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**Case Report**

# Transverse rectus abdominis myocutaneous flap coverage for orbital defect after post-traumatic enucleation: a case report

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## ABSTRACT

A 72-year-old male presented with a chronic, unhealed wound in the left orbital socket following a left eye enucleation due to a traumatic injury sustained 15 years prior. The patient's condition stemmed from a puncture wound that led to significant complications and subsequent orbital defect. Surgical intervention involved the use of a transverse rectus abdominis myocutaneous (TRAM) flap for reconstruction. It includes flap elevation from the abdominal wall, vascular anastomosis between the facial artery and the deep inferior epigastric artery, and inset of the flap into the orbital defect. The surgery was completed without complications, and the patient experienced satisfactory recovery. This case underscores the effectiveness of utilizing a TRAM flap for reconstructing orbital defects following exenteration and highlights the importance of individualized surgical strategies in managing complex facial reconstructive challenges.

**Keywords:** Case report, TRAM flap, Orbital reconstruction, Myocutaneous flap, Free flap

## INTRODUCTION

The reconstruction of complex facial defects, poses significant challenges, particularly when dealing with chronically exposed areas following enucleation. In this report, a transverse rectus abdominis musculocutaneous (TRAM) flap was chosen to cover a large orbital defect, showcasing the versatility of this technique, traditionally used for breast reconstruction, in less common anatomical regions such as the orbit.

The TRAM flap became the gold standard for autologous breast reconstruction in the 1980s, described for the first time by Holström in 1979.[1]

This flap is classified as a Mathes and Nahai type III, consisting of two major vascular pedicles: one originating from the deep superior epigastric artery and the other from the deep inferior epigastric artery. Additionally, minor vascular supply is provided by the intercostal vessels.[2,3]

A 12-year review at the University of Wisconsin Hospital (2000–2012) found that, among 188 enucleation cases following ocular trauma, gunshot wounds accounted for 13.5%, with other causes including recreational activities (18%), falls (12.6%), and motor vehicle accidents (13.5%).[4]

To assess reconstructive outcomes after orbital exenteration for malignancy, a review of 21 patients found 22 free flaps performed, most commonly anterolateral thigh (56%), radial forearm (22%), and parascapular flaps (22%).

Complications occurred in 33% of cases, with a flap success rate of 91%. The 5-year locoregional control and survival rates were 42% and 37%, respectively, confirming the reliability of free tissue transfer.[5]

At the Centro Médico Nacional Siglo XXI, a retrospective analysis of 54 eviscerations (2013–2016) identified exogenous endophthalmitis as the leading cause (25.9%), followed by ocular trauma (22.2%) and painful blind eye (14.8%). Most cases involved systemic and ophthalmologic comorbidities, underscoring the social, occupational, and economic impact of eyeball loss.[6]

## CASE REPORT

A 72-year-old male patient with a surgical history significant for a left eye enucleation performed in 2009. His medical history is otherwise unremarkable.

The patient's current condition began 15 years ago when he fell from a height of approximately 3 meters, suffering a puncture wound to the left eye with a nail. This injury resulted in the loss of the left globe and subsequent infection, leading to a chronic, unhealed area over the left orbital socket. The patient presented to our clinic for evaluation of this persistent wound.

On physical examination, a large open wound was observed in the left orbital socket, with exposure of underlying tissue in the middle third of the face (Figure 1).

**Figure 1: Frontal and side image of wound in orbicular cavity.**

After obtaining informed consent from both the patient and family members, the procedure was carried out under general anesthesia. A TRAM flap was selected for reconstruction of the orbital defect. The surgery began with an incision in the marked area of the abdominal wall, followed by the identification and dissection of four perforators. The myocutaneous flap was then raised and dissected up to the level of the external iliac artery (Figure 2).

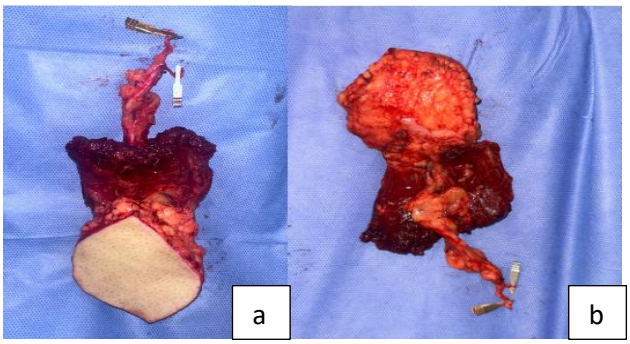


**Figure 2 (a and b): TRAM flap.**

Simultaneously, the wound in the left orbital socket was debrided, and the facial artery was identified and dissected. A tunnel was created from the recipient site to the donor site. A termino-terminal arterial anastomosis was performed between the facial artery and the deep inferior epigastric artery in a 1:1 ratio. Two venous anastomoses were also performed in a termino-terminal fashion, ensuring both antegrade and retrograde flow (Table 1).

