

CLINICAL IMAGE

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Frontal cranioplasty using a free osteomuscular serratus anterior flap: A case report

Rui Casimiro, Filipa Poleri, Leonor Caixeiro, Filipa Monte, Miguel Morgado, Horácio Costa

CASE REPORT

A 76-year-old female Caucasian patient presented with a complex clinical history following surgical resection of a large arteriovenous malformation (AVM) in the frontal region. This initial surgery was performed in 1970 via a bicoronal approach. Following the initial AVM resection, the patient experienced a postoperative intracranial infection, which necessitated two additional surgeries to manage the complication. Despite these interventions, a small punctate opening developed in the frontal region approximately three years ago, gradually enlarging over time.

On examination, the patient exhibited exposure of the frontal bone flap due to the progressive enlargement of the punctate opening (Figure 1). No signs of neoplastic development were observed on biopsy, ruling out malignancy as a cause for the changes.

A computed tomography (CT) scan revealed an extensive area of bone erosion in the frontal region, consistent with chronic osteomyelitis. A multidisciplinary approach was chosen, involving collaboration between neurosurgery and plastic surgery teams. The patient underwent debridement and frontal craniectomy (Figure 2) and reconstruction was performed using a free osteomuscular serratus anterior flap (Figure 3) harvested from the sixth and seventh ribs (12×8 cm) (Figure 4), with the osseous component providing structural support

and the muscle enhancing vascularization and tissue integration. The flap was successfully transferred using microvascular anastomosis to the facial artery and external jugular vein. Postoperative imaging with CT scan confirmed stable flap integration with minimal resorption, and the patient achieved satisfactory cosmetic and functional outcomes (Figures 5 and 6), with no complications such as infection, flap loss, or resorption noted over a 12-month period.



Figure 1: Frontal ulcer with bone exposure.



Figure 2: Frontal bone defect (arrow).

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Figure 3: Serratus anterior flap markings.

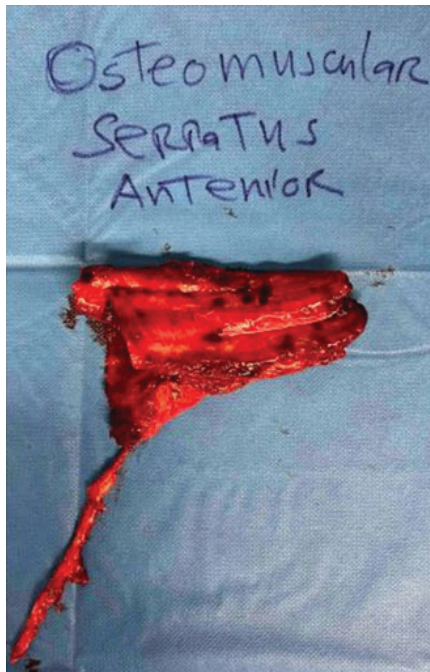


Figure 4: Flap harvest.



Figure 5: Flap graft.

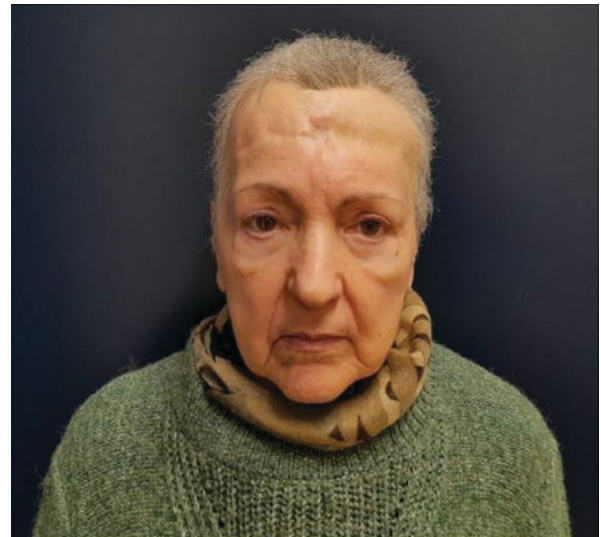


Figure 6: Postoperative result after two months.

