



FUNCTIONAL RECONSTRUCTION OF FACE FOLLOWING ONCOLOGICAL EXCISION GANESH BABU P S

Department of Plastic Reconstructive Surgery, MADRAS MEDICAL COLLEGE AND GOVERNMENT GENERAL HOSPITAL

Abstract : Free tissue transfer has revolutionized the management of complex head and neck defects. In our study 2 cases were selected one was a case of recurrent meibomian cell carcinoma involving the lateral one third of eye lids and malar region on the right side of face and the other was recurrent soft tissue sarcoma involving the right side of face. Both the cases under went wide local excision involving the hemiface with ipsilateral modified radical neck dissection. Reconstruction was done using a chimeric anterolateral thigh flap which includes the vastus lateralis muscle, skin paddle and the nerve to vastus lateralis. By this good facial reanimation with well pronounce mesolabial fold, symmetrical smile good oral competence was attained with in 11 months. Both cases donor site was closed primary there by attaining less donor site morbidity.

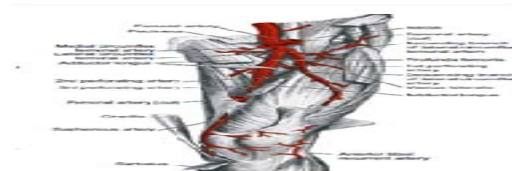
Keyword :Anterolateral thigh flap (ALT), chimeric flap, facial reanimation , meibomian cell carcinoma, soft tissue sarcoma. **AIM OF STUDY** - To restore aesthesia and at the same time reestablish the function of oral cavity, nasal cavity with a symmetrical smile with Minimal donor site morbidity. **INTRODUCTION**-Hemifacial defects following post oncological resection for various tumours can be reconstructed and reanimated by using a chimeric anterolateral thigh flap In 1984, Song and colleagues introduced the anterolateral thigh flap based on septocutaneous branches of the descending branch of the lateral circumflex femoral artery. Since that time, the anterolateral thigh flap has gained popularity for use as a soft tissue flap for reconstruction of regional as well as distant defects. This flap can provide muscle, fascia, skin, or any of these in combination. Early anatomic dissections on cadavers noted that the vascular anatomy was variable and that the majority of skin vessels were septocutaneous compared to musculocutaneous in nature. More recent studies and series indicate the skin vessels are predominantly musculocutaneous perforators and less commonly septocutaneous vessels.

Especially in the past 5 years, the anterolateral thigh flap has replaced many other flaps.

Because of the scar and skin graft at the forearm, the radial forearm flap has been mostly replaced by the anterolateral thigh flap. Because of the donor site morbidity the rectus abdominis flap also has been replaced by the anterolateral thigh flap. **ANATOMY**

Arterial anatomy of the region:

The anterolateral thigh region is supplied largely by the lateral circumflex femoral artery (LCFA). Branching off the profunda femoris artery proximally, the LCFA travels laterally deep to the rectus femoris and sartorius muscles. The artery divides into ascending, transverse, and



descending branches, which take either a septocutaneous or intramuscular course to eventually supply the overlying fat and skin of the thigh.

Vascular anatomy of Lateral circumflex femoral artery

The region of the anterolateral thigh can be harvested based on the descending branch of the LCFA and can be described as the anterolateral thigh flap, the anterolateral thigh perforator flap or the lateral circumflex femoral artery perforator flap. The descending branch usually courses inferiorly along the medial edge of the vastus lateralis muscle or, rarely, over the vastus intermedius muscle. Dominant pedicle: branches of the descending branch of the LCFA Length: 12 cm (range 8–16 cm) Diameter: 2.1 mm (range 2–2.5 mm)

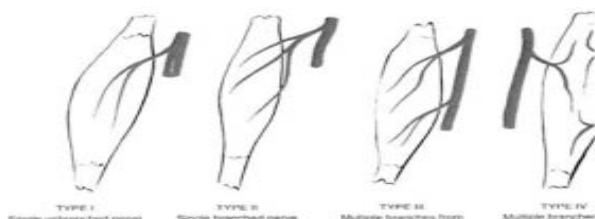
Venous anatomy of the region:

Venous drainage of the anterolateral thigh is provided by branches of the lateral and anterior cutaneous veins, which drain into the great saphenous vein superiorly, just before it enters the femoral vein. Drainage of the anterolateral thigh flap is through venae comitantes that accompany the musculocutaneous and septocutaneous branches of the descending branch of the LCFA.

Nerves in the region:

The lateral femoral cutaneous nerve (L2–L3) is a direct branch of the lumbar plexus and enters the thigh deep to the lateral end of the inguinal ligament. The motor branch to vastus lateralis muscle originates from the femoral nerve and accompanies the descending branch of the LCFA along the intermuscular septum. Vastus lateralis muscle is a type 2 muscle based on its nerve supply.

