

Systematic Review
Trauma

Complications associated with the treatment of fractures of the dentate portion of the mandible in paediatric patients: a systematic review

A. N. Bobrowski¹, M. A. Torriani¹,
C. L. Sonogo², P. H. de A. Carvalho¹,
L. K. Post¹, O. L. Chagas Júnior¹

¹Oral and Maxillofacial Surgery Residency Program, University Hospital at the Federal University of Pelotas, Pelotas, Rio Grande do Sul, Brazil; ²Graduate Program in Dentistry, Oral and Maxillofacial Surgery, Lutheran University of Brazil, Canoas, Rio Grande do Sul, Brazil

A. N. Bobrowski, M. A. Torriani, C. L. Sonogo, P. H. de A. Carvalho, L. K. Post, O. L. Chagas Júnior: Complications associated with the treatment of fractures of the dentate portion of the mandible in paediatric patients: a systematic review. *Int. J. Oral Maxillofac. Surg.* 2017; 46: 465–472. © 2016 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Abstract. This study aimed to answer the following question: What is the best treatment option for fractures of the dentate portion of the mandible in paediatric patients when considering the occurrence of postoperative complications? A systematic literature review was done using the PubMed, Scopus, and Cochrane Library databases, and 1186 articles on the topic were found. Twelve of these articles were included in the final review after the full texts had been read. A sample of 178 paediatric patients was obtained. In the six cases in which treatment was surgery with titanium plate fixation, there were no postoperative complications, whereas in the 141 cases in which treatment was surgery with biodegradable plates, there were 12 postoperative complications, and in the 31 cases in which treatment was non-surgical, there were three postoperative complications. A connection between the best treatment and the number of postoperative complications in fractures of the dentate portion of the mandible in paediatric patients could not be established; however, the occurrence of postoperative complications was low for both surgical and non-surgical treatments.

Key words: mandibular fractures; child; treatment.

Accepted for publication 19 December 2016
Available online 16 January 2017

Mandible fractures are one of the most common types of injuries resulting from maxillofacial trauma in children, comprising 20–50% of all facial fractures.¹ Following the nasal bones, the mandible is the most frequently fractured facial bone in

this age group. The condyle is the most common region, followed by the symphysis and parasymphysis, which is affected more often in children than in adults, possibly due to the presence of canine tooth germs at the lower edge of the mandible.²

Automobile and sports accidents, falls from height, bicycle falls, and violence are the most frequent mechanisms.³

The management of paediatric mandible fractures is particularly challenging because of significant differences from

adults, whether related to the anatomy, the dynamic nature of the developing mandible, and/or the clinical management of these patients. These differences include the small size of the facial bones, the instability of the deciduous or mixed dentition, the development of tooth germs, the relatively soft bone showing good elasticity, the rapid repair process, and difficulties in acceptance and cooperation.¹

Due to the characteristics mentioned above, the management of paediatric mandible fractures requires extra care, and can range from treatment with a soft diet and clinical follow-up, to non-surgical treatment (closed reduction associated with non-rigid fixation – splints or intermaxillary fixation (IMF)), and to surgical treatment (open reduction associated with functionally stable fixation with titanium or biodegradable osteosynthesis plates).⁴⁻⁶

Because a child's mandible is more fibro-elastic than an adult's, incomplete fractures are more common, and the presence of permanent tooth germs often leads to non-surgical treatment of the fractures.⁷ When complete, these fractures generally show small displacement without causing dental disocclusion, and their management only requires painkillers, a liquid or soft diet, attention to oral hygiene, an observation period, and long-term follow-up; the patient should also avoid intense physical activity for a few weeks.⁴

However, for complex fractures, whether displaced or comminuted, the method of treatment is controversial. Mandible fractures are difficult to handle because of the need for three-dimensional mandible control. Although non-surgical treatment with non-rigid fixation (splints) is effective in stabilizing the fracture, this technique does not ensure three-dimensional control in all cases. According to Glazer et al.⁸ and Ferreira et al.,⁹ non-rigid fixation is not suitable for children.

