The Use Of Loupe Magnification In Microsurgery In The Third World: A Trinidad Experience

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Citation

M Ragbir, T Ali, V Naraynsingh, M Ramdass, S Romany, F Mohammed. *The Use Of Loupe Magnification In Microsurgery In The Third World: A Trinidad Experience*. The Internet Journal of Surgery. 2000 Volume 2 Number 2.

Abstract

Aim: To determine the effectiveness of microsurgery in the third world
Methods and Results: A 15 year retrospective analysis of microsurgical procedures performed with the aid of loupe magnification
was done at the General Hospital, Port-of-Spain, Trinidad. There were a total of 38 cases, which included replant surgery (1 digit, 1
penis and 10 hands); free tissue transfers (6 fibulae, 3 latissimus dorsi, 2 rectus abdominis, 1 radial forearm flap); 5 supercharged
TRAM flaps; 4 facial nerve repairs (2 directly, 2 by sural nerve grafting); 5 peripheral nerve repairs with grafts (sural to peroneal and
ulna, medial cutaneous nerve of forearm to digital). Our complications included two failed hand replants, partial necrosis of one tram
which was salvaged with a pedicled latissimus dorsi and minor necrosis of one latissimus dorsi flap.
Conclusion:
There are instances in reconstruction when microsurgery is the only recourse. The operating microscope is still a very expensive
piece of equipment and may not be readily available in the third world. This audit shows that with appropriate training microsurgical
procedures can be successfully performed with loupe magnification in the third world.

INTRODUCTION

Microsurgical techniques are applied to many aspects of reconstructive surgery however, the operating microscope is still a very expensive piece of equipment and may not be readily available in the third world.

Microsurgical success with loupe magnification is well documented[1]. This paper analyzes the effectiveness of microsurgical procedures performed in Trinidad over a 15 year period with the use of loupe magnification

Figure 1

Figures 1 and 2: Surgeons at work with loupe magnifying glasses

Figure 2

PATIENTS AND METHODS

A retrospective analysis of 38 patients in whom microvascular techniques were used for reconstruction at the General Hospital, Port-of-Spain. The age range was 12 to 65 years with 23 males and 15 females. All procedures were performed by one of two trained microvascular surgeons with the aid of loupe magnification. There was no use of preoperative anticoagulation in this group, however dextran was employed in two cases. Postoperative flap monitoring was solely by clinical means as other methods such as Doppler probes, pulse oximetry and laser Doppler were not available.

Figure 3

Figure 3: Left supercharged transversus abdominis pedicled flap using superior epigastric vessels and supercharged with the thoracodorsal vessels to inferior epigastric vessels.

Figure 4

Figure 4: Reconstruction of left breast 1 cweek postoperatively.

Figure 5

Figure 5: Degloving injury to right leg involving knee joint as well as the ankle joint and foot .

Figure 6

Figure 6: Degloving injury to right ankle with severe soft tissue injury.

Figure 7

Figure 7: Knee covered with Medial Head of Gastronemius Pedicled Flap and ankle with Latissimus Dorsi Free Flap (Thoracodorsal Vessels anastomosed to Posterior Tibial Vessels. The remainder of the limb was skin grafted.

RESULTS

Figure 8

A total of 37 cases were performed as shown below.

Replantation surgery:	
Hand	10
Thumb	1
Penis	1
Free tissue transfers:	
Fibula	6
Latissimus dorsi	3
Rectus Abdominis	2
Radial forearm	1
Trams (Supercharged)	5
Facial nerve repairs:	
Direct	2
Sural nerve graft	2
Peripheral nerve repairs with grafts:	
Sural to ulna	3
Sural to peroneal	1
Medial cutaneous of forearm to digital	1

Two of the hand replants failed. There one case of partial supercharged TRAM flap necrosis due to infection in a 55 year old diabetic with recurrent breast cancer after both chemotherapy and radiotherapy to the chest wall and axilla. The flap was debrided 1 week later and salvaged with a latissimus dorsi pedicled on the serratus branch. The partial latissimus dorsi necrosis was due to an extremely large flap being raised and the lower medial portion becoming engorged and not surviving. This area represented less than 5% of the flap which healed with dressings.

Figure 9

Figure 8: Left mandibular tumor

Figure 10

Figure 9: CT scan of left mandibular tumor

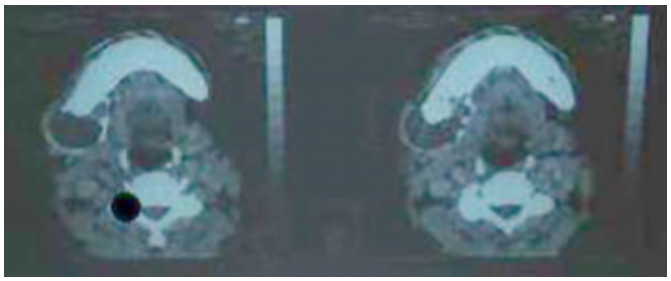

Figure 11

Figure 10: Jaw 3b:Resection of left mandibular tumor

Figure 12

Figure 11: Free fibula graft being raised used common peroneal vessels and nutrient artery to fibula. anastomosed to facial artery and vein.