Classification of muscle based on nerve supply (Taylor classification) Sensate flap: when a sensate flap is required, the lateral musculocutaneous nerve can be anastomosed with a sensory nerve in the recipient site. The nerve is superficial to the fascia.



To preserve the Motor function of the accompanying muscle such as vastus lateralis: The motor nerve can be raised with the muscle flap and be anastomosed to the recipient site (eg, facial reanimation procedures). **Surface marking** The descending branch of the LCFA courses obliquely along the intermuscular septum between the rectus femoris and vastus lateralis muscles. It exits in the majority of cases within a circle of 3 cm radius located at the midpoint of a line drawn between the anterior superior iliac spine and the superior lateral border of the patella as either a septocutaneous vessel or a musculocutaneous perforator, or both.



Advantages

- Ease of harvest with relatively constant anatomy.
- Long length and large pedicle.
- Versatility in design with variable thickness and incorporation of various tissue components.
- Ability to provide sensory innervation.
- Lack of significant donor site morbidity.
- Decreased operative time with two-team approach

Disadvantages

- Color mismatch in some patients for facial reconstruction.
- Presence of hair in some male patients.
- Skin graft requirement at donor site if greater than 8 cm width of harvested tissue.
- Lack of vessels with reasonable size in rare cases.

MATERIALS AND METHODS

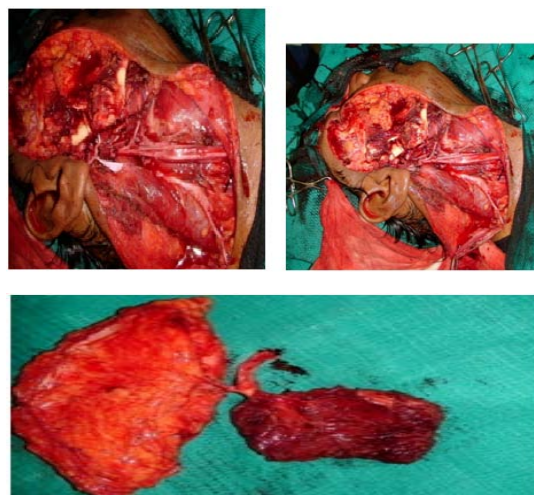
CASE 1 Recurrent meibomian carcinoma (right side of face) after 3 previous attempts of excision done partial excision of upper eyelid with the tarsal plate done. Now the tumour arising from the lateral 1/3rd of lower eyelid and Mass was seen fixation to body of zygoma

Neck nodes present in level 1 2 3 (stage 4 disease.) .



OPERATIVE PROCEDURE-Wide local excision with modified radical neck dissection and reconstruction done using chimeric anterolateral thigh flap.

Lateral 1/3rd of both upper and lower eyelids are excised with near hemi facial excision extending from the temporal region along the lateral orbital margin nasolabial furrow, angle of mouth up to the mandibular region with removal of all effector and mimetic facial muscles with total parotidectomy with excision of masseter muscle and the facial nerve leaving a stump of facial nerve just exiting from the stylomastoid foramen, down to buccinator and excision of a part of body of zygoma to which the tumour was fixed was also removed. Hemifacial excision done exposing the angle and the body of mandible and the temporomandibular joint.

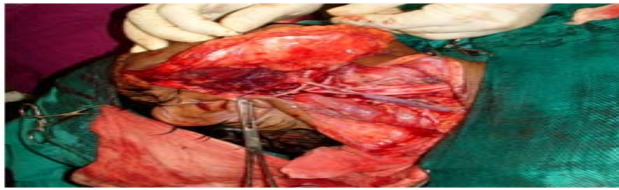


Considering the defect a chimeric anterolateral thigh flap based on two perforators arising from the descending branch of lateral circumflex femoral artery, one supplying the vastus lateralis muscle and the other perforator supplying a large skin paddle along with the nerve to vastus lateralis which usually runs with the lateral descending branch of lateral circumflex femoral vessels were harvested.

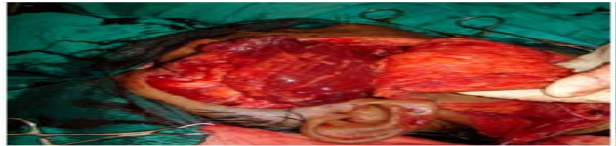
CHIMERIC ALT FLAP WITH NERVE TO VASTUS LATERALIS Lateral canthopexy with simple mobilization of tarsal plates and fixation to Whitnall's tubercle with drill hole and 3/0 prolene. Muscle fixed cranially superiorly to zygoma and inferiorly divided into four fingers each given insert to lateral wall of nose, residuum of orbicularis oris of upper lip, fibrous modiolus and residuum of orbicularis oris of lower lip.

