



Anterolateral thigh osteomyocutaneous femur (ALTO) flap reconstruction for composite mandible and near total tongue defect utilizing a retrograde intramedullary femoral nail stabilization technique: Report of a first case

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ABSTRACT

The anterior lateral thigh osteomyocutaneous free flap (ALTO) offers the advantage of reconstructing large bony and soft tissue defects. We report a novel approach for femur stabilization via retrograde intramedullary nail placement in a patient with a near total tongue and large mandibular defect who underwent ALTO reconstruction that saves operating room time and decreases risk of post-operative fracture.

Introduction

The anterior lateral thigh osteomyocutaneous free flap (ALTO), first described in the otolaryngology literature in 2016¹, offers the advantage of reconstructing large bony and soft tissue defects. Increased risk of femur fractures was initially reported indicating a need for long term stabilization [1]. We report a novel approach for femur stabilization via retrograde intramedullary nail placement in a patient with a near total tongue and large mandibular defect who underwent ALTO reconstruction. Our approach saved an estimated 3–4 hours of surgical time while providing optimal soft tissue and bone for this unique defect.

Report of case

A 52-year old male presented with a T4aN0M0 squamous cell carcinoma of the oral cavity and underwent subtotal glossectomy, partial mandibulectomy (body to contralateral body), bilateral neck dissection, tracheotomy, and ALTO free flap reconstruction. Before flap harvest, prophylactic retrograde stabilization of the left femur was achieved with an intramedullary nail through an incision in the patellar tendon and secured with proximal and distal interlocking bicortical screws (Fig. 1). The ALTO flap was then harvested as previously described [1]. Dual cuts were made in the femur to obtain a curvature for mandible

reconstruction. The soft tissue was inset in the oral cavity, and the bone was fixed to the remaining mandible using a 2.4mm thick reconstruction plate with the marrow space facing outward (Fig. 2).

Discussion

The radial forearm and ALT have served as mainstay donor sites for oral cavity reconstruction for the past two decades. When faced with combined oral cavity and mandibular defects, however, these free flaps are limited in their ability to reconstruct the bony defect adequately and still provide sufficient soft tissue bulk necessary for functional recovery of swallowing. While the fibula free flap is sufficient for mandibular reconstruction, the lack of soft tissue size and volume poses limits. Likewise, scapula free flaps may provide abundant soft tissue and bone for reconstruction, however, typically requires patient repositioning adding significant surgical time thus limiting the advantage of a “two-team” resection and reconstruction effort.

ALTO flap reconstruction can provide reconstruction of large bony and soft tissue defects. In addition, the height and thickness of the femur matches that of the mandible thus permitting osseointegration for dental rehabilitation without height discrepancies.

Previous reports note the risk of femur fracture thus necessitating the use of a prophylactic intramedullary nail placement via antegrade

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Fig. 1. Radiographic (A) and photo illustration (B) of retrograde intramedullary nail placement.

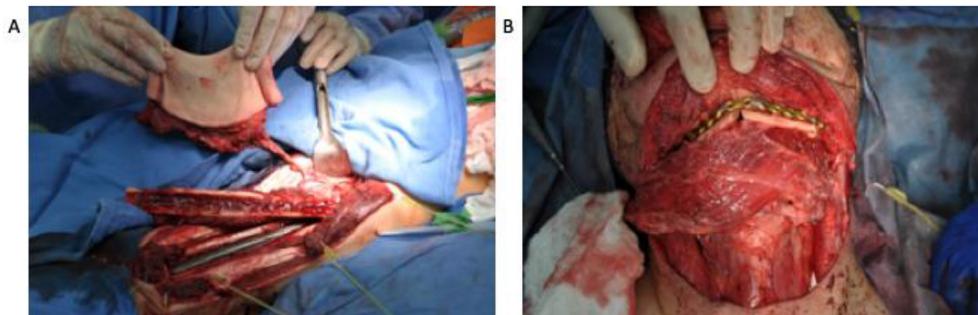


Fig. 2. Free flap harvest (A) and placement in the defect (B).

approach [1,2]. This approach may require temporary transfer of operating rooms tables, adding 2–4 hours of additional surgical time, and put at risk the perforator branches of the ALT portion of the ALTO. No data exists demonstrating a protective benefit of the retrograde approach compared to antegrade approach in cases of prophylactic fixation, however some studies suggest faster operative and less blood loss, which are relevant to free flap procedures [3,4]. To the authors' knowledge, this is the first reported case of a retrograde approach for placement of an intramedullary nail to stabilize the femur prophylactically in a patient undergoing an ALTO free flap. This approach added no overall surgical time, minimized risk to the ALT perforators, and avoided the need to change operating tables or reposition the patient. The cancer resection continued simultaneously while the intramedullary nail was placed.

Conclusion

The ALTO free flap is an excellent option for large bony and soft tissue defects. A retrograde approach for prophylactic femur stabilization during ALTO free flap harvest saves surgical time, obviates the need for patient repositioning, lessens the risk for perforator injury and

optimizes the “two team” approach.

Declaration of competing interest

None.

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