

Abstract

Severe face deformity is one of the most devastating disabilities of human beings. In the majority of cases, this disability produces a myriad of symptoms, including depression, social isolation and suicide ideation. In comparison to other extreme disabilities, such as amputations, spinal cord injuries or cerebrovascular disease, where compassion and sympathy are common reactions in those that relate with the patients and in society in general, catastrophic face deformities produce anxiety, rejection and fear in those that are confronted with them. Physicians that care for this people ordinarily listen to histories of rejection and isolation feelings, fear to expose oneself to society for being “ugly” or “anger gazes” and even increpations such as “how one dares to walk on the street with such a face” or “you are scaring my children”.

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on the street with such a face” or “you are scaring my children”.

Traditional methods of reconstructive plastic surgery include the transplantation of neighbouring tissues to the defect, free tissue transfers and the use of prosthesis and biomaterials. Best outcomes are most often obtained when the surgeon can utilise tissues from adjacent face areas, rendering a good colour and texture match. However, when dealing with severe deformities, these tissues are either absent or injured and deformed also. In these situations, the techniques that are available to reconstruct patients offer outcomes that are far from perfect and do not obtain the desired goal—restoration of image and function—rendering poor quality of life.

Reconstruction often fills the defect with tissue, and social appearance is mediocre. Feelings of isolation, rejection, anxiety and depression are not being overcome and maintain a high level of stress and psychological problems. In many instances, patients require a large number of operations to attempt achieving the desired outcome (some cases require more than 100 interventions in a long lifespan), having a final result far from perfect.

Face transplantation is an excellent alternative to traditional treatments for severe and catastrophic face deformities. Its application in selected cases has been a revolution in reconstructive surgery, similar to that achieved with solid organ transplantation for patients with end-organ failure years ago. Paralleling that experience, it is producing the same social demands and it raises similar scientific and ethical questions. The transplantation of face structures permits the reconstruction of disfigured face anatomy with healthy tissues that have a preformed natural form and function, the final outcome being superb in comparison to that yielded by traditional techniques. All scarred and deformed tissues and anatomical landmarks are resected. Following this step, identical, healthy tissues replace them. A normal functional, sensorial and social outcome is expected at 1–2 years. All techniques that are necessary to perform face transplants are commonly used on a daily basis in tertiary plastic surgery services. Among them, the microsurgical proficiency, which permits anastomosing vessels and nerves and joining together muscles and all anatomical structures, is routinely performed. The outcomes of face transplantation programmes throughout the world warrant that with a robust protocol and team approach, these perfect outcomes can be achieved.

3.1 Indications

Face transplantation is in its initial clinical phase. Therefore, it should be still considered a clinical experimental treatment. The effects and long-term outcomes are still unknown; thus, face

transplantation should be considered and evaluated on a case-by-case basis. In order to provide the maximum safety of the procedure and achieve equilibrium between the potential risks (including death as an outcome) and the benefits to patients affected by severe face deformities, the indications should be limited and be meticulously defined. As mentioned before, it is evaluated in an individualised manner, and it is limited to true severe face deformities that cannot be properly reconstructed with traditional techniques. Focus on functional outcome is essential.

Absolute indications for face transplantation include:

- Complete destruction of the eyelids, including the orbital sphincter
- Complete destruction of the lips, including the oral muscle sphincter

Destruction of face muscle sphincters cannot be currently restored or reconstructed with traditional techniques. There have been attempts to mimic the natural function of these structures with composite free tissue transfer (free flaps). However, results vary and they are poor, both functionally and aesthetically. Therefore, we may assume that the only and unique technique that can render a total restoration of the face sphincters is the transplantation of such structures from a human being (donor) that granted permission for face transplantation. With this manoeuvre, the delicate muscle, internal lining, nerves, vessels and skin of these anatomical landmarks can be properly reconstructed.

Taking into account the former considerations, diseases and anatomical conditions that constitute absolute indications for face transplantation can be listed (Table 3.1):

1. Patients affected by face destruction (total or partial) from burns
2. Posttraumatic face deformities
3. Benign tumours, congenital deformities and other local extensive malformations

Patients affected by burn sequelae present with a broad spectrum of deformity (Figs. 3.1 and 3.2). It may vary from small superficial scarring that produces aesthetic deformities to total destruction of anatomy and function. There have