IMF is not easily tolerated by children, as it blocks mandibular movements, causing discomfort and increased anxiety; furthermore, it is detrimental to the child's quality of life, as a liquid diet adversely affects nutritional intake. Moreover, this type of fixation should be used with caution, inasmuch as it may also result in ankylosis of the temporomandibular joint. Due to the number, stability, and anatomy of the crowns of the teeth available – some deciduous teeth and some partially erupted permanent teeth – proper anchoring of Erich arch bars may be difficult to obtain and result in tooth avulsion, undermining the dental arch stabilization.¹⁰

Splint fixation with circum-mandibular wires is effective in providing stability to

the mandible and can eliminate the need for IMF, but requires intraoperative moulding and the production of models, which are difficult to manufacture in the operating room, as timing is important and materials may not be available.⁴ Furthermore, splint removal requires a second procedure under general anaesthesia.

Open reduction and internal fixation (ORIF) of mandible fractures in children is generally avoided due to the potential damage to developing tooth germs and disruption of the periosteum.¹¹ Osteosynthesis plates installed at the bottom edge of the mandible, in association with monocortical screws, do not usually affect the germs, but extra care is required in the canine area, since these teeth have a lower position and are close to the inferior alveolar nerve.¹² A reduction of the mandibular immobilization period also contributes to the recovery of joint function.¹³

According to Iatrou et al.,¹ surgery is the standard treatment for displaced mandible fractures in children, but issues may arise with the use of titanium fixation, such as allergy, corrosion, plate migration, and limitations of bone growth, and a second intervention may be required for their removal. Although there is no definite evidence of the metal fixation effect on mandibular growth, there is great concern regarding the removal of these materials in children.¹⁴

Alternatively, resorbable plates can be considered for the treatment of paediatric mandible fractures¹⁵; such plates will contribute to a reduction in secondary interventions.¹ Due to the load-bearing nature and direction of various opposing muscle groups on the mandible, isolated biodegradable plates may not be able to withstand the forces acting on displaced mandible fractures. In order to improve the capacity of resorbable plates to withstand these forces, additional stabilization of the dental arch using Erich bars, or steel or orthodontic wire splinting is employed to help fixation.¹⁶ Economic factors can also restrict the use of resorbable materials.¹⁷

The aim of this study was to perform a systematic literature review to determine the best choice of treatment for fractures

of the dentate portion of the mandible in paediatric patients through an analysis of the postoperative complications presenting for each mode of treatment.

Materials and methods

This systematic review was based on the PRISMA P-2015 criteria for systematic reviews (preferred reporting items for systematic review and meta-analysis protocols).¹⁸ The following databases were searched to identify articles: PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>), Scopus (<http://www.scopus.com/search/form.url?zone=TopNavBar&origin=searchadvanced>), and Cochrane Library (<http://onlinelibrary.wiley.com/cochranelibrary/search/>).

Selection criteria

The following inclusion criteria were applied for the initial selection: publications in English, without time restriction; studies performed in humans; specific studies showing the treatment of fractures of the dentate portion of the mandible in paediatric patients. For the initial selection, article titles and/or abstracts were analyzed. The criteria outlined in Table 1 were used for the final selection in this review, after the previously selected articles had been read in full. The selection criteria were established by the authors before the start of the study.

Search strategies

After a brief reading on the topic, a search was performed using the following keywords: ‘‘mandibular fractures’’; ‘‘mandible fracture’’; ‘‘child’’; ‘‘children’’; ‘‘treatment’’; ‘‘therapeutics’’; ‘‘not condyle’’’. The databases used have different advanced search engines; the search lines shown in Table 2 were adopted for each database.

The titles and abstracts of all articles identified were read by two independent reviewers (ANB and CLS). After the initial selection, the two examiners (ANB and CLS) read the full texts of the selected articles against the eligibility criteria

Table 1. Eligibility criteria.

Eligibility criteria for inclusion in the final review
Systematic reviews and meta-analyses, randomized clinical trials, prospective and retrospective clinical studies, case series
Number of patients treated
Location and treatment of fractures (surgical or non-surgical)
Postoperative follow-up
Eventual complications of each treatment modality

Download English Version:

<https://daneshyari.com/en/article/5639257>

Download Persian Version:

<https://daneshyari.com/article/5639257>

[Daneshyari.com](https://daneshyari.com)