

Peronea Magna: An Important Anatomic Variant Impacting Fibula-Free Flap Reconstruction

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Since its initial description in 1975, the fibula osteocutaneous free tissue flap (OFF) has proven to be one of the most versatile free flaps.¹ The combination of robust bone stock and length, components of bone, muscle, skin, fascia, and a rich, reliable vascular supply make it a favored option for reconstruction of bone defects in head and neck surgery. The primary vascular pedicle is provided by a perforating branch of the peroneal artery.² The arterial supply of the lower leg stems from the popliteal artery which gives off the anterior tibial artery, posterior tibial artery, and peroneal (fibular) artery. The peroneal artery supplies the lateral compartment of the leg, including the fibula. However, *peronea arteria magna* is an important congenital variant in which the peroneal artery is the dominant vascular supply to the foot with normal distal pulses.³ While it only occurs in 1% to 5% of the population,^{3,4} this case highlights the importance of preoperatively recognizing this variant and understanding its implications in head and neck reconstructive surgery.

Preoperative History

This study is IRB-exempt by the UT Health San Antonio IRB (HSC20190571N). The patient is a 66-year-old female with an extensive head and neck oncologic history. She was initially diagnosed with stage IV (T4N2M0) squamous cell carcinoma (SCC) of the left base of tongue for which she received chemoradiation therapy. Nine years later, she was diagnosed with a second primary T1N0M0 SCC of right retromolar trigone for which she underwent wide local excision and local reconstruction with negative margins.

The patient had been doing well since until she was referred to our clinic. She had experienced several months of worsening right-sided tongue, ear, and jaw pain. She was initially evaluated at an outside facility and found to have a new 3 cm mass at right posterolateral tongue with

biopsy showing invasive SCC. Physical exam showed ill-defined 3 cm ulcerative mass at right posterolateral oral tongue with palpable extension to right retromolar trigone and floor of mouth. Computed tomography (CT) neck showed new 2 × 1.3 cm mass at right posterior tongue with cortical erosion of the adjacent mandible (T4aN0M0). CT Angiogram of lower extremities showed dominant left peroneal artery with diminutive left anterior tibial and posterior tibial arteries with no other evidence of stenotic or atherosclerotic disease (**Figure 1**).

Diagnosis and Plan

Preoperative diagnoses were SCC of the right retromolar trigone extending to right lateral tongue, right buccal mucosa, and right floor of mouth with bony mandible invasion. She was admitted to hospital and underwent right-partial glossectomy, right-segmental mandibulectomy, followed by right OFF reconstruction of for mandible, floor of mouth, and partial glossectomy defect.

Reconstructive Operative Summary

Following SCC resection, the soft tissue defect was noted to be approximately 11.5 × 7.5 cm. The bony defect involved the right hemimandible to just anterior to the right mental foramen in the parasymphiseal region. As planned, the defect was reconstructed using a right OFF with 2 bony segments, each 3.5 cm, with initial flap measuring 11 × 6 cm for soft tissue inset. The right fibula flap was used instead of left due to the left dominant

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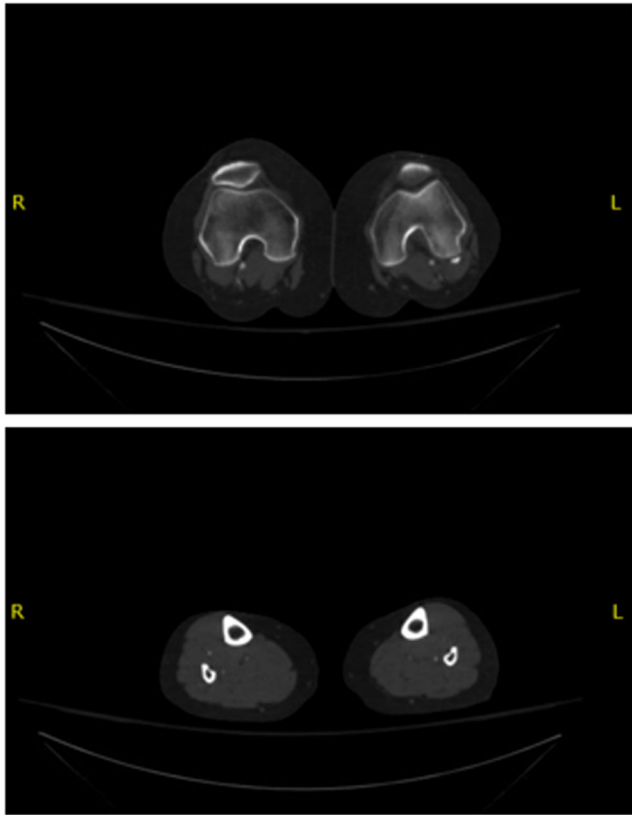


Figure 1. Sections in computed tomography angiogram showing left dominant peroneal artery.



Figure 2. Postoperative reconstruction of defect.

peroneal artery found on preoperative CT Angiogram. The right facial artery and facial vein were used for the microvascular anastomosis. Implantable Doppler probes were placed on the peroneal artery and vena comitante and noted to have excellent signals in both the arterial and venous portion of the anastomosis (**Figure 2**).

Discussion

This case was a representation of the versatility of the osteocutaneous fibula-free flap. It also highlights the

utility of preoperative imaging. Although uncommon, a dominant peroneal artery can significantly impact decision making in the use of a fibula-free flap. Using a fibula-free flap in the setting of a dominant peroneal artery could have devastating consequences for the extremity with ischemia and possible limb loss. Thus, it is important to remain vigilant with preoperative planning and imaging.

Although preoperative imaging is not universal practice, sole reliance on intraoperative assessment of anatomy could lead to an aborted procedure with increased costs.⁴ Preoperative imaging has been found to influence 55.3% of cases in one study.³ Some groups view lack of CT angiography imaging prior to fibula-free flap as potential negligence.⁵ This case demonstrates the considerations to keep in mind during preoperative workup and decision making, and highlights an important, albeit relatively uncommon, anatomic variant.

Author Contributions


Wasiq Nadeem, Manuscript writing and editing, presentation; **Jay K. Ferrell**, Design, manuscript writing and editing; **Christine B. Taylor**, Conceptualization, design, manuscript writing and editing, presentation.

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