**Table 1: Description of arterial and venous anastomosis.**

| Anastomosis | | |
|---|---|---|
| **Arterial** | 1:1 | Termino-terminal |
| **Venous** | 1:1 | Termino-terminal |

After completing the vascular anastomoses, the TRAM flap was inset into the orbital defect and secured with 3-0 nylon sutures. A Penrose drain was placed, and the skin was closed. The donor site in the abdomen was then closed in layers, including fascia closure with 2-0 nylon sutures, and a closed drainage system was placed. The skin at the donor site was closed with 3-0 Monocryl sutures (Figure 3). The surgical procedure was completed without complications.

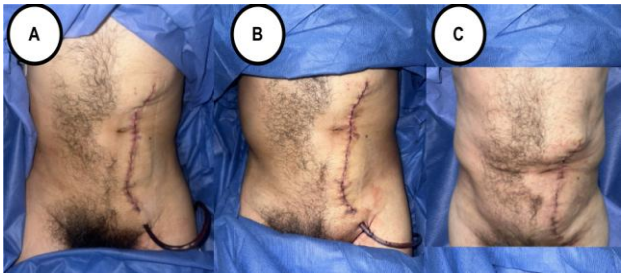


**Figure 3: Primary closure of tram flap wound, (A) immediate postoperative, (B) 2 days postoperative, and (C) 1 week postoperative.**

The patient's follow-up was carried out without any complications; good integration of the flap was observed one week after surgery (Figure 4).

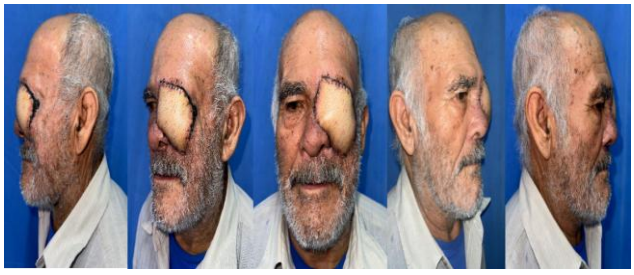

**Figure 4: Front and side photo 1 week postoperative with good integration of the TRAM flap.**

## DISCUSSION

This case report illustrates the TRAM flap's effectiveness in reconstructing larger tissue volumes, particularly for covering exposed midfacial tissue while providing adequate vascularization. Its application in the orbital region demonstrates that, with careful planning, the TRAM flap can achieve excellent functional and aesthetic outcomes in challenging defects.

However, the use of the TRAM flap carries risks, including complications such as hernias, abdominal bulging, and wound healing issues, which occur in 12–39% of cases. Elevated body mass index (BMI) and smoking significantly increase these risks, along with potential umbilical necrosis and sensory changes in the thigh due to nerve injury. Vascular insufficiency or flap necrosis may also occur, especially in larger flaps or patients with higher BMI.[7]

Both our case and the study "Reconstruction with rectus abdominis myocutaneous free flap after orbital exenteration in children" demonstrate the TRAM flap's role in restoring orbital volume and achieving positive aesthetic results. While the referenced study focuses on pediatric patients, our case shows successful application in an adult with post-traumatic enucleation. Both emphasize the importance of vascular anastomosis for flap viability and report minimal donor site morbidity.[8]

This report is limited to a single patient experience, restricting the generalizability of the findings. The short follow-up period also limits the assessment of long-term flap behavior and functional impact. Future studies should consider larger series to validate these findings and enhance reconstructive recommendations.

## CONCLUSION

TRAM flap represents a valuable option for orbital reconstruction following exenteration, particularly in cases with extensive soft tissue loss where local flaps may be insufficient. Although traditionally used for breast reconstruction, its robust vascularity, substantial tissue bulk, and versatility make it well-suited for complex head and neck reconstructions, including the orbit. The ability to provide adequate coverage and promote healing in previously compromised tissues underscores its effectiveness. Despite being less commonly reported in orbital cases, the TRAM flap demonstrates promising outcomes and should be considered a viable reconstructive option in challenging post-exenteration scenarios.

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