MICROVASCULAR ANASTOMOSES

Facial nerve stump anastomosed to nerve to vastus lateralis using epineurial sutures and



lateral branch of descending Lateral circumflex femoral artery to Superior thyroid artery by end to end anastomoses and venae comitantes to External jugular vein by end to end anastomoses.



WELL PERFUSED FLAP IS SEEN AFTER THE ANASTOMOSES IMMEDIATE POST OPERATIVE PICTURE AFTER INSERT BEEN GIVEN

Donor site closed primarily 1 months post operative period showing a bulky flap with deviation of angle of mouth when the patient tries to animate

After 6 months postoperative picture Close-up view of the animated mesolabial fold and symmetrical smile with good oral



continence is attained at 11months postoperative period.

Close-up view of the animated mesolabial fold



one year post operative picture CASE 2 -Another case of soft tissue sarcoma face recurrence after 3 previous surgeries



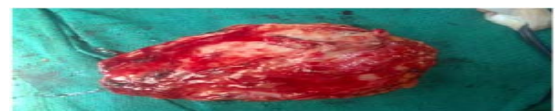
Preoperative picture of the patient showing the grafted site with recurrence

CASE 2

PROCEDURE-Wide local excision of the right side of face with modified radical neck dissection and reconstruction done using chimeric anterolateral thigh flap



After WLE and the defect was similar to previous case (hemifacial excision) leaving behind only stump of seventh nerve just below the stylomastoid foramen.



Immediate post operative picture





After one month post operative picture showing periorbital edema

After one year post operative period showing infraorbital edema due to trap door scar for which an z plasty was planned

Post op course-Apart from regular monitoring of free flap with administration of dextran 40, oral prednisolone started after 1 week and continued until the axonal regeneration indicated by the Tinel sign crossed mastoid and mandibular angle scar. Electrical muscle stimulation and night time strapping done up to attainment of spontaneous mesolabial animation. Discussion:-Antero lateral thigh flap can be harvested as a chimeric flap with vastus lateralis muscle & nerve to vastus lateralis. Muscle is used to reanimate the face, arterial and venous anastomoses done, nerve to vastus lateralis is anastomosed to facial nerve stump. Type 2 innervation of vastus lateralis muscle facilitated in harvesting of the muscle based on single fascicular branch to the muscle which was used for function preserving muscle transfer for facial reanimation.

Karonidis and Yao described the harvest of a chimeric ALT with vastus lateralis to reconstruct an extensive defect of the oral tongue and cervical soft tissue. Enhanced utility of the anterolateral thigh free tissue transfer, when harvested in a chimeric configuration. The ability to harvest multiple skin paddles with independent vascular perforators is especially useful for complex oral cavity reconstruction. ALT flap remains the most versatile and the most reliable.

Although the ALT flap may be adapted to most indications for soft tissue reconstruction in the head and neck region, its versatility may be limited in a minority of patients who are particularly obese or hirsute. ALT flap donor site is superior for head and neck reconstruction as the patient is maintained in the supine position to allow a two-team approach. A unique attribute of the ALT flap is the design of multiple flaps with variable composition. To harvest chimeric flaps, the following components can be included: muscles, fascia and bone (an osseous flap can be joined to the flap with microvascular anastomoses).

This can encompass all forms of compound flaps, including composite flaps (e.g., musculocutaneous, fasciocutaneous), chimeric flaps.

RESULTS Total number cases done 2 Number of complications 1 (exploration and redo arterial anastomosis in one case) None of flaps were lost Average time for acquiring symmetrical smile was 11.5 months

CONCLUSION-By using a chimeric antero lateral thigh flap for hemifacial defects following post oncological resection we can achieve both form and function. Face can be reanimated, symmetrical smile as well as oral continence regained by one year post operatively. Reconstructing complex head and neck defects with the anterolateral free flap has become more popular in recent techniques and clinical applications. The volume of soft tissue and availability of fascia, fat, and muscle render the ALT one of the most versatile flaps for head and neck reconstruction. Good facial reanimation can be attained even after an near hemifacial excision involving almost all the effector muscle of facial expression. A well pronounced nasolabial fold with symmetrical smile, good oral competence is attained by anastomosing the facial nerve stump to the motor nerve supplying the vastus lateralis. Good reanimation of face can be attained with a low donor site morbidity along with good speech and swallowing outcomes with excellent aesthetic results.

Bibliography

Flap and reconstructive surgery- FU chan wei samir mardini chapter 37 page 537 to 530

Anterolateral thigh flap: an ideal soft tissue flap - Clin Plastic Surg 30 (2003) 383-401

The expanding role of the anterolateral thigh free flap in head and neck reconstruction -Current Opinion in Otolaryngology & Head and Neck Surgery 2011, 19:263-268

perforator flaps in head and neck reconstruction- semin plast surg.2010 aug;24(3):237-254