DISCUSSION

Frontal cranioplasty is a challenging reconstructive procedure, particularly in cases involving extensive bone and soft tissue defects resulting from trauma, infection, or tumor resection [1]. Traditional reconstruction options, such as synthetic implants or autologous bone grafts, may be limited by infection risk, insufficient vascularization, or graft resorption, especially in complex cases [2]. This case report presents an alternative approach using a free osteomuscular serratus anterior flap for frontal cranioplasty in a patient with significant frontal bone loss. The serratus anterior flap offers both a robust vascular supply and adequate structural support due to its osseous component, making it a viable solution for complex cranial defects [3].

CONCLUSION

This case highlights the utility of the osteomuscular serratus anterior flap for complex frontal cranioplasty, emphasizing its benefits in achieving a durable, well-vascularized reconstruction in cases unsuitable for conventional techniques. Further studies are warranted to assess long-term outcomes and potential applications in various cranial reconstructive contexts.

Keywords: Chronic osteomyelitis, Frontal cranioplasty, Microsurgical reconstruction, Osteomuscular serratus anterior free flap

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Author Contributions

Rui Casimiro – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Filipa Poleri – Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Leonor Caixeiro – Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy

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Filipa Monte – Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Miguel Morgado – Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Horácio Costa – Conception of the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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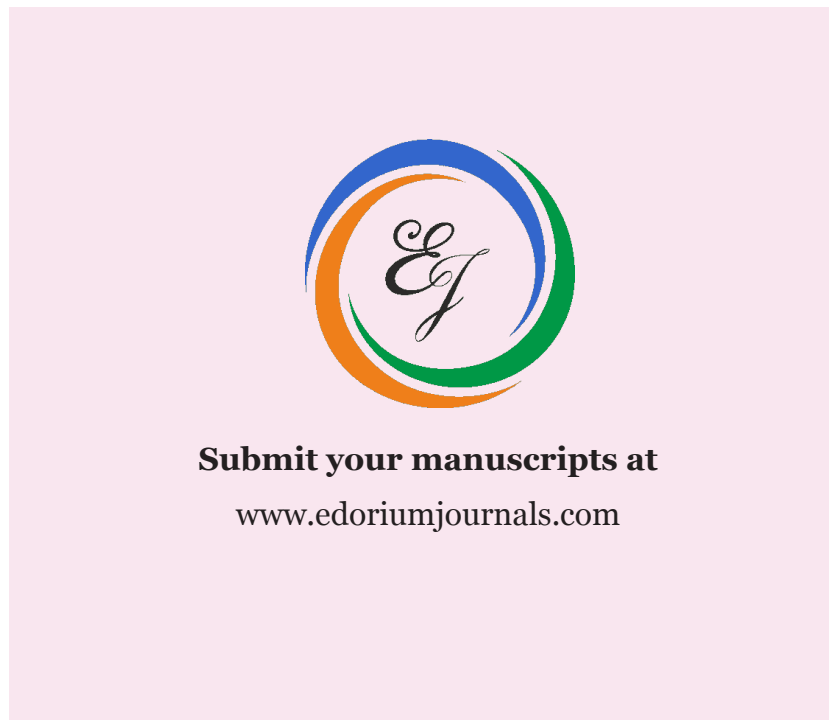
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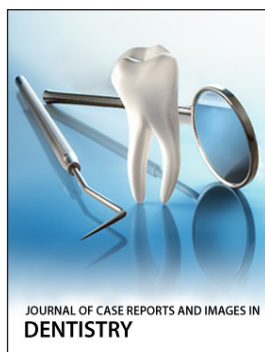
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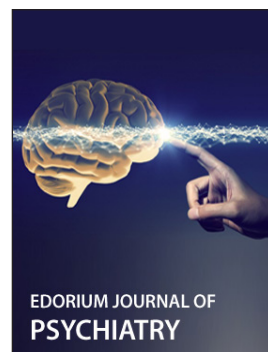
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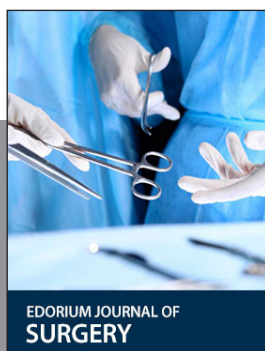
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