Chapter 8

In Chapter 1, an introductory overview is given on the aetiology and incidence of mandibular fractures in general. The different anatomical localisations of mandibular fractures are described, with the mandibular condyle being the most frequently affected site. The anatomy of the mandibular condyle and the complexity of the treatment of fractures in this region is described, as well as possible complications.

Treatment of mandibular condyle fractures refrains to be a subject of controversy. Most studies comparing different treatment modalities have gained acceptable results with both conservative and operative methods. In recent years, a trend can be seen towards more operative treatment of especially lower (condylar base and condylar neck) mandibular condyle fractures.1–3

A review is presented in Chapter 2. The purpose of this review is to compare the influence of objective and subjective treatment outcomes after open versus closed treatment of mandibular condyle fractures on quality of life, based on the current literature. Subjective outcomes may differ from objective outcomes that are rated by clinicians.4 Many studies have compared treatment outcomes after open reduction and internal fixation (ORIF) and closed reduction (CR) of mandibular condylar fractures. However, patient centered-outcomes are rarely taken into account.5 Thirty-six studies were found in the review in chapter 2 of this thesis. Twenty-eight retrospective studies, in addition to eight prospective studies were assessed. Three studies did report on subjective discomfort, all three using the MFIQ questionnaire. Although many studies investigated (objective) measurements (e.g. range of motion, masticatory function), no studies evaluated quality of life outcomes.

From the literature in chapter 2, it was learned that to date there seems to be controversy concerning the best treatment in case of a mandibular condyle fracture. Imaging plays an important role in both the diagnostics and the treatment decision-making in mandibular condyle fractures. Several of the studies that have been assessed in the review stated shortening of the height of the ascending ramus to be one of the diagnostic criteria for fracture displacement. Different cut-off points have been used in the literature as a critical value indicating ORIF.6–9 In Chapter 3 the validity and accuracy of the measurement of mandibular ramus shortening on OPT is studied. Seventy-four patients and 74 controls were studied. The height of the ramus on the fractured was less than that on the uninjured side, although this was not statistically significant (p = 0.25). In the control group, 50 subjects (68%) had a difference in the ramus height of more than 2 mm. Of 74 patients, 25 (34%) had a shorter, uninjured ramus on the opposite side. The interobserver and intraobserver reliability both showed excellent agreement for all measurements that were done. In conclusion, although shortening
of the mandibular ramus may technically be relatively easy to measure on OPT (with high inter- and intra-rater reliability) it cannot be relied on as an absolute indication for intervention.

Dysocclusion is one of the most common hard tissue complications after maxillofacial trauma. The incidence of a posttraumatic dysocclusion is reported to be 5-20%. It is the main indication for secondary operative intervention after maxillofacial trauma. Chapter 4 describes all patients suffering from a posttraumatic dysocclusion, severe enough to impede sufficient functioning and thus negatively influencing the quality of life, leading to an indication for secondary surgical intervention between 1970 and 2012 at our hospital. In 42 years, 64 patients underwent orthognatic surgery for a posttraumatic dysocclusion. After treatment of maxillofacial trauma different types of dysocclusion may occur including anterior open bite, lateral open bite, crossbite, mandibular retrognathia, maxillary retrognathia or laterognathia. Several orthognathic surgical modalities are available to treat these dysocclusions. In the present study these modalities proved to be unilateral sagittal split osteotomy, bilateral sagittal split osteotomy, Le Fort I, vertical ramus and segmental osteotomies or combinations of the before mentioned. Further, according to the literature the time frame between the initial treatment of the trauma and the occurrence of the dysocclusion is important for the treatment of the dysocclusion. In the present study we were not able to draw firm conclusions on the importance of this time frame. In conclusion, as the majority of patients were initially treated conservatively, even without surgical repositioning of the fractured mandibular condyle, a posttraumatic dysocclusion indicating secondary surgery is a seldom complication.

As has been stated previously in chapter 4, several types of dysocclusion may result from a mandibular condyle fracture. Unsuccessful outcomes may occur even with a good treatment course, as not all patients might have the biological ability to adapt to their injury harmoniously. An attempt was made to provide an insight into the occurrence of dysocclusion after a unilateral mandibular condyle fracture in Chapter 5. In silico experiments were performed, using a biomechanical model of the human masticatory system, with alterations applied mimicking a fracture of the mandibular condylar process. The biomechanical analysis demonstrated that after a unilateral mandibular condyle fracture, jaw movements became non-symmetrical, despite symmetrical muscle activation. The model predicted the jaw to close with an open bite, conform clinical observations. However, the orientation of the laterodeviations upon jaw opening were not in accordance with clinical observations. Future research using the biomechanical model to predict jaw movements after treatment for a mandibular condyle fracture is aimed for.
After addressing difficulties concerning the diagnostics, treatment and treatment outcomes of unilateral mandibular condyle fractures, in Chapter 6 an attempt was made to quantify the level of agreement in the clinical setting, on the classification and treatment decisions in three different unilateral mandibular condyle fracture cases. Consistent with what is known from the current literature it seems, according to the results from this study, there is a large degree of controversy when it comes to unilateral mandibular condyle fractures. Both classification as treatment decision-making are largely done based on expert opinion, and vary notably amongst maxillofacial surgeons worldwide. The number of years of experience of a surgeon did not seem to influence treatment decision-making. However, the continent of residence and practice do significantly influence the choice of treatment. In Northern-America, maxillofacial surgeons will less frequently choose an operative treatment, compared to colleagues from other continents. European surgeons showed a preference for expectative treatment relative to conservative treatment with IMF, when compared with surgeons from other continents.

Assessment of the condylar head and condylar neck fracture based on 3D imaging resulted in significantly more operative treatments compared to assessment based on 2D imaging. In conclusion, based on the result from both Chapter 3 and Chapter 6, it may be advisable to choose conebeam CT as imaging technique of preference, when a mandibular condyle fracture is suspected.
Summary

References


5. Oliver R: Condylar fractures: is open or closed reduction best? Evid Based Dent 9: 84-2008


