

Infant Multiple Mandibular Fracture: Case Report

Fractura Múltiple Mandibular en Infante: Reporte de Caso

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SUMMARY: Infant facial fracture incidence is low. Most reported cases affect the jaw and are single fractures. We present a twenty-two-month old patient, who had a high-energy car accident. Among other injuries, she suffered a multiple mandibular fracture: bicondylar, left body and right parasymphiseal. Stable internal fixation of parasymphiseal and body mandibular fracture was performed on the third day. Condylar fractures had a functional treatment with switching elastic traction to prevent ankylosis. Computed tomography (CT) showed mandibular condyles remodelling after six months. Clinical examination showed that mandibular movement ranges were preserved without alteration. Successful treatment of paediatric patients is based on the achievement of an adequate anatomic reduction and the stability of the fracture, allowing opportune form and function recovery, in order to assure further development of dental and facial structures.

KEY WORDS: Multiple fractures; Mandibular fracture; Infant.

INTRODUCCIÓN

Incidence of facial fractures in paediatric patients is low, particularly when it affects children under two years old and it represents between 0.9 and 2.6 % of the cases (Haug & Foss, 2000; Chidzonga, 2006). This low percentage is due to a reduced exposure to causative factors because of parental protection (Knoche *et al.*, 2012; Vasconcelos *et al.*, 2009; Glazer *et al.*, 2011; Muñante-Cárdenas *et al.*, 2011) and the bones anatomical characteristics that are of greater elasticity. Despite this low incidence, many cases of infant mandibular fractures are referred to in papers, being 96 % single fractures and 4 % double fractures (Knoche *et al.*; Chidzonga; Yen *et al.*, 2004). We present the case of a patient of this age group with multiple mandibular fractures, which has not been previously reported.

CASE REPORT

A 22 months old patient, with no morbid record who had a car accident, was expelled in her mother's arms through the windscreen after crashing against a road barrier. She was found conscious, ten meters away from the car and then taken to the emergency of the Hospital Clínico San Borja Arriarán (HCSBA), Santiago-Chile. During the physical examination the patient was connected, Glasgow scale 15, she had a right periorbital ecchymosis, severe right hemifacial edema, erosive facial injuries, erosive chin wound (Fig. 1), blunt cutting wound in the inner side of the lower lip, gingival wound of upper front teeth zone, avulsion of 52 and 53 teeth, luxation of 51 and 61 teeth. Diagnosis was carried out after multidisciplinary evaluation: uncomplicated closed cranio-

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encephalic trauma, uncomplicated abdominal contusion, traumatic dental injuries and multiple mandibular fractures. The images of computed tomography (CT) revealed bicondylar, left body and right parasymphiseal mandibular fracture and alveolar fracture in the area of upper incisors (Fig. 2). Patient remained in intensive care unit where cleaning and disinfection of wounds was done; antibiotic treatment was indicated with intravenous cefazolin

and analgesia. Three days after the accident the following interventions were performed: internal fixation with miniplates and screws in the parasymphiseal and body mandibular fracture was made (Fig. 3), the lip and gingival wound were sutured, splinting of inferior-anterior teeth was performed to facilitate the functional treatment of condylar fractures. Moreover, a screw was inserted into the maxillary midline just below the anterior nasal spine (to raffle permanent tooth germs) so that an elastic traction was performed between this screw and the mandibular splint (Fig. 4). Facial CT showed good postoperative fracture reduction. Functional treatment began by alternating elastic traction switching sides every four hours during the day in order to produce contralateral movements of condyles. Elastics were removed at night. This treatment lasted more than a month after leaving hospital. Three months later facial CT showed remodelling of mandibular condyles (Fig. 5) and on the sixth month during clinical examinations laterality and opening ranges were preserved, without deviation from the midline (Fig. 6).



Fig. 1. Pre-surgical appearance.

DISCUSSION

Mandibular fractures treatment planning of infants should be based on anatomy and physiology knowledge of the region. The objectives are to restore function and form with minimal morbidity (Glazer *et al.*; Bast, 2009; Ellis & Throckmorton, 2005). The main aim is to preserve mandibular mobility, allowing normal growth of the condylar skeletal units, given the secondary nature of their cartilage. The function will prevent the occurrence of temporomandibular ankylosis, one of the most serious

