

MANAGEMENT OF FRONTAL BONE FRACTURE USING CORONAL ACCESS

MANEJO DE FRATURA DO OSSO FRONTAL POR ACESSO CORONAL

Luana Ferreira Oliveira¹
Mateus Diego Pavelski²
Geovanna Maria Ramos Porto de Souza³
Melissa Koto Murai⁴
Maicon Douglas Pavelski⁵
Eduardo Francisco de Souza Facco⁶
Idelmo Rangel Garcia Junior⁷
Oswaldo Magro Filho⁸

RESUMO: Introdução: As fraturas do osso frontal são originadas a partir de acidentes de leve ou alta intensidade. Várias modalidades de tratamento têm sido descritas como, tratamento conservador ou a osteossíntese da fratura. Objetivo: O objetivo do presente trabalho é relatar uma abordagem cirúrgica de uma redução e fixação de fratura panfacial, envolvendo o osso frontal. Nesse trabalho utilizou-se acesso coronal para reposicionamento anatômico e restabelecimento do contorno em região frontal. Nenhuma complicação ou seqüela foi observada na preservação de aproximadamente três meses. Relato: Paciente do gênero feminino, 22 anos de idade, foi avaliada pela equipe de Cirurgia e Traumatologia Bucomaxilofacial, em hospital de referência, com história de acidente automobilístico, cursando múltiplas fraturas em face. Ao exame inicial, a paciente se apresentava consciente, hemodinamicamente estável e com todos os sinais vitais dentro dos padrões de normalidade. Foi realizado tomografia computadorizada, a qual indicou múltiplas fraturas em face, incluindo em osso frontal. Diante disso, optou-se por tratamento cirúrgico, sendo realizado por meio de acesso bicoronal, com redução e fixação interna rígida das múltiplas fraturas em face incluindo a de região frontal, sob anestesia geral, sem intercorrências. Resultado: Foi obtido o restabelecimento estético e funcional da região frontal mantendo a integridade da parede anterior do seio frontal. Atualmente, a paciente se encontra com quatro meses de pós-operatório, com resolução das queixas, e local do acesso cicatrizado completamente. Considerações finais: O acesso coronal é uma opção viável para restabelecimento estético de fraturas de osso frontal, proporcionando uma ótima visibilidade transoperatória e adequada cicatrização.

Palavras-chave: Traumatologia. Osso Frontal. Fixação de Fratura.

¹Master's student in Dentistry with Concentration Area in Oral and Maxillofacial Surgery and Traumatology – São Paulo State University Júlio de Mesquita Filho – Brazil.

²Oral and maxillofacial surgeon, Doctoral student in Dentistry with Concentration Area in Oral and Maxillofacial Surgery and Traumatology – São Paulo State University Júlio de Mesquita Filho – Brazil.

³Dental Surgeon from Universidade Brasil, Fernandópolis/SP – Brazil.

⁴Master's student in Dentistry with Concentration Area in Oral and Maxillofacial Surgery and Traumatology – São Paulo State University Júlio de Mesquita Filho - Brazil.

⁵Oral and maxillofacial surgeon, Doctoral student in Dentistry with Concentration Area in Oral and Maxillofacial Surgery and Traumatology – São Paulo State University Júlio de Mesquita Filho - Brazil

⁶PhD in Dentistry with Concentration in Implant Dentistry, Doctoral student in Dentistry with Concentration Area in Oral and Maxillofacial Surgery and Traumatology – São Paulo State University Júlio de Mesquita Filho Brazil.

⁷Oral and Maxillofacial Surgeon, Professor of the Department of Surgery and Diagnosis São Paulo State University Júlio de Mesquita Filho - Brazil.

⁸Oral and Maxillofacial Surgeon, Professor of the Department of Surgery and Diagnosis São Paulo State University Júlio de Mesquita Filho - Brazil.

