

Henri Mondor Experience with Microsurgical Head and Neck Reconstruction Failure



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KEYWORDS

- Reconstructive surgery • Free flaps • Head and neck surgery • Mucosal reconstruction
- Dental rehabilitation • 3D planning

KEY POINTS

- The failure of a head and neck reconstruction even after a successful free flap transfer may be life-threatening if a drop in vital function is not restored.
- Simple plastic surgery techniques such as fat or skin autograft and local flaps are used to resolve sometimes complex issues without the need for a new major surgery.
- Inert reconstruction tissues in the oral cavity may impair the ability to swallow and phonation.
- Using surgical cutting guides for osteotomy results in better outcomes when a complex reconstruction of the mandibular or maxillary bone is needed.
- Allograft transplantation allows treating complex multitissular defects without free flap transfer and results in enhanced functional rehabilitation.

INTRODUCTION

Head and neck reconstruction surgery largely relies on the use of free flap techniques. The emergence and diffusion of microsurgery in the 1970s have marked a major change in the approach of the maxillofacial reconstruction surgery. In particular, it is now possible to consider complex reconstructions with a real functional and aesthetic rehabilitation potential.

However, microsurgery is a very demanding field. The progress with respect to the instrumentation (microscope, microinstruments) does not compensate for the difficulty of the surgical procedures. The learning curve is long, and considerable experience is necessary to ensure a satisfactory success rate.

The reconstructive surgeon is frequently faced with very complex decisions: donor site, recipient

site, function to be rehabilitated, tissues to be reconstructed. It is sometimes impossible to fulfill all the requirements because of difficulties related to patient condition: salvage surgery, extensive and complex deterioration involving multiple tissues, adjuvant therapies (radiotherapy), precarious vascular status.

Surgeons concur that a truly successful reconstruction involves restitution, on the one hand, of essential functions: eating, phonation, oral continence, and respiration, and, on the other hand, restoration of the most aesthetically pleasing anatomy possible, compatible with a normal social life.

An unsatisfactory conformation of the transferred flap or a defective healing in the mouth will lead to functional rehabilitation failure. Conversely, too large of a tissue transfer will alter the functioning of residual anatomic structures such as the tongue or soft palate.

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In this article, the surgical techniques are discussed that allow improving the functions and aesthetic aspect when a free flap reconstruction has been carried out but with an insufficient functional or aesthetic result.

Discussed are the techniques used to improve the essential functions of swallowing, phonation, salivary continence, and the final morphologic result.

STANDARD PRACTICE

At the Henri Mondor teaching hospital, the authors treat patients with multiple injuries, ballistic injuries, and malformations (neurofibromatosis) and perform reconstructions after cancer therapy. Microsurgery was introduced in the 1980s. The adoption of microsurgical techniques by plastic surgeons has been very rapid, in particular for hand surgery and facial reconstructive surgery.

The use of free flaps for breast reconstruction after cancer therapy was adopted later, in the 1990s. The main free flaps used for maxillofacial bone reconstruction were fibula osteocutaneous flaps.

Other osteocutaneous flaps have been used: chimeric scapulodorsal, iliac crest, chimeric antebrachial, prefabricated flaps. It should be noted that 25 years after the fibula flap was first used, it remains, for the authors, the preferred technique when it is necessary to perform extensive mandibular and maxillary reconstruction (**Table 1**).

WHAT IS A FREE FLAP RECONSTRUCTION FAILURE?

Consider that there is a failure of the reconstruction in 2 different situations:

- The microsurgical free transfer fails with partial or total necrosis of the flap (partial or total necrosis of the skin paddle, necrosis of a fibular bone segment). The anatomic structure or function is not restored either partially (**Fig. 1A**) or totally (**Fig. 1B**).

- The microsurgical free transfer is functional, but one or several anatomic structures have not been reconstructed because of lack of tissues or failure to achieve satisfactory conformation of the transferred flap.

HOW IS HEAD AND NECK RECONSTRUCTION FAILURE MANAGED DESPITE A FREE FLAP SUCCESS?

It is necessary to carry out a precise semiological analysis of the patient anatomic and functional features to choose the technique that is the most suitable for the reconstruction of the missing structures.

Five issues related to the alteration of the essential anatomic structures are of interest and correspond to the main complaints of patients after reconstruction even when the free tissue transfer has been successful:

- Oral feeding
- Phonation and articulation
- Salivary continence
- Morphology and motor function of the face
- Infections and exposures of the osteosynthesis material

WHAT ARE THE ANATOMIC AND FUNCTIONAL STRUCTURES THAT SHOULD BE RESTORED?

A. The main problem faced after a partial failure of reconstruction is that of oral feeding.

Indeed, chewing and swallowing functions are extremely complex to restore after cancer surgery, even when the tissue transfers have been successful. These functions require an anatomic and functional restoration and a long rehabilitation. When one or more of these functions are not restored, feeding is compromised:

- Mobile tongue
- Soft palate and upper jaw
- Tongue base

Table 1

Classification of osteocutaneous flap qualities according to the parameters required for oral reconstruction after buccopharyngectomy and maxillectomy, ranked from A to D

Flap	Tissue Flap Composition			Donor Site Parameters	
	Bone Length	Skin Paddle	Pedicle	Position	Morbidity
Fibula	A	C	B	A	A
Scapula	C	B	B	D	D
Antebrachial	D	A	A	C	C
Iliac crest	B	D	D	B	C

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