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Editorial

Barriers and Facilitators for Setting Upper Limb Reconstruction Services

Luigi Troisi, MD, PhD, FEBOPRAS[1,2], Juan Enrique Berner MD, MSc, FRCS(Plast) FEBOPRAS[3,4], Macarena Vizcay, MD[1,2], Giorgio Eugenio Pajardi, MD[1,2]

[1] Reconstructive Microsurgery Service, University Department of Hand Surgery & Rehabilitation, San Giuseppe Hospital IRCCS MultiMedica Group Milan, Italy. School of Specialization in Plastic and Hand Surgery, Milan University, Italy
[2] School of Specialization in Plastic, Reconstructive and Aesthetic Surgery, Milan University, Italy
[3] Queen Victoria Hospital, East Grinstead, United Kingdom
[4] Kellogg College, University of Oxford, Oxford, United Kingdom

Corresponding author: Luigi Troisi, Milan, Italy luigitroisi@gmail.com

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Introduction

Microsurgical limb reconstruction is a complex surgical technique that aims to preserve an extremity that has been affected by acquired conditions, such as trauma or cancer [1]. It involves the transfer of free tissue flaps, which are micro-surgically revascularized in the recipient site to reconstruct a variety of defects. This can be not only technically demanding for the surgeon leading this type of procedure but also requires a well-set-up perioperative team and service [2]. This article aims to present the experience of the first author setting up a new microsurgical service.

Training in Italy and The United Kingdom

My first experience involving the creation of a new microsurgical unit was as a trainee when I had the opportunity to work in Trieste. Professor Zoran M. Arnez moved recently from Ljubljana to establish a new microsurgery service within a previously established Plastic Surgery unit in an Italian public hospital [3]. I was able to appreciate as I progressed as a resident the challenges encountered by my mentor, and the energy and perseverance required not only to innovate but also to stand initial complications while the service matures. Having had the chance of working in different countries gave us the opportunity of seeing the good and the bad of different systems and make our minds on how to set up a reconstructive service.

For instance, In the United Kingdom, the management of lower limb trauma is guided by the British Orthopaedic Association and British Association of Plastic and Reconstructive Surgery "Standards for the management of open fractures of the lower limb" [4].

I had the chance of doing a lower extremity microsurgical fellowship at Southmead Hospital, Bristol, where I was exposed to all the aspects of limb reconstruction from clinical to managerial. In this major trauma center, wound debridement was routinely performed by a senior plastic surgeon together with a senior orthopedic surgeon within the first 24 hours post admission. Protected theatre and surgeon's capacity allowed obtaining definitive soft tissue cover with free flaps no later than three days and patients were constantly looked after by a multidisciplinary team of orthopedic and plastic surgeons, microbiologists, dieticians, physiotherapists, occupational therapists, and specialist nurses. After finishing this fellowship in Southmead Hospital, Bristol, I considered myself well versed in the principles behind these standards.

I then had the opportunity to move to Salisbury and work as a consultant. The main challenge derived from the fact that the plastic surgery service in this city is embedded in its District General Hospital (SDH), while the regional trauma center is located 40 kilometers away in the city of Southampton (UHS). This particular setup implied that polytrauma patients could not be treated in the plastic surgery unit, but at the same time, the major trauma center lacked the facilities and personnel to look after microsurgical reconstructions.

A variety of different reconstructive techniques were required for treating complex cases in Southampton, avoiding transfers to Salisbury unless necessary. To involve nurses, physiotherapists, occupational therapists, and other allied health professionals, lectures were organized, and multidisciplinary rehabilitation meetings were introduced. A perioperative flap care protocol was designed with the input of the whole team to guide the provision of consistent service. Outcomes such as weight-bearing status, length of inpatient stay, and return to work were routinely measured.

Experience in an Italian hospital

In early 2019 I was relocated to a regional hand surgery center with vast experience in all aspects of hand surgery, but with no consistent microsurgical service. Despite the support of my surgical colleagues, soon I noticed that anesthetists were not used to this kind of procedure and nurses had no experience in

looking after free flaps. Luckily, despite that soft tissue transfer was not common previous to my arrival, there was previous microsurgical expertise involving replants and hand surgery that helped as a starting point.

