

# AN UNUSUAL PRESENTATION OF ISOLATED OUTER TABLE FRACTURE OF THE FRONTAL SINUS

## A CASE REPORT

**Dr. Harvey Thomas <sup>1</sup>, Dr. Abhilash Mathews Thomas <sup>2</sup>, Dr. Aby Kuruvilla <sup>3</sup>,  
Dr. Riny George <sup>4</sup>, Dr. Hisham Ibrahim <sup>5</sup>, Dr. Sunil R. <sup>6</sup>**

1. Principal and Professor, Department of Oral and Maxillofacial Surgery
- 2, 4, 6. Assistant Professor, Department of Oral and Maxillofacial Surgery
3. Professor, Department of Endodontics and Conservative Dentistry,
5. Professor, Department of Oral and Maxillofacial Surgery,  
Al Azhar Dental College, Thodupuzha

### Abstract

Frontal bone is more protected from traumatic events due to the prominence of the nasal pyramid which protects the naso-orbital region as well as the frontal bone has higher resistance to mechanical impacts. The anterior table of the frontal sinus is normally convex. In cases of high-impact trauma, compressive forces on the frontal bone deform the convexity into a concavity. Comminuted fractures can result in trapped mucosa within fracture lines. This case report discusses a rare frontal bone fracture involving the sinus in a 23-year-old male patient who experienced trauma to the face from a fall. The report provides a thorough examination of the patient's history, clinical findings, and diagnostic process, emphasizing the importance of three-dimensional CT imaging for accurate assessment. The patient underwent surgical treatment with open reduction and internal fixation to address the displaced fracture. The discussion highlights the rarity of frontal bone fractures, their diverse causes, and potential complications, including the risk of infections. Long-term follow-up is emphasized to monitor for complications such as mucocele formation. The case underscores the significance of three-dimensional imaging in accurate diagnosis and its role in guiding appropriate management strategies for frontal bone fractures.

**Key Words:** Frontal sinus, Radiographic Imaging, Bi-Coronal approach.

### INTRODUCTION

Fractures involving frontal bone are rare and are associated with high-impact craniofacial trauma. The frontal bone consists of three parts, the squamous part which is the largest and forms the majority of the forehead supraorbital

margins, and the superciliary arch. The orbital portion forms the roof of the orbit and floor of the anterior cranial fossa and articulates with the trochlea of the orbit. The nasal portion articulates with the nasal bone and frontal process of the maxilla to form the root of the nose <sup>1</sup>. The frontal bone is more protected from traumatic events due to the prominence of the nasal pyramid which protects the naso-orbital region as well as the frontal bone has higher resistance to mechanical impacts. The anterior table of the frontal sinus is normally convex. In cases of high-impact trauma, compressive forces on the frontal bone deform the convexity into a

#### Address of correspondence

**Dr. Abhilash Mathews Thomas**  
Assistant Professor, Department of  
Oral and Maxillofacial Surgery,  
Al Azhar Dental College,  
Thodupuzha  
Abhilashmathews1@gmail.com

#### Quick Response Code



concavity. Comminuted fractures can result in trapped mucosa within fracture lines. This can result in sinusitis or late mucocele formation. Any redundant or injured mucosa at the periphery of the fracture or on isolated bone fragments should thus be removed <sup>2</sup>

### CASE REPORT

This is a rare case report of an isolated fracture involving the frontal sinus, wherein a 23-year-old male patient came to the department with a chief complaint of pain in the right side of the face since three days. Patient gave a history of fall three days back following which the right side of the face hit the floor. There was a history of bleeding from the nose immediately after the fall and vomiting. No history of loss of consciousness or seizures. On extraoral examination, a depression was seen over the right supraorbital ridge region and mouth opening appeared normal. There was no tenderness or deviation in opening and closing the mouth. No tenderness on palpation of the zygomatic arch and infraorbital region. There was tenderness seen on the right side frontal bone region. There was a subconjunctival hemorrhage seen on the right side. On intraoral examination, it was seen that the maxillary arch and mandibular arch were partially edentulous. No presence of bony irregularities or tenderness. There were no occlusal derangements. Based on the patient's history and clinical examination, a provisional diagnosis of frontal sinus fracture was given. The conventional posterior-anterior radiological view did not appreciate any abnormalities. The computed tomography examination revealed a fracture of the right frontal sinus. A three-dimensional view revealed a depressed frontal bone fracture. A final diagnosis of frontal sinus fracture was given and the patient was referred for surgical evaluation.

### TREATMENT DONE

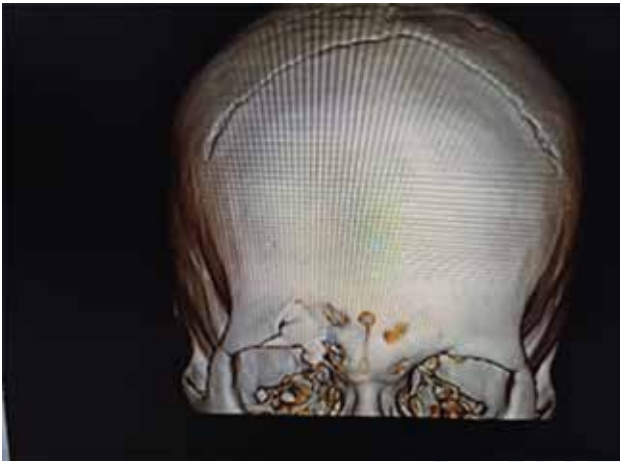
The patient was posted for ORIF under GA. Bi coronal incision was placed. Fracture segment was reduced and fixed using 2-0 Prolene. the wound was closed with 3-0 Vicryl and staple sutures.



