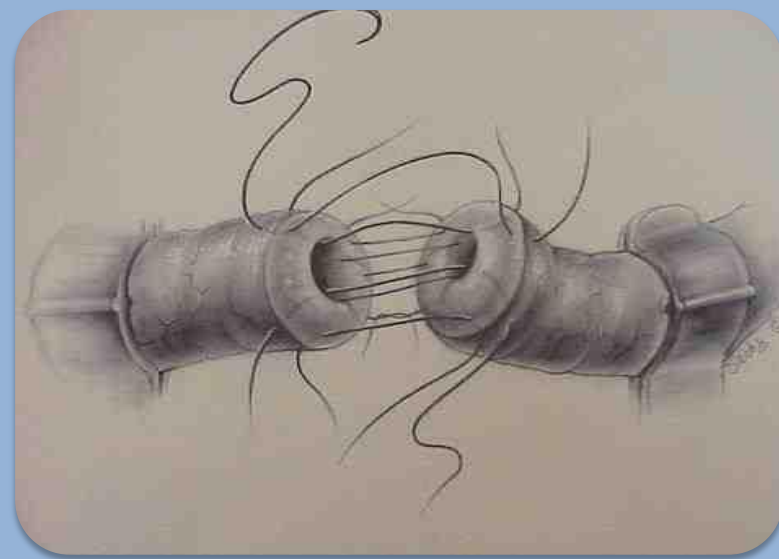


Microsurgery and free Tissue Transfer, today's Avant-garde concept in Plastic surgery

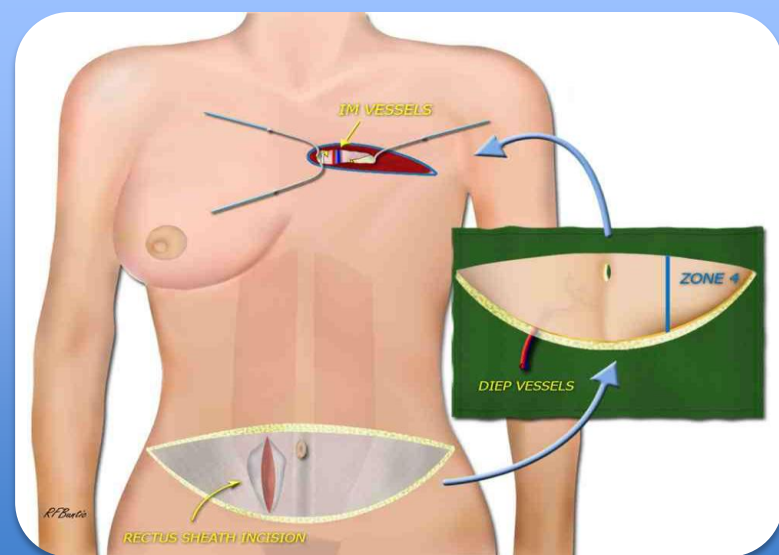
Abstract- Microsurgery is the modern technique responsible for helping restore function, improve aesthetic outcome and save lives. Microsurgery utilizes a concept called free Tissue transfer that involves detachment of an isolated piece of vascular tissue allowing it to be moved to another part of the body with anastomosis of the arteries and veins (Fig. 1). The tissue can consist of bone, muscle, nerves and fat¹. Microsurgery involves using high powered microscopes and specialist microsurgical equipment to anastomose vessels as small as 1mm (Fig. 3). The ability to carry out such procedures has facilitated plastic surgeons in performing unimaginable complex reconstructive challenges. This includes replantation of body parts during its infant stages in the 1970's to currently performing hand transplants and facial transplantation. Microsurgery is undoubtedly pivotal to modern day plastic surgery as it is currently placed at the helm of the plastic surgeons reconstructive ladder. If Sir Harold Gillies became the father of plastic surgery with his pedicle tube flap rotation to move tissue around the body, then microsurgery must surely warrant being called the deserved son of plastic surgery.



The Beginning

In 1960, Initially developed by a vascular surgeon named Jules Jacobson, microsurgery was carried out using ENT equipment to anastomose vessels in vascular surgery in which he 'coined' the term 'microsurgery'. In 1964, Harry Buncke further developed the technique that would excel the frontiers of plastic surgery. Using home made microsurgical instruments, nylon sutures and needles he developed the technique in his garage. At a later date in his microsurgical research laboratory he was able to replant a rabbit ear. In 1969 he filled a large scalp defect with omentum and in 1972 he performed the worlds first toe to hand transplant in the U.S. After the 1970's, microsurgery allowed plastic surgeons to reconstruct defects of the breast, mouth, scalp, jaw, neck, face and pelvis².

(Fig. 1)



The Importance

Microsurgery and free tissue transfer are very important for cancer and trauma patients. In head and neck cancer, most of the jaw may need to be removed. Muscle, bone and skin can be transferred from the leg to rebuild a new jaw with the help of microsurgery³. Free tissue transfers such as the transverse rectus abdominis musculocutaneous (TRAM) flap reconstruction allows better symmetry, shape and contour to be achieved for the patient (Fig. 2). It also decreases the possibility of fat necrosis and flap loss. In trauma cases where defects exist, compared with local advancement, using free flaps promotes wound healing, decreases time in hospital and minimises post-operative complications such as infection⁴.

(Fig. 2)



The Need

There has long been a requirement to allow 'reshuffling' of body parts to restore function and maximise aesthetic outcome. Before the 1970's it was difficult for a surgeon to repair a severed thumb. In Recent times surgeons can use big toes as grafts as well as transfer tendons to allow opposition of the fingers. The ability to transfer tissue in a single operation has meant many stages of the reconstructive ladder can be avoided, such as those employed in pedicle tube flap rotation during the world war. . Previous clinical decisions that required amputation can now salvage limbs due to microsurgical techniques that offer many reconstructive options. Larger margins of tumour can be resected than before which prevents disease recurrence as well as the many complications alternative surgeries currently offer⁵.

(Fig. 3)

The Future- Routine operations involve autologous transfer of tissue (self). However, recently more operations have utilised composite tissue allografts (Non-self) for many body parts including the hand (1998) (Fig. 5). Another exciting area of interest is that of facial transplantation. In 2005 a partial face transplant was performed in France and allowed replacement of highly similar tissue⁶. The imminent full face transplant by a highly qualified team in London allows us to witness why microsurgery is imperative in this growing discipline.

(Fig. 4)

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(Fig. 5)