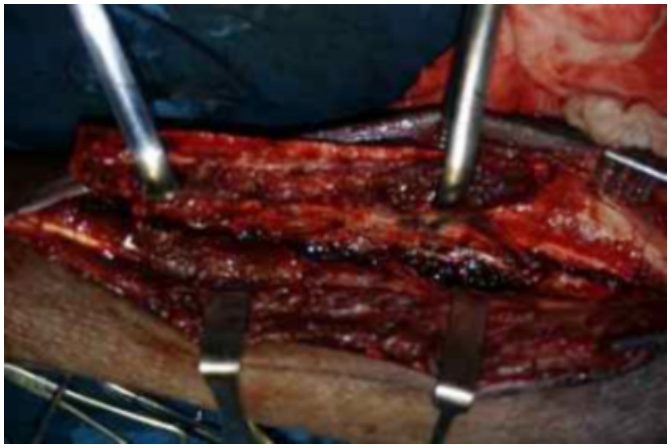

Figure 13

Figures 12 and 13: Free fibula graft in place of resected portion of the mandible and the patient postoperatively.

Figure 14

Figure 13: Free fibula graft in place of resected portion of the mandible and the patient postoperatively.

Figure 15

Figure 14: Severe Full thickness friction burns to the face of a young girl involved in a motor vehicle accident

Figure 16

Figure 15: Radial Forearm Free Flap used to covered area. Anastomosis to External Carotid artery and Common Facial Vein

Figure 17

Figure 16: Chop wound to the left wrist involving flexor tendons as well as the radial and ulnar vessels .

Figure 18

Figure 17: Good functional results.

Figure 19

Figure 18: A traumatic ulcer to the anterior tibial area of the leg.

Figure 20

Figure 19: free rectus abdominis muscle flap. anastomosis done using inferior epigastric vessels to the posterior tibial vessels.

Figure 21

Figure 20: Chop wound to the left thumb and index finger involving digital neurovascular bundle of the thumb.

Figure 22

Figure 21: Compound fracture of the left 1st metacarpal.

Figure 23

Figure 22: Good functional result

DISCUSSION

Since the late 1890s and early 1900s surgeons have routinely approximated blood vessels without the aid of magnification. In 1902, Alexis Carrel described the techniques of triangulation for blood vessel anastamosis and advocated end to side anastamoses for size disparity[2]. Nylen[3] was the first to use the operating microscope for eardrum surgery in 1921. Despite this it was not until 1962 when Malt and McKhann[4] described the first successful clinical replantations on two patients who had arm amputations. A further two years later in 1964 Nakayama[5] and associates reported what is most likely the first clinical series of free tissue microsurgical transfers.

Since this beginning clinical microvascular surgery has experienced a rapid expansion of donor sites for free tissue transfer and considerable refinements in microsurgical tools and techniques. A plethora of innovations and flaps from virtually every anatomic region has been developed. The microscope has evolved with and facilitated these advancements. Current models provide a magnifying power of 6x to 40x with foot controlled zoom and focusing options. Cooler external fiberoptic lighting reduces tissue dessication, and beam splitting permits the incorporation of additional viewing systems[6,7].

For a variety of reasons including surgical expertise and availability of equipment; microsurgery has not taken off in the third world and specifically in the Caribbean.

Whilst still not in a position to afford the operating microscope we have performed a range of microsurgical procedures with the aid of loupe magnification with an almost 100% success rate for free tissue transfer. The flaps chosen were of relatively large vessels of diameters in the region of 3.0 mm.

The use of loupe magnification in microsurgery in our setting appears to be well justified in trained hands. Its use at this center is advocated on the grounds of cost effectiveness, portability, efficiency and operator freedom. The purchase price of the instruments is nominal in comparison with the operating microscope. However, their utility is not without limitations and for smaller vessels in the range of 1.0 mm in diameter the operating microscope would be a great asset if it were available.

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References

1. SM Shenaq, MJA Kebluc, D Vargo. Free tissue transfer with the aid of loupe magnification: Experience with 251 procedures. Plast Reconstr Surg 95: 261-269, 1995.
2. Carrel A: The operative technique of vascular anastomoses and the transplantation of viscera. Med Lyon 98: 859, 1902. English translation in Clin Orthop 29:3, 1963.
3. Nylen CO: The otomicroscope and microsurgery, 1921-1971. Acta otolaryngol 73: 453, 1972.
4. Malt RA, McKhann CF: Replantation of severed arms JAMA 189: 716, 1964.
5. Nakayama K et al: Experience with free autografts of the bowel with a new venous anastomosis apparatus. Surgery 55: 796, 1964.
6. Hoerenz, P. The Operating Microscope: Optical principles, illumination systems, and support systems. J Microsurg. 1:364, 1979-1980.
7. Hoerenz, P. The Operating Microscope: III. Accessories. J Microsurg. 2: 22, 1980.

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