Problems of micro vascular free tissue transfer.

*Oluwatosin O. M., *Adigun I. A., **Shokunbi M. T., **Malomo A. O., **Komolafe E. O., *Olawoye O. A.

Departments of Division of Plastic & Reconstructive Surgery*, Division of Neurosurgery**, Surgery*, University College Hospital, Ibadan, Nigeria.

Correspondence to:
Oluwatosin O. M.
Department of Surgery, University College Hospital, P.M.B. 5116, Ibadan, Oyo State, Nigeria.

Reconstructive microsurgery may be defined as the functional restoration of body structures by transfer of tissue, utilizing microsurgical techniques. Success in head surgery is determined to some extent by the method of reconstruction that is available. Late presentation of cases is a peculiarity in this part of the world; tumor extirpation and wide resections are made possible only with an adequate knowledge of reconstruction. Pedicle flap reconstruction usually requires more than a single stage of surgery. Micro vascular free flaps are particularly suited for such cases. Division of Plastic and Reconstructive surgery has carried out some free flaps; the last two cases are presented in this paper to highlight the advantages of micro vascular free tissue transfer. We also highlight some problems of successful micro vascular free tissue transplantation in the developing world and suggest certain modifications of locally available facilities to encourage other units to adopt this method of tissue transfer. It is most appropriate at this time of the updating of our health care facilities.

Key Words: ***Micro vascular, free tissue transfer, latissimus dorsi flap.***

Microsurgical techniques have been applied to virtually every aspect of reconstructive surgery for a wide range of surgical problems[1–3]. Success in head surgery is determined to some extent by the method of reconstruction that is available. Despite the late presentation of cases, which is a peculiarity here in the developing world, tumor extirpation and wide resection is made possible only with an adequate knowledge of reconstruction. On the other hand where this knowledge is lacking, there is an attending risk of leaving behind residual disease. Division of plastic and reconstructive surgery of the University College Hospital, Ibadan has carried out some micro vascular free tissue transfers. The last two cases, carried out jointly by the divisions of plastic and neurosurgery are hereby presented to highlight certain problems of micro vascular surgery in the developing world and also to stimulate the interest of intending micro vascular surgeons in this part of the world to start the race.

Case I

Mr. A. A. had suffered persistent headache, diagnosed as a chronic frontal sinusitis, the extent of which was confirmed by CT-scan to involve frontal and parietal bones bilaterally and the roof of both orbits. After radical debridement, a micro vascular free latissimus dorsi musculocutaneous flap repaired the defect created, shown in figure 1. Prior to surgery,

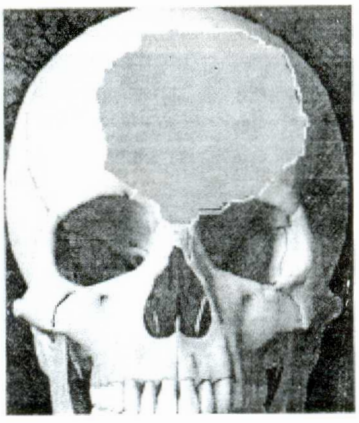

Fig. 1: **Case 1 - Diagrammatic representation of the skull defect after radical debridement.**

a serratus anterior musculo periosteal flap had been planned but the large size of the defect after debridement necessitated the use of latissimus dorsi flap. The immediate post-operative period was uneventful. Apart from the alopecia in the skin paddle of the flap, figure 2, patient has felt very satisfied with the result as at 6 months after surgery. He is yet to have an X-ray to demonstrate the extent of bone reformation.

Case 2

Miss A. A. had an extensive fibrous dysplasia of the frontoparietal skull that after excision was covered similarly by a latissimus dorsi musculocutaneous flap. Post-operative period was marred by extensive scalp and facial oedema. The flap thus survived only till day 5-post operative when it was discovered to be ischaemic 2 hours after the last monitoring. Review in theatre, showed the muscle was necrotic and had to be debrided.