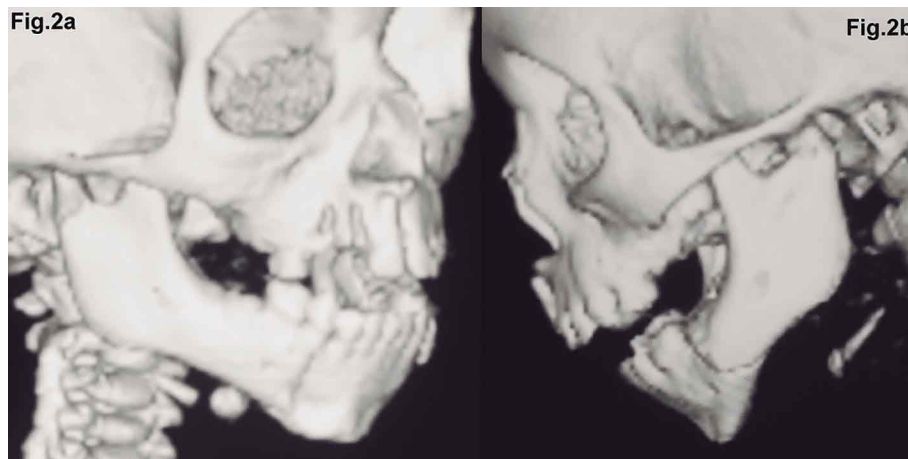


Fig. 2. a) Right condylar and parasymphiseal mandibular fracture. b) Left condylar and body mandibular fracture.

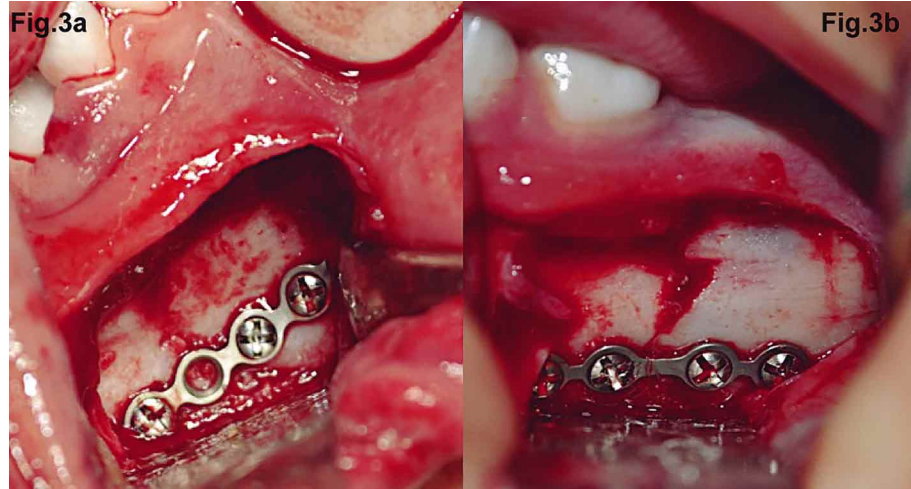


Fig. 3. a) Right parasymphiseal fracture, reduction and osteosynthesis. b) Left body mandibular fracture, reduction and osteosynthesis.

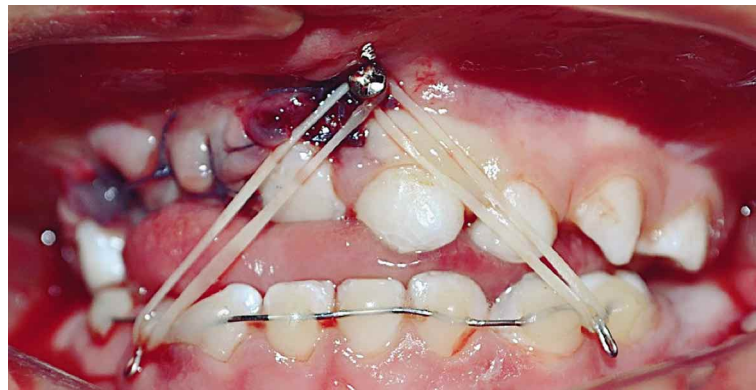


Fig. 4. Maxillary screw and mandibular dental splint for elastic traction.