Table 3.1 Types of general indications for face transplantation

Aetiology	Considerations
Postburn deformities	Evaluate psychosocial impact and functional status; severe scarred faces may not be good indications
Posttraumatic deformities	Important complexity, bone commonly involved; good indication if functional impact is severe. Gunshot injuries are excellent indication
Benign tumours and congenital deformities	Good indications if pan-face deformity is present. May require treatment of tumour/malformation first, followed by transplantation. Neurofibromatosis and AV malformations excellent indications
Postoncological deformities	Severe deformities. Evaluate on a case-by-case with oncology. Check oncological risk and functional impact Important ethical issues

**Fig. 3.2** Destruction of face sphincters and severe face scarring are common problems in burn patients that have an indication for face VCA**Fig. 3.1** Massive third-degree burns to the face are good candidates for face VCA. It may be considered in the acute phase for patients with the involvement of deep structures

been diverse face transplantations on burn patients, all having in common destruction of oral and/or eyelid sphincters. Postburn pan-face deformity should be addressed with caution, especially in those patients with scarred faces with minimal functional deficits. In this patient

population though, deformities may pose significant psychological and social impact. The indication should be carefully addressed on a case-by-case basis, taking into consideration the risk–benefit of the procedure.

Posttraumatic face deformity (Figs. 3.3 and 3.4) is a second important group of patients that may benefit from face transplantation. Deformities of the soft tissues are commonly encountered, coupled with bony destruction and functional incompetence. Gunshots to the face are a paradigm of such deformities. The latter are formal indications for face transplantation. Similar to burn deformity, the patient should be thoroughly evaluated. Some patients function well in society and face transplantation may not be indicated in these situations.

Benign tumours and congenital/acquired malformations are commonly treated in tertiary plastic surgery departments (Figs. 3.5 and 3.6). Most of them are treated within a multidisciplinary team with good to excellent outcomes. Patients present with localised or restricted tumours/



Fig. 3.3 Gunshot injuries to the face are excellent indication for face transplantation. They allow for immediate restoration of form and function



Fig. 3.5 Complex congenital deformities may benefit from a face VCA team approach, which is aimed to reconstruct face sphincters and anatomical landmarks and face bones

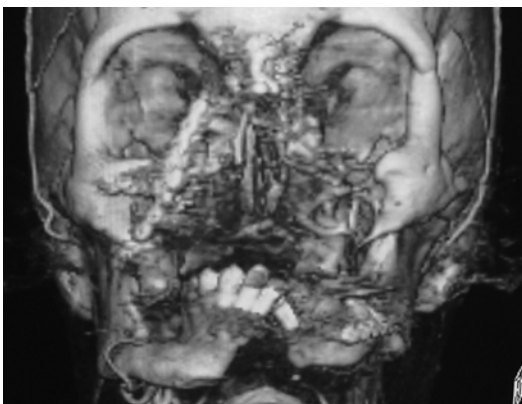


Fig. 3.4 Posttraumatic bone involvement can be restored with a composite tissue face allotransplantation that includes the maxilla and the mandible

deformities, and traditional or classical techniques after formal resection of the cause of the deformity render acceptable functional and aesthetic results. Large and severe tumours/deformities require multiple operations and mutilations. Consequently, patients required a long-term follow-up, a large number of operations, difficult rehabilitation and a secondary deformity (both aesthetic and functional) caused by the surgical treatment. This kind of patient reintegrates badly into society and function is commonly impaired. These types of patients are good

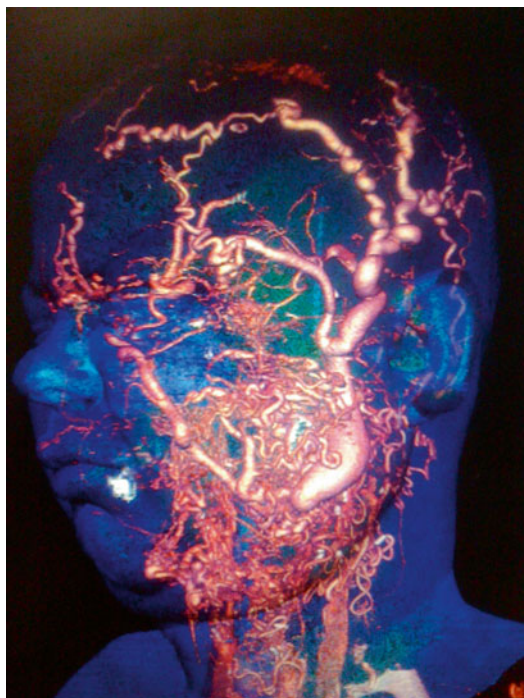


Fig. 3.6 Vascular malformations and neurofibromatosis are also prime indications in face VCA programmes. They allow resection of the tumour and restoration of anatomy

candidates for face transplantation, provided they understand the nature of the treatment, its limitations and the potential and real risks. Common