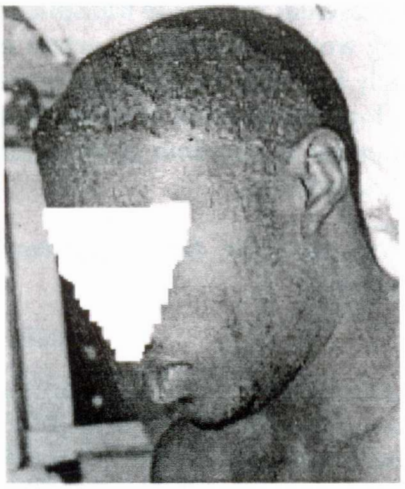

Fig. 2: **Case 1 - After reconstruction of the scalp and skull defects with a free micro vascular latissimus dorsi musculotaneous flap. Note the area of alopecia in the flap skin.**

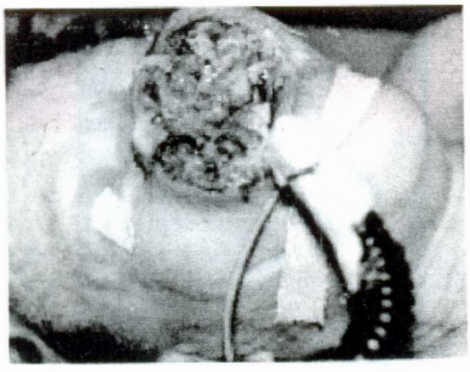

Fig. 3: **Preoperative picture of a patient with squamous cell carcinoma of the upper lip, palate and nose.**

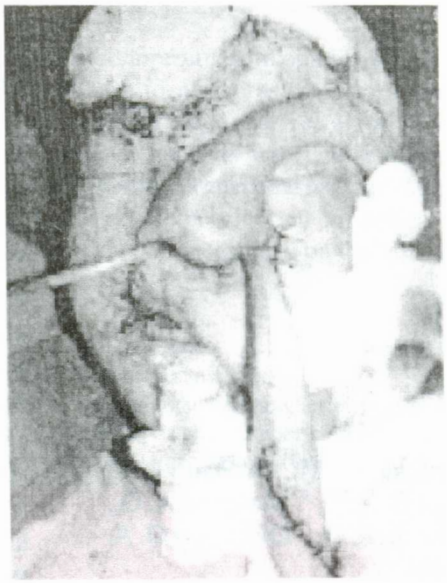

Fig. 4: **Postoperative picture showing a forehead flap for nose reconstruction and a Bakamjian flap for upper lip reconstruction.**
The pedicles were divided after two weeks.

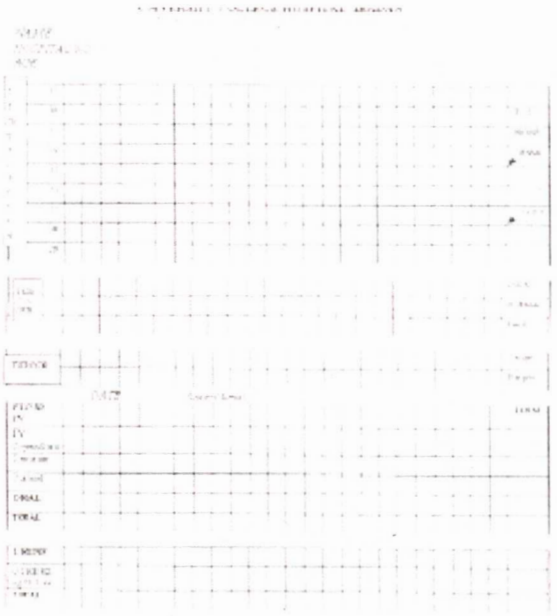

Fig. 5: **Micro vascular tissue transfer chart.**

Discussion

We have performed some reconstructive procedures using pedicle flaps, which ultimately required more than a single stage procedure. An example was an albino who presented to the division several years ago with locally advanced squamous cell carcinoma of the upper lip, which had involved hard palate and nose. After wide excision, pedicle flaps reconstructed the lip and nose. Pre-operative and post-operative pictures are shown in figures 3 and 4.

