

Systematic Review Trauma

Closed treatment of unilateral mandibular condyle fractures in adults: a systematic review

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Abstract. Of all mandibular fractures, 25–35% are condylar. Many studies have focused on whether to treat such fractures via open or closed modalities. A uniform protocol for closed treatment is lacking, but such a protocol could ensure good clinical practice. The aims of this systematic review were to provide an overview of the published studies exclusively pertaining to closed treatment and to summarize the existing modalities for closed treatment and their clinical outcomes. Sixteen studies were selected for detailed analysis. The treatments given were highly variable, ranging from doing nothing to applying maxillomandibular fixation with stainless steel wires. The results of the different studies and the treatment modalities used were difficult to interpret; however no clear differences in the outcome measures were seen between the treatment modalities applied. Complications encountered after closed treatment included malocclusion, limited mouth opening, reduced range of motion, and persistent pain. Due to the heterogeneity between groups, high loss-to-follow-up, poor descriptions of the treatments given, and variability in outcome measurement methods, no clear associations between adverse outcomes and the treatments applied could be determined. This review suggests that due to the high level of methodological variability in the relevant studies published to date, there are currently no uniform standards for the closed treatment of condylar fractures that can be expected to yield good clinical results. The establishment of such standards could potentially improve treatment outcomes.

Key words: mandibular condyle; mandibular fracture; conservative; closed; non-invasive; non-surgical.

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The mandible is prone to external forces as a result of its exposed position in the maxillofacial skeleton. Thus, mandibular fractures are one of the most common facial fractures (42–66%).^{1–3} Of all mandibular fractures, 25–35% are fractures of the mandibular condyle.^{4–6} This can be explained by the fact that the mandible is similar to a hunting bow in

shape—strongest in the midline (symphysis) and weakest at the ends (condyles).

Treatment options for fractures of the mandibular condyle consist of either closed treatment or open reduction with internal fixation (ORIF).^{7,8} Several studies have reported favourable clinical results with closed treatment of condylar fractures.⁹

Some of these studies have even concluded that the closed approach should be regarded as the first choice of treatment for condylar fractures,^{10–12} based on the assumption that closed treatment methods are favourable in terms of the potential complications arising from surgical treatment.

Potential complications of closed treatment include malocclusion (particularly

open bite), reduced posterior facial height, facial asymmetry, chronic pain, and reduced mobility.^{8,13}

Conservative treatment normally consists of a period of maxillomandibular fixation (MMF). It is widely held that immobilization is likely to maintain and/or re-establish normal occlusion and relieve post-traumatic pain.¹⁴

Recent studies have generally focused on whether to treat mandibular condyle fractures via open or closed methods.

However, none of these studies has focused on the outcomes of different closed treatment procedures.^{15,16}

Due to the substantial diversity of definitions of closed treatment, a uniform protocol/guideline for closed treatment is required. Most closed therapy interventions require expert experience. The aims of this systematic review were to provide an overview of the literature published exclusively on closed treatment, to generate a summary of the existing closed

treatment modalities, and to define what the outcomes of these modalities are.

Methods

Systematic literature searches were performed in PubMed (all indexed years, Appendix) and Embase (all indexed years, Appendix) on 19 May 2015, with multiple search terms. The searches excluded case reports with 10 or fewer subjects, and only reports in English, German, or Dutch were considered. All remaining prospective and retrospective human clinical studies reporting data relating to any form of closed treatment of unilateral fractures of the mandibular condyle and the outcomes of those treatments were included. A flow diagram of the inclusion process is given in Fig. 1.

