

An Account of First Five Cases of Microvascular Free Tissue Transfer at Mayo Hospital, Lahore.

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A microvascular free flap, involves transferring of nonessential donor tissue from one part of the body to another with the help of microvascular anastomosis. The program of microvascular free tissue transfer was started last year for the first time in the history of Mayo Hospital, which is an 1800 bedded hospital of Pakistan affiliated with King Edward Medical College, Lahore. Five cases were successfully performed, two of these were free radial forearm, one rectus abdominus, muscle flap, one transverses rectus abdominis and free fibula for mandible reconstruction.

Key words -Free radial forearm flap, free tissue transfer, free rectus abdominis muscle.

Pare¹ in 1552 described earliest vascular surgery technique. J. B. Murphy was the first surgeon to describe vascular anastomosis in 1897; however, Carrel² accomplished true experimental work in 1902, and described triangular method in an end to end anastomosis in animals. Charles C. Gauthrie³ extended the field of peripheral vascular surgery, replantation and transplantation and laid the foundation for modern microvascular surgery.

Microsurgical development can be traced back to the invention of compound microscope by Zachariah in 1590. Initially monocular microscope was used by Nylen⁴ for otology in 1921 and later on in ophthalmology by Peritt⁵ and Kurze⁶ for neurosurgery in 1927. The credit for modern micro vascular surgery goes to Jacobson and Suarez⁷ who showed 100% patency in small vessel of up to 1.5 to 3 mm diameter in 1960.

The experience in microvascular surgery is of fundamental importance in modern plastic surgery. The surgery for free tissue transfer is relatively new in Pakistan. We managed to start microsurgical free flaps for the first time in Mayo Hospital, one of the oldest medical institute of Pakistan. Summary of each case in our series is as follows.

Case I:-

A fourteen year old male presented with history of soft tissue loss of left forearm along with flexor tendon and median nerve injury following trauma. Soft tissue loss involved the volar, medial and lateral aspects of the middle 3/5 of the forearm (Fig. 1). Reconstruction was planned and executed by harvesting contra lateral radial artery free flap along with lateral cutaneous nerve of forearm and palmaris longus tendon, to be utilized at a later stage (Fig. 2). Radial artery was anastomosed with the ulnar artery of recipient

area and venous anastomosis was done with the basilic vein. Donor area was grafted and graft take was 100%.

Fig.1

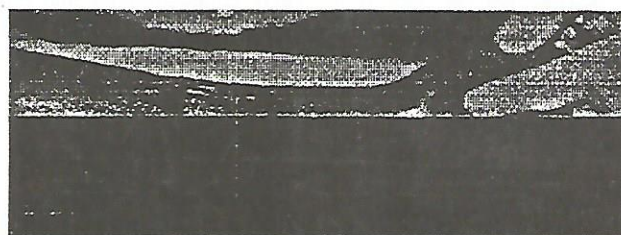
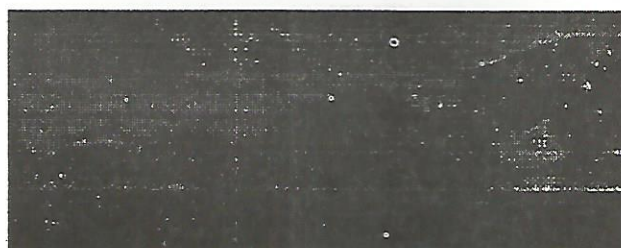


Fig.2



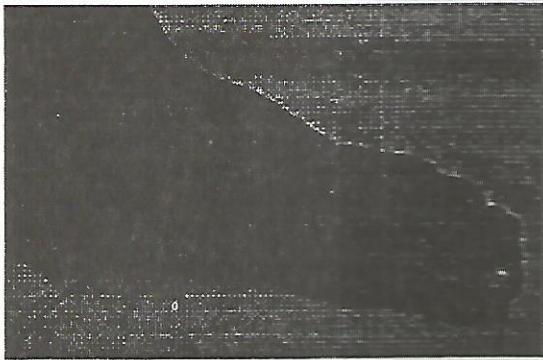
Case II:-

An eighteen years old male presented with history of gunshot injury to the left foot with loss of navicular and first and second metatarsal bones (Fig.3). The rectus abdominis muscle free flap was harvested and inferior epigastric artery and veins were anastomosed with posterior tibial vessels. Donor site was closed primarily. The free muscle flap was over grafted (Fig. 4).