Pre operative



CT- Axial view



CT- 3D reconstruction



Closure



Exposure of the fracture site



Post operative

## DISCUSSION

Frontal bone fractures are rare and occur in only 5- 12% of maxillofacial traumas. An estimated 1% to 9% of facial fractures can involve the supraorbital rims and the anterior table of the frontal sinus. The degree of association has been reported to be 95% with fractures of the anterior table or wall of the frontal sinuses, 60% with the orbital rims, 60% with complex injuries of the naso-orbital-ethmoid region, 33% with other orbital wall fractures, and 27% with Le Fort level fractures. Apart from high-energy impacts, and motor

vehicle collisions many other causes have been identified like tire explosions, ruptured garage door springs, chain saws, high-voltage electric shocks, swinging objects, and falls from high places.<sup>3</sup> After the trauma, the patient may manifest with a flattened or depressed supraorbital ridge. These injuries may present with intensely turgid periorbital ecchymoses, edema, soft tissue lacerations, and paresthesia over the area of distribution of the supraorbital and supratrochlear nerves. If the fractures are displaced orbitally then, enophthalmos, exophthalmos and proptosis may be noted, along with diplopia.<sup>4</sup> Ocular discomfort, epiphora, limitation of eye movement, increased scleral show, and increased width of the palpebral fissure have also been reported. A three-dimensional CT may provide excellent detail than a simple CT scanning for the assessment of orbital fractures. Any damage to the posterior table of the frontal sinus can be ruled out by CT. If there is a displaced fracture of the posterior table, then a dural tear is quite possible.

The aim of frontal sinus fracture management is to create a safe sinus, restore facial contour, and aesthetics, and avoid short and long-term complications. When the fractured segments are displaced, surgical exploration, reduction, and stabilization are indicated. Supraorbital rim fractures frequently involve the frontal sinus. The reduction is often stable once the fragments are levered into position, as there are no associated muscular displacing forces. If the anterior table of the frontal sinus and the supraorbital rim are displaced, then operative treatment is required. The primary decision criteria for surgical intervention are the degree of fracture displacement and the presence of a CSF leak. Patients with posterior table displacement less than one table width and no CSF leak present may be observed. Long-term follow-up with repeat CT scans at 2 months and 1 year is appropriate to rule out mucocele formation.<sup>5</sup>

The peculiarity of frontal bone fractures is that inadequate treatment could not only

encompass functional or aesthetical problems but also more dangerous complications such as the risk of infections like meningitis, mucocele, encephalitis, and cerebral abscess.<sup>6</sup> If the involvement of the fracture is limited to the anterior table of the frontal sinus, then an assessment of the frontonasal duct is important to ensure continued drainage of the frontal sinus after fracture reduction. It helps to prevent the formation of a mucocele of the frontal sinus, which could result in the formation of a mucopyocoele, a delayed but serious infectious complication. These patients, therefore, require long-term follow-up. In patients who are at high risk of not returning for follow-up evaluation, cranialization of the frontal sinus with complete removal of all mucosal elements may be necessary to eliminate the risk of later mucocele formation.

## CONCLUSION

This is a case report of an uncommon frontal bone fracture involving the sinus. Here, the main concern would be to maintain the aesthetics and reduce the complication of mucopyocoele formation by long-term follow-up. However, the importance of three-dimensional imaging modality can be appreciated which has led to accurate diagnosis and aids in management.

## REFERENCES

1. Neil S Norton. Netter's head and neck anatomy for dentistry. e book pg 28.
2. Surya Rao RVM, Durairaj AR, Sundaramurthy N, Jesudasan JS. Frontal bone fractures - a report of three different methods of fixation: a case series. *Int Surg J* 2017;4:3162-5
3. Taylor P, McGuire, Petrus P. Gomes, Cameron M.L. Clokie, George K.B. Sándor, Fractures of the Supraorbital Rim: Principles and Management *J Can Dent Assoc* 2006; 72(6):537-40.
4. Garg RK, et al., A novel classification of frontal bone fractures: The prognostic significance of

vertical fracture trajectory and skull base extension, *Journal of Plastic, Reconstructive & Aesthetic Surgery* (2015).

5. E. Bradley strong. Frontal sinus fractures: current concepts. *Craniofacial trauma & Reconstruction*. Volume 2, number 3/4.2009.

6. Oannides CH, Freihofer HP, Friens J. Fractures of the frontal sinus: a rationale of treatment. *Br J Plastic Surg*. 1993;46:208-14.

Conflict of interest: There is no conflict of interest.