ABSTRACT: Introduction: Fractures of the frontal bone originate from minor or high-intensity accidents. Various treatment modalities have been described, such as conservative treatment or osteosynthesis of the fracture. Objective: The objective of the present work is to report a surgical approach to a reduction and fixation of a panfacial fracture involving the frontal bone. In this work, coronal access was used for anatomical repositioning and reestablishment of the contour in the frontal region. No complications or sequelae were observed at approximately three months follow-up. Report: Female patient, 22 years old, was evaluated by the Oral and Maxillofacial Surgery and Traumatology team, in a reference hospital, with a history of an automobile accident, with multiple facial fractures. At the initial examination, the patient was conscious, hemodynamically stable and with all vital signs within normal limits. Computed tomography was performed, which indicated multiple fractures in the face, including in the frontal bone. In view of this, we opted for surgical treatment, which was performed through a bicoronal access, with reduction and rigid internal fixation of the multiple fractures on the face, including the frontal region, under general anesthesia, without intercurrents. Result: The aesthetic and functional reestablishment of the frontal region was obtained, maintaining the integrity of the anterior wall of the frontal sinus. Currently, the patient is four months after the operation, with resolution of the complaints, and the access site completely healed. Final considerations: Coronal access is a viable option for the aesthetic restoration of frontal sinus fractures, providing excellent intraoperative visibility and adequate healing.

Keywords: Traumatology. Frontal Bone. Fracture Fixation.

1. INTRODUCTION

Le Fort III, panfacial, orbitoethmoid, and frontal sinus fractures have a 50% or greater risk of being associated with head injury, probably because they involve a wall of the cranial fossa. Depending on the intensity of the trauma, there may be injuries to the anterior and posterior wall of the frontal bone. As such, there is a frequent association with injuries in the orbit, in the central nervous system and in the frontal sinus (MORH et al., 1994).

Fractures of the frontal bone correspond to between 3-5% of facial fractures. The frontal sinuses may be associated with these fractures, due to their thin thickness and because they are located between the internal and external laminae of the frontal bone and may involve the nasofrontal duct. (Alinasab et. Al., 2018).

The etiology of this fracture is varied and may result mainly from physical aggression and car accidents, where the average age of cases ranges from 29.1 years, with 92.3% male patients. Some complications may be associated and are easily diagnosed in the initial clinical examination, such as frontal depression, epistaxis, nasal obstruction and possible neurological alterations (Marinheiro et. Al., 2014).

Treatment ranges from conservative to surgical, depending on the displacement, patient choice and degree of functional and aesthetic impairment.

Fracture reduction consists of repositioning the bone stumps, restoring anatomical and functional integrity, and may use titanium plates/screws and/or titanium mesh and/or biomaterials for filling in cases of advanced bone loss to ensure fixation. In most cases, frontal bone fractures are accompanied by multiple fractures on the face from polytraumatized patients, where the multidisciplinary interaction between neurosurgery and buco-maxillofacial teams is paramount for better planning and surgical execution (Pires et. Al., 2018; Stevens M, Kline SN, 1995; Doonquah L, Brown P, Mullings W. 2012).

Surgical treatment, when indicated, consists of fracture reduction followed by internal fixation. Due to the surgical access used, the importance of disclosing fracture treatment in this region was raised in order to disseminate a viable and safe possibility that guarantees less scarring damage to the patient.

2. OBJECTIVE

The objective of this work is to present a surgical approach as a way of treating fractures of the frontal bone using the coronal access. Its presentation is justified by the possibility of demonstrating the performance of this surgical intervention in this type of fracture.

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3. METHODOLOGY

The criterion used for the bibliographical research for the construction of the text was the selection of articles from the sites of PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>), Revista decirurgia e Traumatologia Bucomaxilifacial, Journal of Oral and Maxillofacial Surgery, Archives of Otolaryngology Head and Neck Surgery and Journal of Neurosurgery. With the selection of articles, reading and analysis were carried out to assemble the work. The articles used were those that presented issues related to fractures of the frontal region, such as anatomy, etiology, signs and symptoms, imaging tests, surgical access, and complications.

4. CLINICAL CASE

A 22-year-old female patient entered the emergency department of the local hospital for evaluation by the Oral and Maxillofacial Surgery and Traumatology team

after being the victim of a car accident with a collision with a fixed object. The patient was eupneic on room air, verbalizing and walking, performing normal physiological functions. On clinical examination of the face, the patient presented edema, abrasions, a step in the frontal region and no rhinorrhea. Also, the presence of periorbital edema and ecchymosis, edema in the supraorbital and frontal regions, where during palpation despite the edema, a sinking of the area was noted, diagnosing a possible fracture. Furthermore, she confirmed the diagnosis with a face computed tomography scan, which showed, through axial, sagittal and coronal sections and three-dimensional reconstruction, the depression of the anterior wall of the frontal bone (Figure 1).