The hospital management had to buy new equipment, such as microsurgical instruments, portable doppler devices, and thermal cameras to plan and monitor flaps. The same flap care protocol I used in my previous job in the United Kingdom was then introduced in Milan, with not such a good response from the nursing staff initially. However, after a few cases, it was possible to gain the trust of the theatre staff, leading to a more effective working environment [5].

It is crucial to transmit that every member of the team is part of a reconstructive team. As long as everyone knows their role and tasks, every step of the surgery can be done more efficiently. Preoperative briefs are essential [6,7] and trainees play a vital role, as inspiring role-modeling can make a resident a stakeholder when new changes are introduced [8].

Covering microsurgical commitments in two different hospitals can be also difficult. A supportive management team can help flexibility schedules in order to free time for the microsurgical team to support other teams when needed.

It is part of our plans to expand this new service, expand our capacity and help train the next generation of plastic surgeons interested in reconstructive microsurgery. A

new international fellowship would not only provide a training opportunity but also this person could be in charge of a teaching program for trainees and running a journal club.

Discussion

Setting up a microsurgical service is a multifactorial process. Both technical and human factors are an important part of the process.

Trust

Without the trust and management on the surgeon's side, it would be impossible to set up a new service. Reconstructive microsurgery is expensive for a hospital, therefore a good management plan must be in place. Avoiding time and resource waste along with obtaining support from patients and the public are important to secure the needed resources [9]. In a public health system, limb-saving surgery does not only result in a better quality of life but is also cost-effective as patients are more likely to return to their previous occupations.

Hospitals willing to set up new microsurgical services need to be able to provide emergency theatre capacity along with the adequately trained surgical staff. Apart from being long and difficult procedures, Trusts need to be able to take patients back to the theatre for salvage when needed. Dedicated scrub teams and ward nurses with an interest in reconstructive surgery are mandatory to have a high flap success rate.

Team

Lower limb reconstruction is not a "one-surgeon-show". There needs to be a leader, but the team is composed of surgeons, of one or more specialties, anesthetists, trainees, scrub nurses, anesthetic nurses, and health care professionals. Everyone must have a role and tasks to perform so that surgery can go smoothly, and will be less time demanding. The WHO checklist must be followed to avoid adverse events and to make sure that the entire team is aware of the plan and concerns.

If multiple cases have been booked it is useful to gather a brief at the beginning of the day. This should be as precise and detailed as possible. After the introduction of the members of the team, the surgeon can explain the purpose of the operation and the planned process of steps, giving precise roles to the rest of the team. This helps everyone concentrate on what is expected from them and avoid surprises.

Theatre

The operating theatre must be organized for this kind of surgery. The team must be trained for the procedure and the surgeons must be sure that all the instruments are available. It is crucial to have good instruments to minimize the stress for the surgical team.

Standardizing procedures as much as possible can help trainees and nursing staff, as they can think ahead of what steps are coming next. Pre-filled cards are an aid so that the scrub team can get all the necessary equipment beforehand, speeding up procurement times and avoiding waste. When possible, a two-team approach allows preparing the recipient site while harvesting the free flap. Again, this helps in shortening operating and anesthetic times.

Training

Trainees are an integral part of the surgical team. It is the responsibility of the senior members of the team to teach the next generation of microsurgeons. The team brief allows giving residents tasks that they feel satisfying according to their training level. Giving them feedback after the procedure enhances their learning experience and sets up new goals for the next case. Trainees have also the motivation for introducing innovations and conducting research projects.

Ward

The aftercare following surgery care is critical. A clear postoperative protocol allows standardized flap monitoring. Nursing and medical staff need to be trained adequately for this purpose. Doing lectures for nurses has allowed empowering them in the process of monitoring. This protocol is not

written in stone, as it might need to be adapted to a different setting and new technologies.

Conclusion

Ignoring the above-mentioned domains can result in failing to set up a new microsurgical unit. The BAPRAS guidelines [4] and the Get It Right First Time [10] philosophy reflect a culture of patient safety and resource-saving philosophy. Research, audit, and training, along with a multidisciplinary approach are not only key to microsurgical success, but also to evidence-based, safe surgical care.

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