

VERSATILITY OF THE RADIAL FOREARM FREE FLAP FOR TONGUE RECONSTRUCTION - LITERATURE REVIEW AND 2 CASES PRESENTATION

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INTRODUCTION

The tongue is a common site for oral cavity malignancy. Patients with tongue cancer not only face a life-threatening disease but also deal with the after effects its treatment renders on appearance and important functions such as mastication and speech. Tongue reconstruction is a challenge for the head and neck surgeon due to the complex three-dimensional architecture inherent to the area. Since the introduction of the radial forearm free flap (RFFF) by Yang et al in 1981, it has become a workhorse free flap in head and neck reconstruction. Its utility is in that it provides a thin pliable reconstruction that readily conforms to complex defects. The flap also has consistent vascular anatomy which simplifies harvest in what is normally a quite complex surgical endeavor.

PREOPERATIVE ASSESSMENT

The anatomy is quite consistent with limitations most commonly due to prior trauma or surgery to the wrist or forearm. Of greatest concern is ensuring the integrity of the ulnar arterial supply to the hand through the communication of the deep and superficial palmar arches. McCormick et al. found that both radial and ulnar arteries present 100% of the time. 10% of the time the superficial palmar arch does not supply branches to the thumb and index finger. 50% of the time, the deep palmar arch and the ulnar artery do not have communication. Only if both variations are present, the thumb and index finger rely solely on the radial artery for perfusion. Therefore, an Allen's test must be performed prior to harvest. A color flow Doppler or a CT Angiography can be performed if the Allen's test is questionable. If there is no evidence of ulnar artery perfusion of all five digits, an alternative flap should be chosen.

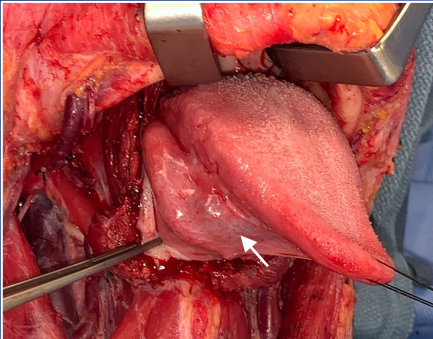
VERSATILITY OF THE RADIAL FOREARM FREE FLAP

The forearm is ideally suited for oncologic reconstruction. It is a fasciocutaneous flap that is thin, pliable and predominantly hairless. Both the arterial supply and the venous drainage can be accurately assessed pre-operatively by simple clinical examination. It has a long pedicle with adequate vessel size that can be raised simultaneously as excision of the primary tumor. For ablative tongue surgeries, it can be used for partial or total glossectomy reconstruction as well as have the adaptability for coverage of composite floor of mouth and soft tissue mandibular defects. Donor site morbidity is low, and infection is quite rare with proper sterile technique. Harvest does not significantly affect the function of the hand or forearm. Usual drawbacks are patient's complaint of transient numbness to the thumb as well as a contour deformity of the skin grafted harvest site.

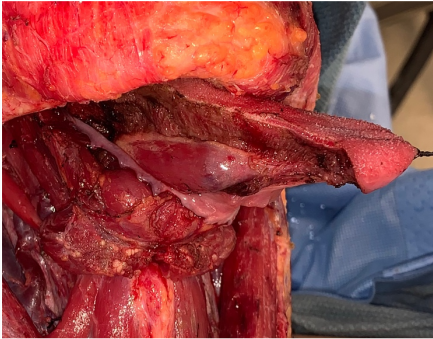
CASE #1 / Partial Glossectomy: 24-year-old female presented as a referral to the head and neck surgery clinic with a biopsy proven squamous cell carcinoma (SCCa) p16 (-) of right lateral tongue. After complete oncological work up including CT neck and PET CT, the patient underwent bilateral modified radical neck dissection (MRND), right partial glossectomy including floor of the mouth resection and reconstruction with left RFFF. She had an uncomplicated hospital course and was discharged on post operative day 7. Final pathology of invasive keratinizing SCCa, pT2 pN2c ENE (-). Patient underwent adjuvant chemoradiation therapy and is currently in cancer surveillance. Following a short course of enteral nutrition via a nasojejunal feeding tube to allow for healing of her oral wounds, the patient is tolerating regular diet without limitations. Also, her speech is completely intelligible four months following surgery.



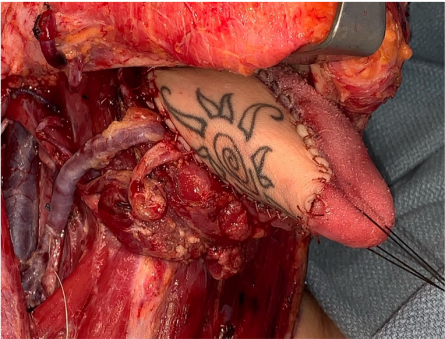
- Preop clinical condition. SCCa of the right lateral border of tongue



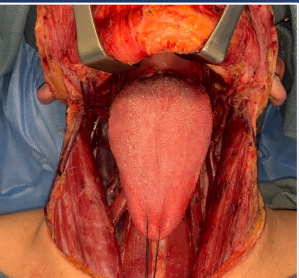
- Transcervical approach to primary site after bilateral MRND. White arrow points the tumor location



- Tongue defect after right partial glossectomy. Extrinsic and intrinsic muscles of the tongue can be seen.



