

# SURGICAL REPAIR OF A COMMINUTED FRONTAL FRACTURE AFTER TRAUMATIC HEAD INJURY: - A CASE REPORT

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**Abstract:** *The aim of this case report is to present the surgical technique used for anterior skull base fracture. A 26-year-old patient was admitted to our Service due to mild T.B.I (traumatic brain injury) caused by falling after standing up. The patient presented with common symptoms: headache followed by dizziness with no signs of complications such as IH (intracranial hypertension), meningeal syndrome or CSF (cerebrospinal fluid) fistula. We performed surgery immediately after the computed tomography scan had showed the comminuted fracture with frontal sinus obstruction. During surgery eschilectomy was being performed followed by cranioplasty with titanium mesh at the bone level. The following day the routine computed tomography scan showed no signs of hematoma. Post-operative, under administration of antibiotic treatment and painkillers the evolution of the injury was favorable and the patient was discharged and scheduled to come back one week later.*

**Keywords:** *traumatic brain injury, comminuted fracture, eschilectomy, cranioplasty*

## 1. Introduction

TBI is the leading cause of mortality in patients under the age of 45, as well as head trauma is the leading cause of CSF (cerebrospinal fluid) leak. After a comminuted frontal bone fracture the patients can develop CSF leak, anosmia, seizures, infections or extraaxial or intraaxial haemorrhage [3], [6, 7].

In some cases conservative treatment is a good option but in a complex fracture or a

depressed fracture surgery may be required. Surgery is very useful for infection prevention, treatment of CSF leak and cosmetic aspects [1], [9].

## 2. Case report

A 26-year-old male patient with no significant medical history was admitted to our Neurosurgery Department due to headache, posttraumatic amnesia and dizziness following TBI. Neurological

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examination revealed no motor or sensory deficits, the patient had a GCS score of 15 points.

A computed tomography of the head was performed which showed

comminuted frontal bone fracture involving the anterior skull base. The patient also developed pneumocephalus (figure 1).



Fig. 1. *Preoperative CT scan. Comminuted frontal bone fracture and right frontal pneumocephalus. Median line is preserved and there is no brain edema*

We performed surgery 24 hours after the traumatic event. The patient underwent general anesthesia and he was placed in a supine position on the operating room table with his head slightly raised and in a neutral position.

We performed a modified bicoronal incision and the skin flap was turned anteriorly. The comminuted fracture was revealed and we dissected the periostum that covered the fracture (figure 2).

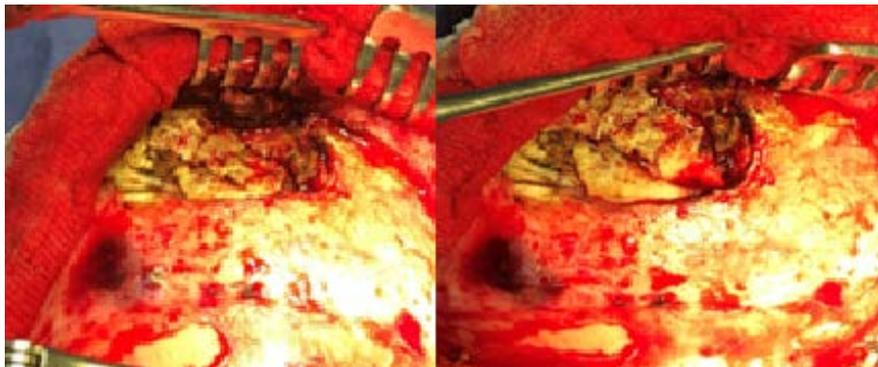


Fig. 2. *Intraoperative aspects after the frontal fracture was exposed*

Eschiectomy was performed with gentle dissection of the bone fragments from the dura mater. One of the bone fragments had perforated the dura mater and a CSF leak was discovered. After eschiectomy

the cranialization of the frontal sinus was performed (figure 3). The frontal sinus was filled with muscle, bonewax and hemostatic material. Dura mater was sutured and anchored. The bone

fragments couldn't been put back because they were very small and fragmented. In order to cover the bone defect we

performed a cranioplasty with titanic mesh (figure 4). We closed the skin in a classic manner placing a subgaleal drain.

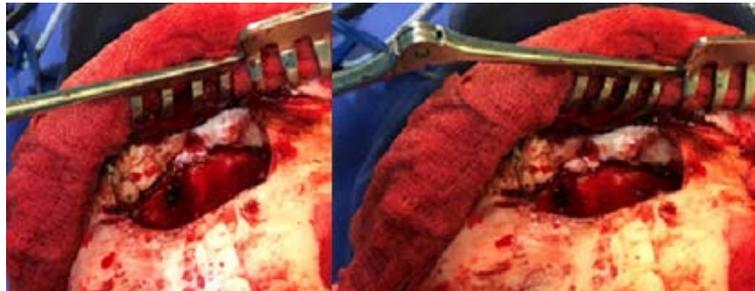


Fig. 3. *Intraoperative aspects - cranialization of the frontal sinus*

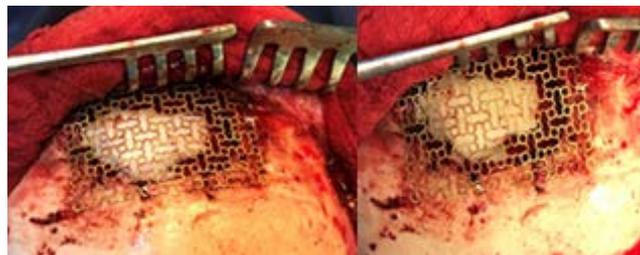


Fig. 4. *Intraoperative aspect – cranioplasty with titanic mesh*

After 24 hours from the operation we performed a follow- up CT scan that

showed no blood on the intervention zone (figure 5).



Fig. 5. *Postoperative CT scan. We can see there is no blood in the intervention zone. Median line is preserved. The titanic mesh is in the correct position and completely covers the bone defect*

After ten days of hospitalization the patient's Karnofsky score was 100 points and his GOS score of 5 (no disability). He was discharged from the hospital with recommendations and painkiller treatment. At the three month visit the patient

was in a good condition and he had no neurological deficits or no wound concerns.

### 3. Discussion

Comminuted frontal skull fracture may

represent a very challenging surgery because in such cases can be involved the surrounding bones [5], [10].

When we encounter such a fracture with multiple fragments and depression surgery is mandatory to reconstruct the bone [8].

Cranialization of the frontal sinus is a very important step in this kind of surgery because the lack of it can lead to CSF leak and spread the infections from the paranasal sinuses.

Restoration of bone defects is crucial because if it is not being performed the patient can suffer severe injuries to the brain and also the environmental pressure can affect the normal activity of the brain.

Titanium mesh is a good option to reconstruct the bone defect after comminuted skull fracture because this type of material has a long survival time [2], [4], [8], [11].

In our opinion, if the wound is not infected it is better to perform eschiectomy and cranioplasty in one-stage surgery.

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