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Surgical Treatment of Exclusive Palatine Bone Fracture in Child after Impalement: A Case Report

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Abstract

We report an atypical presentation of an exclusive palatal bone fracture in an 8-year-old child, with laceration of the oral mucosa after being impaled by a broom handle. The child grasped the object with his mouth and while trying to climb on a chair, the object was impaled on the upper part of the oral cavity, perforating the palatine mucosa and fracturing the palatine bone towards the nasal cavity. There was no damage to other structures such as teeth and tongue. A clinical evaluation and tomographic images were obtained revealing the extension of the trauma. Treatment was performed under general anesthesia and nasal intubation, with repositioning of the palatine bone and suturing of the oral mucosa. Oral hygiene with toothbrush and toothpaste was prescribed, including the use of chlorhexidine digluconate rinse and a paste-like diet. The patient's recovery was uneventful with mucosal healing in 4 weeks.

Subject Areas

Dentistry

Keywords

Open Fractures, Lacerations, Rupture, Penetrating Wounds, Hard Palate

1. Introduction

According to data from the Ministry of Health in 2015, unintentional injuries were the leading cause of death in children aged 1 to 14 years in Brazil [1]. The facial region is more prone to trauma due to the exposed and unprotected nature

of this region. Maxillofacial injuries can occur in isolation or as part of a trauma that affects other regions of the body as well.

The palate is an important bone in the middle third of the face, which supports different pillars and helps in determining facial width and architecture. It is a combination of two bones, palatine process of the maxilla and horizontal plate of palatine bone.

Palatine bone is thicker anteriorly compared to the posterior region; it is also comparatively thinner in the midline and thicker toward the alveolus. Fractures of the middle third of the face are frequent, but palatal fractures are very rare. These fractures were first described by Rene Le Fort in his 1901 article on maxillary fractures.

In summary, transverse palatal fracture alone is rare and can be overlooked by an inexperienced practitioner. It can be diagnosed with a thorough clinical and radiographic examination.

The mean incidences of palatal fractures combined with maxillary fractures range from 8% to 46.4% [2] [3] [4] [5].

Children rarely present with middle third fractures due to the elasticity of the facial skeleton and delayed synostosis of the palatal sutures [6] [7]. However, when they occur they are more commonly due to impalement with objects, such as pencils [8].

The tremendous energy required to fracture the palate transversely foreshadows an unfavorable clinical outcome for the patient [9].

We will report an atypical presentation of exclusive palatal bone fracture in an 8-year-old child with laceration of the oral mucosa after suffering impalement from a broom handle.

This clinical case is justified by the rarity of the type of fracture that occurred, and there are not many published cases of exclusive palatine bone fracture in the literature. Thus, this case is of great value for dentistry and medicine. The aim of this paper is to describe a clinical case of an exclusive fracture of the palatine bone treated at Hospital Municipal Dr. Fernando Mauro. Da Rocha Municipal Hospital—Campo Limpo by the Oral and Maxillofacial team, as well as the trauma mechanism that led to the exclusive fracture of the palatine bone. We report the procedures taken for diagnosis and treatment of the case in question and demonstrate the evolution of the clinical picture after surgical treatment.

2. Material and Methods

This case report occurred at the Hospital Municipal Dr. Fernando Mauro Pires da Rocha. For this, the person responsible for the patient will be called to authorize and sign the Informed Consent Form (ICF) (attachment 1) after reading and verbally explaining it.

3. Case Report

An 8-year-old male child was referred from the Emergency Department to the

Pediatric Emergency Room of the Hospital Municipal do Campo Limpo after trauma with a perforated object in the palate region.

The child grasped the object with his mouth and when trying to climb on a chair, the object was impaled in the upper part of the oral cavity, perforating the palatine mucosa and fracturing the palatine bone towards the nasal cavity. There was no damage to other structures such as teeth and tongue.

The primary evaluation patient was eupneic on room air, active, conscious and oriented, presenting dysphonia with hypernasal speech. Interincisal opening of 40 mm, without pain and without deviation. No complaints of dysphagia.

The temporomandibular joints were not painful on palpation. Maxilla and mandible were unaltered. There was no neurological deficit of the face.

Intraoral examination showed a laceration of approximately 3 cm in the region of the hard palate, well located in the midline, with exposure of the nasal cavity. There was no active bleeding. The palate was detached into the nasal cavity along with the oral mucosa (**Figure 1**). The wound edges were irregular. There were no changes in the muscles near the injury. There was no change in the usual occlusion referred by the patient.