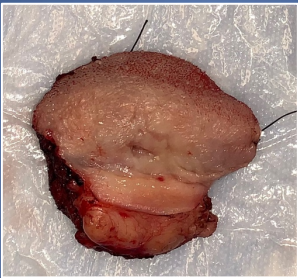
- Radial forearm free flap inset. Adequate reconstruction of the tongue. Anastomosis to vessels in the neck can be seen.



-Transcervical approach (frontal view)



-Partial glossectomy (frontal view)



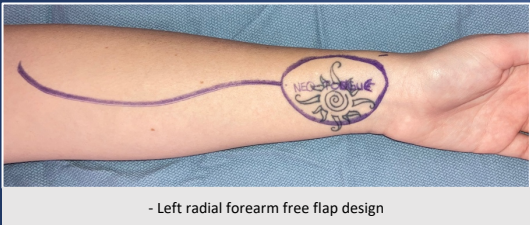
- Right partial glossectomy specimen



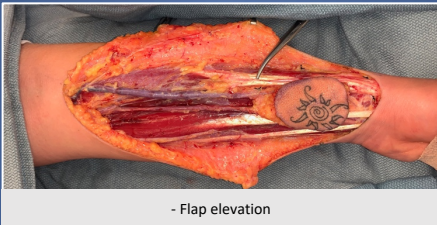
-2 weeks postoperative, adequate healing process, flap perfused, good capillary refill



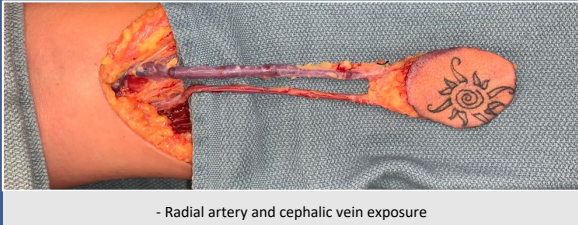
- No changes in postop occlusion or mandibular function



- Left radial forearm free flap design

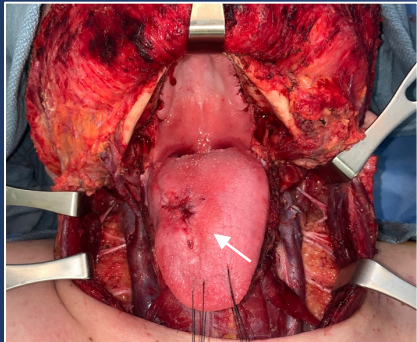


- Flap elevation



- Radial artery and cephalic vein exposure

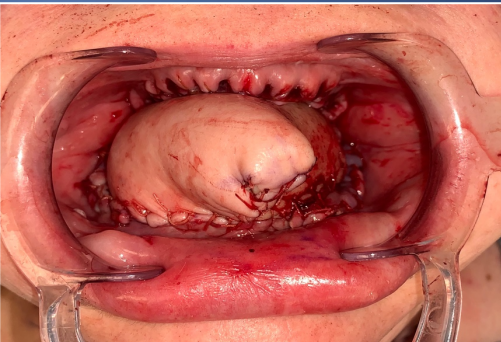
CASE #2 / Total Glossectomy: 43-year-old female was referred for evaluation and treatment of a biopsy proven SCCa of the right lateral and dorsal tongue. PET/CT and CT Neck revealed extensive deep involvement of muscles of the tongue as well as bilateral lymphadenopathy. Patient underwent bilateral MRND, total glossectomy with extraction of all remaining teeth and reconstruction with Left RFFF. Final pathology of Invasive SCCa pT3 pN3b ENE (+). Planned tracheostomy, Mediport, and PEG tube were also placed during hospital stay due to significant findings on her final pathology indicating the need for adjuvant chemoradiotherapy. She has now completed adjuvant treatment and is now in cancer surveillance. Patient is tolerating combined nutrition through PEG and oral intake of soft diet with plans to transition to solely oral intake as she continues to heal. She was successfully decannulated after completion of adjunctive therapy. Her speech is almost fully intelligible, and this continues to improve as she works with speech therapy.



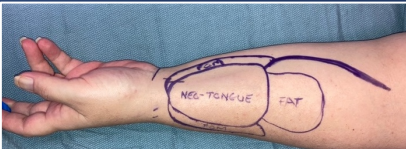
- Transcervical approach for total glossectomy. White arrow points primary site of the tumor



- Total glossectomy performed. White arrows point the remaining base of tongue



- Left radial forearm free flap inset as a neo-tongue and floor of the mouth reconstruction



- RFFF design for complete tongue reconstruction



- Specimen (Oral tongue)



6 weeks post-op. Neo-tongue is healed and functioning.

CONCLUSION In patients with tongue malignancies, surgical resection significantly complicates what are taken for granted as basic functions of speech and mastication. When considering reconstruction of these surgical defects, it is critical to restore bulk, and contour, but at the same time to preserve mobility and pliability in order to recreate the structure that allows for those basic functions while also maintaining an esthetically acceptable result. This has been time and again proven to be readily achievable with the radial forearm free flap.

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