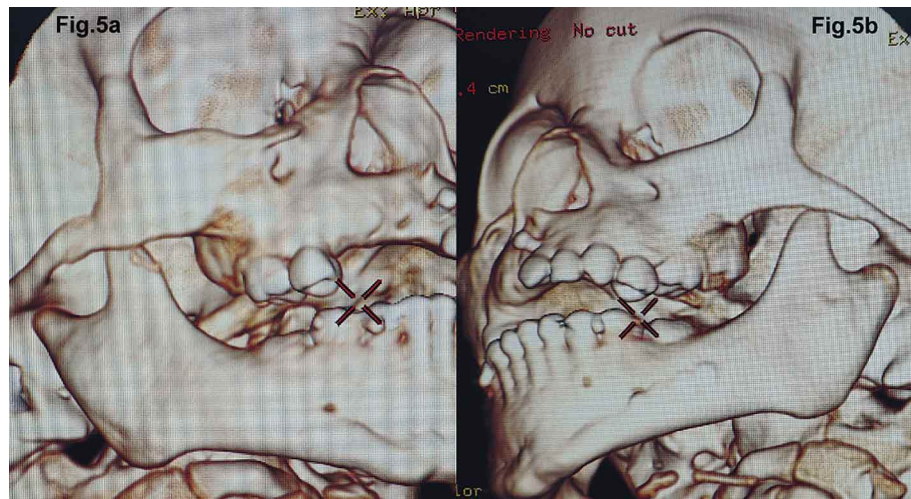


Fig. 5. CT after 3 months of treatment. a) Right side. b) Left side.

complications of condylar fractures. Another function that must be recovered is an adequate dental occlusion.

Paediatric patients have more elastic connective tissue, an increased osteogenic potential and a faster tissue repairing due their better vascularization. Therefore their fracture healing time is less and anatomical reduction should ideally be achieved within the first four days (Haug & Foss; Glazer *et al.*; Muñante-Cárdenas *et al.*; Bast; Herford & Punjabi, 2004).

Therapeutic possibilities of condylar fractures are functional, orthopedic, surgical or mixed (Haug & Foss; Bast; Herford & Punjabi; Sharif *et al.*, 2010). The treatment is defined considering the characteristics of each case, growth stage and development of the patient, the presence of teeth and tooth germs, as well as the therapeutic options available, among others. Whenever possible functional treatment is indicated to children younger than ten years of age with mandibular condyle fracture. This is possible thanks to the high morphological and functional condyle capacity of regeneration, as long-term clinical and experimental studies confirm (Bast; Ellis & Throckmorton; Kotecha *et al.*, 2008; Singh *et al.*, 2010). Independently from the severity of the fracture, after an early, maintained and a good quality functional treatment, an operative condyle generation is achieved, with its new head in the mandibular fossa (Ellis & Throckmorton; Caubet Biayna *et al.*, 2014).

The fractures, in this case, occurred in two different units of the mandibular skeletal complex. Condylar fracture required early mobilization and body fracture needed adequate fixation and immobilization. Therefore, surgical treatment of body and parasymphyseal fractures was made so as to stabilize the jaw, to allow early mobilization of temporomandibular joint and to reduce ankylosis risks.

Currently, due to possible alterations that titanium plates may cause in growing and development patients, the maintenance of them is controversial. One approach considers that plates must be removed after 2-3 months; another proposes to maintain osteosynthesis

material unless a real alteration is observed. On one hand, the latter is based on biocompatibility of titanium. And on the other hand, there is no scientific evidence to establish a causal relation between the presence of titanium plate and changes in facial bone growth (Muñante-Cárdenas *et al.*; Bast). It is important to mention that there is a risk of intraosseous translocation of plates because of mandibular growth, which makes difficult their removal, if required (Haug & Foss; Vasconcelos *et al.*, 2009; Bast).

The mandibular function is essential for dentofacial growth and development. When there are mandibular fractures in young children it is important to ensure a proper reduction and stabilization, as well as to provide the conditions for early and normal mandibular mobility, which is the main morphogenetic agent of the lower third of the face.

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RESUMEN: La incidencia de fracturas faciales en infantes es baja. Los casos reportados muestran que afectan principalmente a la mandíbula y corresponden a fracturas únicas. Presentamos una paciente de 22 meses de edad, que sufre accidente automovilístico. Resulta entre otros, con múltiples fracturas mandibulares: bicondílea, de cuerpo izquierdo y parasinfisiaria derecha. Al tercer día se realiza fijación interna estable en fractura parasinfisiaria y de cuerpo mandibular y tratamiento funcional de las fracturas condíleas a través de tracción elástica alternada, para prevenir la anquilosis. Tomografía computada a los seis meses muestra remodelación de los cóndilos mandibulares. Al examen clínico los rangos de movimiento mandibular están conservados y sin alteración. El éxito del tratamiento en pacientes pediátricos se basa en obtener una adecuada reducción anatómica y estabilidad de la fractura, que permita recuperar oportunamente forma y función, asegurando el futuro desarrollo de las estructuras dentarias y faciales.

PALABRAS CLAVE: Fractura multiple; Fractura mandibular; Infante.

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