Micro vascular free flaps are particularly suited for cases like this because they allow the surgeon the opportunity to make use of any suitable tissue for reconstruction however remote from the defect. More importantly, it is a single stage surgery involving the excision of lesion, elevation of flap with skeletonization of the supplying pedicle, preparation of the recipient vessels, insetting the flap, micro vascular anastomosis and coverage of anastomotic site all performed in one operation.

Since it's beginning in the early 1970s, clinical micro vascular free tissue transfer has experienced a rapid expansion of donor site possibilities and considerable requirement in microsurgical tools and techniques. As microsurgery became more prevalent and experience with free tissue transfer mounted, the success rate also climbed and now averages over 90% in most series in the developed countries[4]. In a developing country like ours, we are still contending with the basic problems of micro vascular free tissue transplantation. These include technical expertise including anaesthetic; instrumentation and immediate post-operative follow up of the patients.

We have been able to supplant the problem of instrumentation by piecemeal purchase of micro instruments some of which are available as "Opthalmic" instruments in our local shops. Since micro forceps (jeweler's forceps) were not easily available locally, we used ophthalmic "springly" forceps until we were able to purchase the necessary micro forceps. Such springly forceps can be utilized both as dissecting forceps and as micro needle holder. An important implement is the micro vascular clamp[5] which when it is not available small bulldog clamps may be used. However, the clamps should be purchased as soon as possible. We have performed micro vascular anastomoses in the forearm using the Esmarch's bandage as tourniquet prior to the availability of micro vascular clamps. This can only be applied for a short period and however is not possible in the head and neck.

We have performed anastomosis on the radial artery, deep inferior epigastric and thoracodorsal, superficial temporal vessels, that is, in vessels as small as 3mm diameter using x4 loupe magnification. A pair of operating loupes may therefore act as replacement until the surgeon purchases the operating microscope. Intra-operatively a most useful tool in fluid balance monitoring is the half hourly urine output through an indwelling urinary catheter. This helps to ensure the prevention of hypovolaemia, which might give rise to an ischaemia induced re-perfusion injury of the flap during the early post-operative period. Papaverine is an essential vasodilator, which is not available locally. We have been able to replace it with plain lignocaine, which is also a known vasodilator. One of the most important management phases in free tissue transplantation is immediate post-operative follow up. Because this method of reconstruction is a prolonged procedure and because it involves extensive dissection, post-operative complications particularly thrombosis obstruction at anastomotic sites should be detected early and rectified before tissue necrosis. Ideally nurses trained in microsurgical nursing should monitor these patients. Figure 5 shows the "chart" for post-operative follow-up that we use in our division. While awaiting availability of trained nurses, medical personnel may be utilized.

In Nigeria, we do not have the advantage of skin colour in flap monitoring. Skin colour changes from pink to blue and white are best observed in the light complexioned whereas most of our patients are pigmented. Reliance on temperature differentials has not been helpful particularly since it is known that temperature drop in a failing flap is one of the terminal events prior to tissue necrosis. The flap failure in the second patient typifies these predicaments. Doppler ultrasound is a very useful item in monitoring. Intending micro vascular surgeons should endeavour to attend locally available micro vascular course to improve on their technical expertise.

The beginning may appear rough, but with persistence and regular free micro vascular operative practices and sessions, confidence will build up and success rate shall also rise. In conclusion, microvascular free tissue transfer is very feasible locally and should be more widely utilized, especially as facilities improve.

References

1. Title B. J., English M. J., Hodges P. L. Microsurgery: Free tissue transfer and replantation. Selected Figure 1 is not supplied Readings in Plastic Surgery 1993; **7**(11): 1–21.
2. Fasika O. M. Surgical Reconstruction: the common factor. 6th Eruchalu Memorial Lecture. *Nigerian Journal of Surgical Sciences*. 1997; **7**: 1–7.
3. Wei F. C., Tan B. K., Chen I. H., Hau S. P., Liau C. T. Mimicking lip features in free flap reconstruction of lip defects. *Brit. J. Plast. Surg.* 2001; **54**: 8–11.
4. Khouri R. K. Avoiding free flap failure. *Clin Plast Surg.* 1992; **19**: 773.
5. Numley J. A. Microscopes and Micro instruments. *Hand Clin* 1985; **1**: 197.