Fig.3



Fig. 4



Case III:

A thirty years old male reported with the history of intra oral tumor excision fourteen years earlier with soft tissue deficiency of right side of face. Free radial forearm dermo-facial flap was harvested and anastomosed with facial artery and external jugular vein.

Case IV

A free transverse rectus abdominus flap was harvested in a thirty five years old female to cover the ankle defect. In this case partial necrosis of zone IV was observed which was healed by putting split skin graft on the ankle.

Case V

A free fibula flap was raised and mandible was formed to cover the post-traumatic defect of mandible of a twenty eight years old labourer.

Results

All the flaps survived without any major complications. In case No. III, haematoma developed at the donor side on 5th postoperative day, which was evacuated under aseptic conditions. Recovery was uneventful. No donor site functional morbidity was seen in any of the cases.

Table

Age(Years)	Sex	Flap	Operating time
14	M	Radial forearm	8 hours
18	M	Rectus abdominus flap	6 hours
30	M	Radial forearm for maxilla	7 hours
30	F	TRAM flap for ankle	8 hours
28	M	Free fibula	9 hours

Discussion

The radial artery flap has a very good skin texture with a thin subcutaneous layer. It is nourished by relatively large diameter vessels that can be handled easily with loupe magnification only. Because of its thin skin, it is ideal for neck contractures. The flap is also used extensively for intra oral lining⁸.

The first free forearm flap was reported by Chang T. S⁹. in 1982. Mahaffey et al¹⁰ have discussed a case report in which a large contra lateral radial forearm flap is used to cover a significant degloving injury on the opposite wrist and hand. We used the flap for reconstruction of contra lateral forearm and found this thin flap to be a good source to provide complete coverage of the large defect. Possible sensory innervation and tendon transfer was also possible as in our case where nerve and tendon repair was done at a later stage.

The disadvantages of radial forearm flap are that the donor area has to be grafted in most of the cases although Soutar and McGregor¹¹ have achieved direct closure of the donor site in 12% cases. The other disadvantage is the limitation to flap width. Other complications including graft loss and exposure of tendon of flexor carpii radialis were not observed in our cases¹².

The free forearm flap has been used extensively for reconstruction of head and neck region^{13,14,15}. The success rate was 90% in a series of 60 consecutive patients undergoing intra oral reconstruction with this flap¹¹.

Ismail¹⁷ has recommended the free radial arm flap as a facial flap thus preserving the forearm skin. We used the dermo facial flap for the reconstruction of post tumor excision with satisfactory results. We used the forearm skin as full thickness graft, which took very well with excellent functional results.

The free rectus abdominis flap is a versatile flap having a number of applications. It is a type III muscle having two dominant pedicles i.e. superior and inferior epigastric arteries and veins. The inferior epigastric artery has a diameter of approximately 2.5mm and a pedicle length of 5-8 cm can be achieved. The muscle has been widely used for breast reconstruction as a pedicle flap as well as free flap^{18,19}. It has also been used for head and neck reconstruction²⁰, and lower extremity coverage²¹. The flap in our case was placed on medial side of the foot with satisfactory results. The advantages of free rectus

abdominis flap include the length of pedicle and ease of harvesting the flap. Complications of the donor site including weakness of the abdominal wall or abdominal hernia²² or flap loss²³ were not encountered in our patients. Three of our anastomoses were done with magnifying loupes while two flap anastomoses were done with microscope.

Conclusion

Free microvascular tissue transfer represents top rung of reconstructive ladder. It is an important landmark in the evolution of reconstructive surgery. Free radial forearm and rectus muscles have a variety of applications and have been successfully utilized in our set up in spite of the lack of proper facilities and long operating time for microvascular surgery.

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