In the primary review process, conducted in accordance with the PRISMA criteria, two authors (RB and AR) first screened the titles and abstracts of the articles retrieved to determine potential relevance.¹⁷ Next, the full-text articles were retrieved and relevant articles were designated for inclusion. The references sections of all of these articles were hand-searched for further relevant articles; as a result, four additional articles were identified and assessed. Any disagreements relating to inclusion were resolved by discussion with a third person (LD). The articles included were critically appraised via a checklist of key criteria (Table 1).¹⁸

Results

A total of 16 studies were identified in the systematic search.^{5,11,19–32} These studies included a combined total of 1535 patients with mandibular condyle fractures (Tables 2–4). The year of publication of the selected studies ranged from 1952 to 2015. The sample size in almost 50% of the studies was more than 100 patients. The mean age of the patients in the studies was 31 years, but unfortunately some of the studies did include children. A clear distinction between children and adults was not made in any of the studies. The male to female ratio was 3:1. Both mandibular joints were fractured in 20% of the cases; the fractures were unilateral in 80% of the cases. In the cases of unilateral fracture, 53.6% were on the left side and 46.4% were on the right side. Of these fractures, the location was intracapsular in 17% and extracapsular in 83%. Follow-up periods varied substantially. Silvennoinen et al. reported the shortest mean follow-up period (5.4 months),⁵ while Andersson et al. reported the longest (31 years).¹⁹

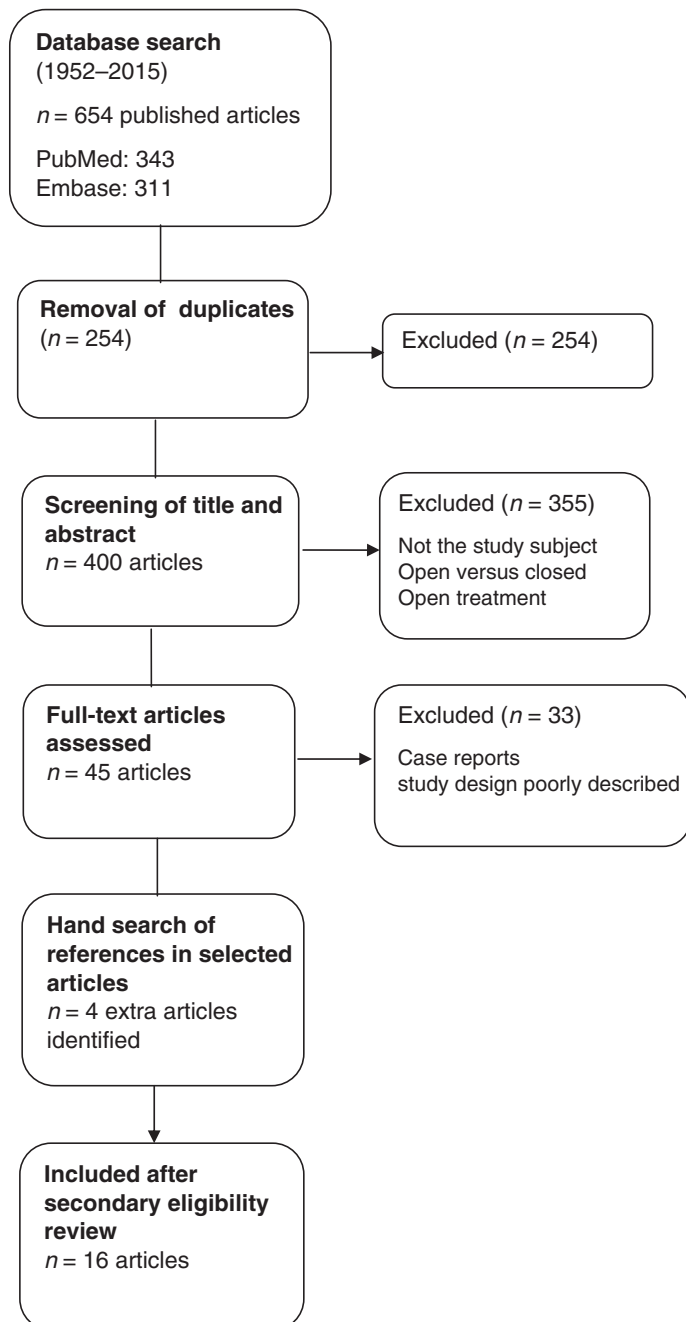


Fig. 1. Flow chart of the study selection and inclusion process.

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