Analgesia was prescribed and imaging tests (CT scan) were ordered.

The CT scan revealed that the palatal defect measured 8.50 mm in the anterior posterior dimension (**Figure 2**).

The patient was taken to the operating room for further examination and definitive treatment.

The treatment initially proposed was osteosynthesis of the palatal region using titanium plates, the use of a mucous flap and suture to cover the synthesis material.

Under general anesthesia and nasotracheal intubation the treatment plan was modified when it was noticed the displacement of the palatine bone that was still attached anteriorly by the maxillary periosteum.

Figure 1. Initial clinical examination.

The palatine bone was mobilized through the nasal cavity, reduced to its original position, where it remained stable. The mucosa adhered to the fractured bone was integrated and did not require a soft tissue graft.

The wound margins were debrided and sutured with 3 - 0 vicryl.

The patient recovered without complications after the procedure. There was no dysphonia. He was hospitalized for observation for 3 days. Patient and guardian were instructed about local care with proper hygiene, using a soft bristle brush on the stitches, and keeping the site clean. Use chlorhexidine digluconate-based mouthwash three times a day after brushing. For light, use pasty diet to avoid displacement of the repositioned bone fragment and suture dehiscence.

After discharge, the patient attended reevaluations at 7 days (**Figure 3**), 14 days, 21 days, and 30 days postoperatively.

In the last visit, a new tomography was requested to verify the osseointegration of the repositioned fragment (**Figure 4**).

In the post-operative clinical examination the soft tissues were in the process of repair (**Figure 5**), revealing a healthy-looking mucosa, without dehiscence and without any type of secretion.

Figure 2. Initial tomographic exam.

Figure 3. Appearance of the operative wound after 7 days.

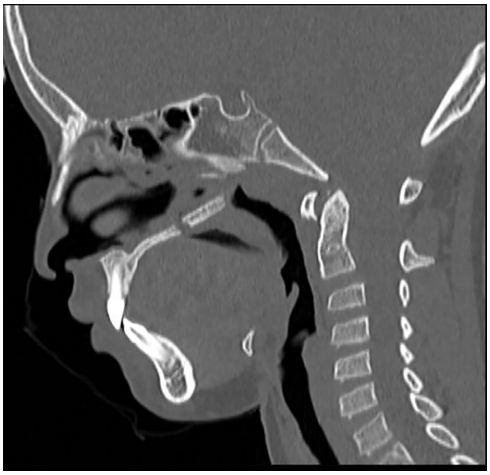

Figure 4. Final CT scan—30 days after surgery.

Figure 5. Appearance of the palatal oral mucosa after 30 days.

In the last clinical examination, only a few sutures were still in position, mucosa with normal coloring, no signs of bulging or infection, and no pain on palpation. Patient was released for normal feeding, but with caution. No pain complaints.

4. Discussion

Children and adolescents are constantly at risk of some type of accident in the domestic setting. According to the Brazilian Society of Pediatrics [10], accidents or unintentional injuries account for more than five thousand deaths and 110 thousand hospitalizations per year. The vast majority of these cases could be avoided.

They rarely occur in isolation as in the clinical case described, usually occur together with other fractures [2] [9] [11]. Corroborating with what was found in all academic material researched, there was only one clinical report of impalement with exclusive fracture of the palatine bone in a child, which shows us the rarity of this type of fracture.

The treatment goal of this patient was to restore the form and function of the palate. The hypernasal speech could be explained by the loss of the oropharyngeal seal of the palatal mucosa, which resulted in air escaping through the defect

of the palatine bone into the nose during speech.

Based on the literature, reduction of the palatal fracture, in general, should be attempted as soon as the diagnosis is made with arch bar followed by miniplate fixation if possible. This should be followed by a short period of intermaxillary fixation (about 2 weeks) [11]. However, in the clinical case reported, after the reduction of the bone fragment to its initial position it presented acceptable stability which led to the decision by the team of surgeons not to fixate the fractured segment using plates and screws. It was also decided not to use arch bars, or intermaxillary fixation since the alveolar ridge was intact and mandibular movement would not cause any movement of the reduced fragment. The decision was made to reduce and reposition the palatal mucosa using sutures combined with postoperative care, especially in relation to feeding during the first 30 days.

5. Conclusion

Fractures unique to the palatine bone are rare, and there is little academic literature on the subject; therefore, cases with this type of trauma should be treated with caution to achieve a good result.

Conflicts of Interest

The authors declare no conflicts of interest.

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