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## Abstract

A 44-year-old male with severe facial polytrauma from blunt force underwent joint surgery involving ENT, neurosurgery, and oculoplastics. Injuries included comminuted fractures of the orbits, maxilla, frontal sinus, and NOE complex with pneumocephalus. Surgical management involved a coronal flap, frontal sinus cranialization using a pericranial flap, orbital and maxillary fracture fixation, and craniotomy. No CSF leak was noted. Post-op recovery was uneventful, and he was discharged on post-op day 3.

## Introduction

Severe facial polytrauma involving the frontal sinus and anterior cranial fossa presents a high risk for cerebrospinal fluid (CSF) leak, intracranial infection, and long-term functional and cosmetic morbidity<sup>(1)</sup>. Optimal management requires coordinated multidisciplinary care and robust skull base reconstruction. Frontal sinus cranialization with vascularized pericranial flap reconstruction is a well-established technique for addressing complex frontal sinus and anterior skull base injuries<sup>(2)</sup>.

## Case Presentation

A 44-year-old male presented as a Level 1 trauma after sustaining multiple blunt force injuries to the face. Initial CT imaging demonstrated acute comminuted facial fractures, including displaced nasal bones, bilateral nasal-orbital-ethmoid (NOE) fractures, fractures of the anterior and posterior tables of the frontal sinus, bilateral orbital fractures, maxillary fractures, and small-volume pneumocephalus.

Given the extent of injury, the patient was taken to the operating room for a joint procedure involving otolaryngology, neurosurgery, and oculoplastics.

### Surgical Management:

A coronal incision was used to elevate a supragaleal flap to the level of the superior orbital rims, with careful preservation of the frontalis nerve and vascular supply to the pericranial flap. A vascularized pericranial flap was elevated and preserved for later reconstruction.

Subtarsal and Lynch incisions provided access for reduction and fixation of orbital rim, NOE, and frontal fractures. A sublabial incision facilitated reduction of maxillary fractures.

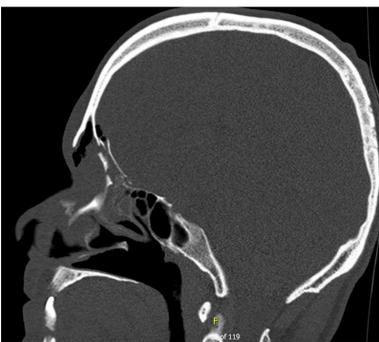


Figure 1. Preoperative CT demonstrating skull base and frontal sinus fractures

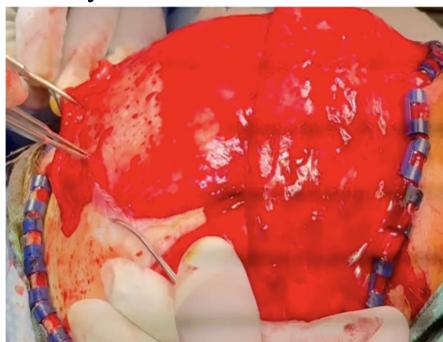


Figure 2. Intraoperative view of elevated vascularized pericranial flap

A frontal craniotomy was performed, allowing removal of fractured frontal sinus and anterior cranial fossa fragments. Complete mucosal removal from the cranialized frontal sinus was performed, followed by copious irrigation. The pericranial flap was then placed over the anterior cranial fossa defect, and the frontal bone plate was replaced and secured.

## Results

The patient tolerated the procedure well without intraoperative complications. Postoperatively, there was no evidence of CSF leak. Follow-up CT imaging demonstrated appropriate fracture reduction and fixation with expected postoperative pneumocephalus. The patient had an uncomplicated recovery and was discharged on postoperative day three.

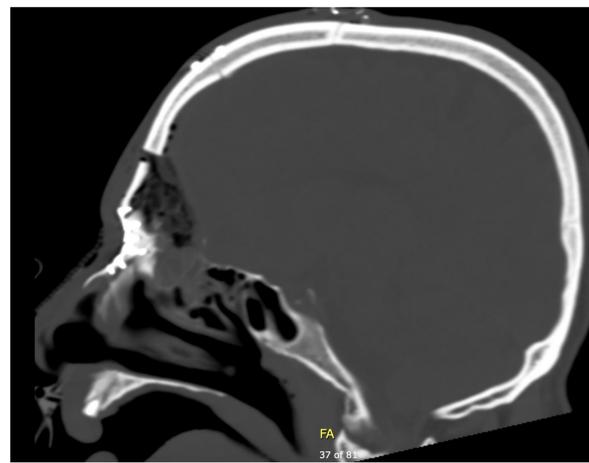


Figure 3. Postoperative CT demonstrating skull base reconstruction and fracture fixation

## Discussion and Conclusion

This case highlights the importance of early multidisciplinary collaboration in the management of complex facial polytrauma involving the skull base. Frontal sinus cranialization with vascularized pericranial flap reconstruction provides durable separation between the sinonasal tract and intracranial contents, reducing the risk of CSF leak and infectious complications<sup>(3-6)</sup>. When performed in a coordinated setting, this approach can result in favorable outcomes even in severe injury patterns.

## References

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