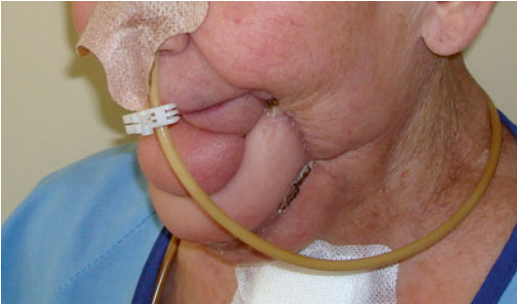


Fig. 3.7 Postoncological deformities should be evaluated in a case-by-case basis with full oncology work-up to rule out other primaries, recurrences and the individual oncological risk

aetiologies include type I neurofibromatosis, vascular malformation and secondary craniofacial deformities.

Postoncological deformities deserve a special word of caution (Fig. 3.7). They are common, especially in large tertiary care centres. Their aesthetic and functional impact is severe, although their unique biology deserves an individualised approach. Even though they are not formal contraindications for face transplantation, it is well accepted that immunosuppression can promote the development of recurrences or newly acquired cancer tumours from silent clones of cancer cells. The experimental nature of face transplantation limits its utilisation in this patient population. If they are to be evaluated, patients should be “cured” from their disease and follow a complete check-up by the oncology department. The oncological risk of the patient has to be evaluated and a final decision be made. It has to be remembered that almost all patients affected by oncological deformities have received preoperative or postoperative radiotherapy, causing an added deformity and defect in tissues, with extensive fibrosis that may prevent transplants to be functionally correct.

3.1.1 Contraindications for Face Transplantation

A list of indications and contraindications for face transplantation may produce an intense

debate, similar to that produced in society during the first four years of the twenty-first century regarding face transplantation.

Contraindications for face transplantation vary with time, centre, culture and country. They must be listed in the face transplant protocol, and they usually follow a consensus with the ethical committee and the transplant organisation body of the region/country. In general terms, however, we may accept that the following are absolute contraindications for face transplantation:

1. Evidence of tumour malignancy
2. Negative report from psychiatric/psychological evaluation (active psychiatric disorders, severe personality disorders and known and reported non-compliance to treatments, among others)
3. Medical conditions that affect systems and/or organs (especially those that may be affected by immunosuppression drugs)

3.1.2 The Timing for Face Transplantation

The initial approach and formulation of clinical protocols indicated that face VCA was an experimental clinical treatment that should only be attempted in cases with no other alternatives and as a last resort. Indeed, long-term outcomes were still unknown, and the efficacy of face transplantation for restoration of form and function in an effective manner had to be explored. However, the indication of a face transplantation under these circumstances raises important ethical questions.

Obtaining informed consent when nothing else can be offered as a method of treatment makes informed consent almost impossible. Without a reasonable alternative, patients cannot counterbalance risks and benefits of different techniques and approaches for the deformity, and this increases the stress and the inability to make plausible decisions. Moreover, clinical protocols stated that there should be an alternative to reconstruct the defect should the transplant failed and return the patient to the premorbid condition. Even though this is a formal requirement for ethical accreditation, it would be almost impossible

to return patients to the pre-transplant appearance and function if no other alternatives are possible. On the other hand, this line of treatment would condemn patients to a large number of unnecessary operations when reconstruction of a severe deformity is performed with traditional techniques: the final outcome will be less than acceptable, and the patients will be then confronted with the difficult decision to accept a face VCA as a last resort.

The evolution of the successful team approach for face transplantation and the good to excellent outcomes that have been obtained forced this approach to be turned to a more aggressive and early indication for face transplantation.

It is our belief, which is shared by others, that patients with complex and severe face deformities that cannot be reconstructed with traditional techniques be offered a face VCA early in the treatment plan process. All other donor sites and techniques will be still available should the transplant failed, and the patient will show less scarring, untouched face tissues and good alternatives for acceptor vessels and nerves. The evolution of face transplantation in its early stages has rapidly

Table 3.2 Timing of face VCA indication

	Positive effects	Negative effects
Early	Avoids unnecessary operations	Halts reconstructive plan
	Limits scarring	Increases time in waiting list with functional problems
	Preserves vessels and nerves	Limits acceptance of functional deficits
	Low stress level	
Limits transfusions and immunological barriers		
Late	Better acceptance of functional deficits	Limits rescue operations
	Allows good communication with team and surgeons	Large number of operations
	Increases patient compliance	Increases scarring Acceptor vessels and nerves may be limited Ethical problems in informed consent

changed to a more restorative surgery, changing the paradigm of face reconstruction and face transplantation (Table 3.2).