Figure 1 - Computed tomography of the face in three-dimensional reconstruction showing multiple fractures, including a frontal bone fracture.



Source: The author.

Given the diagnosis, the surgical procedure was performed under general anesthesia with orotracheal intubation in a surgical center. The procedure began with trichotomy in the cranial scalp region, marking the surgical incision from the right pre-auricular region to the left pre-auricular region and degermation of the surgical area followed by local infiltrative anesthesia with 2% lidocaine and 1 epinephrine: 100,000 for hemostasis and analgesia. After fixing the field, the incision was made up to the pericranium, the flap was tensioned after using three traction points. (Figure 2)

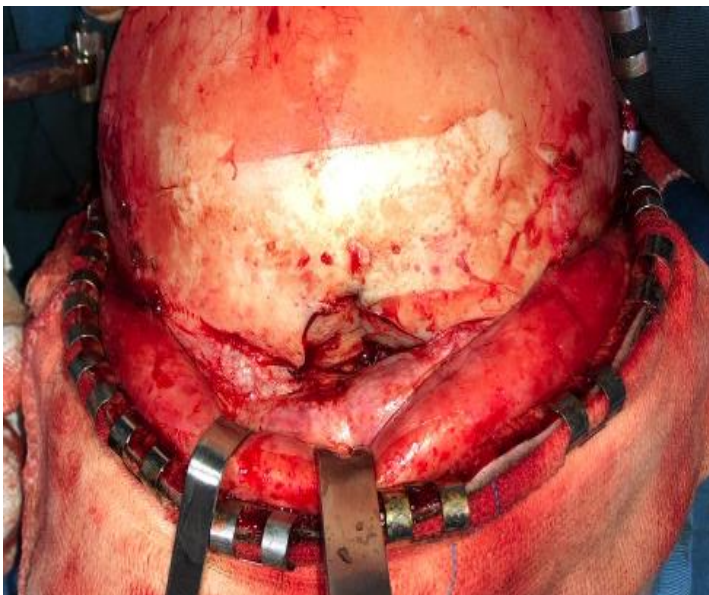
Figure 2 – Trichothymia, marking of the surgical incision from the right pre-auricular region to the left pre-auricular region, degermation of the surgical area.



Source: The author.

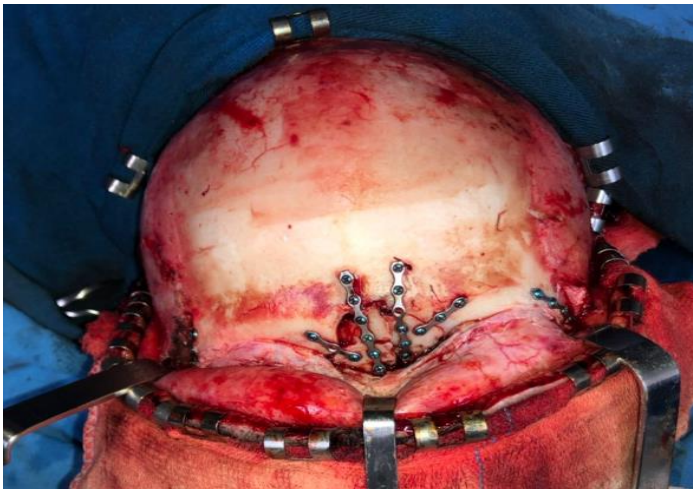
After accessing the fracture, the procedure for reducing and fixing the bone fragments with titanium plates and screws was initiated, anatomically reestablishing the region, followed by the installation of a suction drain in the frontal region (Figure 3, Figure 4). reductions and fixations of the other facial fractures, completing the surgical procedure without interurrences. Computed tomography of the face (Figure 5) showed correct fixation and stability of the fractured bone stumps. The patient was discharged 72 hours postoperatively, with normal physiological conditions, no pain complaints and returning to the outpatient clinic for postoperative follow-up in 07 days.

