condylar volume between the open and closed treatment methods was found. But, a larger condylar volume was associated with better chewing ability and patient gender and MMO influenced post-treatment condylar volumes. Overall, good results were achieved with both open and closed treatments.

Chapter 4.4 presents a promising alternative to the conventional pragmatic RCT, which is presently the golden standard for evaluating the effects of medical interventions. A RCT to address the question of 'open versus closed' has been proven to be challenging in terms of logistics, planning, and costs.⁴⁵ A cohort multiple RCT approach, which is designed to facilitate randomized trials for pragmatic evaluation of interventions,^{45,51} may be a feasible research option.