Figure 3- Exposure of the frontal bone fracture.



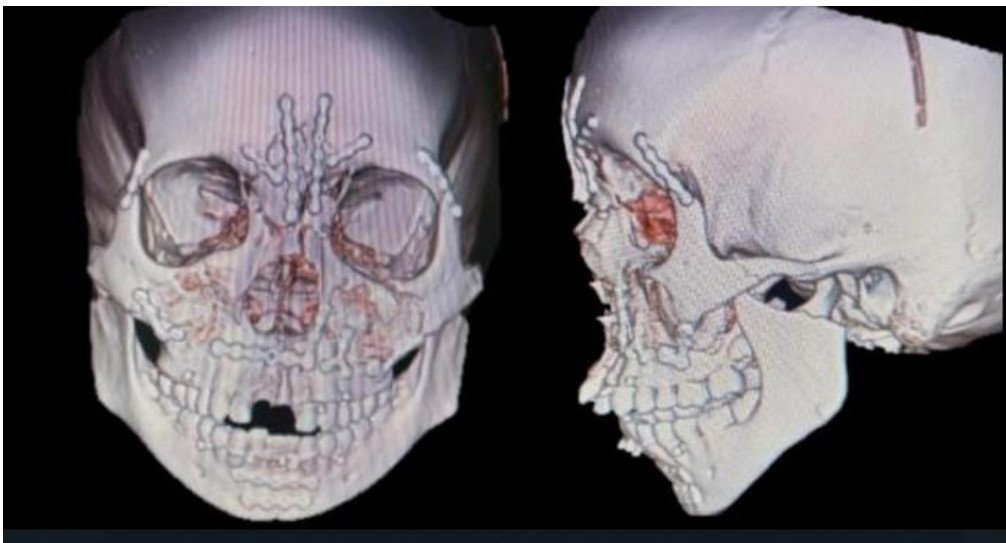
Source: The author.

Figure 4- Procedure for reduction and fixation of bone fragments with titanium plates and screws, anatomically restoring the region.



Source: The author.

Figure 5- 3D Reconstruction from Computed Tomography of the postoperative reduction and fixation of frontal bone fractures and other fractures in the maxillofacial region.



Source: The author.

5. DISCUSSION

Fractures in the frontal bone can be caused by different types of trauma, such as car accidents, falls, assaults or sports injuries. Such a fracture may be isolated or associated with other facial injuries. Treatment depends on the severity of the lesion, associated aesthetics and function. Simple fractures can be treated with immobilization, rest and follow-up, although more severe fractures may require surgery to reposition the bone stumps and fix them with plates and screws (Chukwulebe S, Hogrefe C.2019; Pires WR et., al. 2018).

It is essential to seek medical attention immediately after an injury to the frontal region for proper evaluation and treatment, since fractures in this area can affect important structures such as the frontal sinus and orbitoethmoidal region, in addition to the possibility of other internal injuries, such as cerebral concussions (Stevens M, Kline SN. 1995; Imajo K et., al. 2018).

In surgical treatment, the incision along the coronal plane is made to expose the area affected by the fracture and allow direct access to the fractured bones. Once exposed, the bones can be realigned and fixed with surgical plates and screws to allow for proper healing. Such a procedure is aesthetically favorable for the patient, having a good postoperative prognosis, being performed by the oral and maxillofacial surgeon or in conjunction with neurosurgery (Doonquah L, Brown P, Mullings W. 2012).

It is important to emphasize that the coronal access is an invasive surgical approach and that the decision to use it should be based on the clinical evaluation of the patient and the severity of the fracture. In the case reported in this paper, good repositioning and bone fixation were obtained. Furthermore, surgery involves risks and complications, and these aspects should be discussed in detail with the oral and maxillofacial surgeon before the procedure. Only an experienced and qualified surgeon should perform coronal access surgery in cases of frontal bone fractures (Steve Chukwulebe, Christopher Hogrefe 2019).

FINAL CONSIDERATIONS

The coronal access is a viable option for the aesthetic and functional reestablishment of fractures in frontal regions, providing excellent intraoperative visibility and adequate healing when performed by an Oral and Maxillofacial Surgery and Traumatology team with adequate training.

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