

# Facial Transplantation



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## KEYWORDS

- Facial transplantation • Composite tissue allotransplantation • Microvascular surgery
- Immunosuppression • Ethics

## KEY POINTS

- Computed tomography angiography is helpful preoperatively for assessment of recipient vessel targets to plan for typically 2 arterial and 2 venous anastomoses to support the transplant.
- Skin is highly antigenic; acute rejection of facial transplants is common, if not universal, but chronic rejection is rare.
- Typical 3 drug immunosuppression exposes patients to risks of infection and development of malignancies, both of which can be deadly.
- Careful patient selection, thoughtful informed consent, and consideration of the psychosocial impact of facial transplant are necessary to keep the procedure ethically sound.

## INTRODUCTION

Conventional approaches to facial reconstruction are largely dictated by the extent of the defect. Although smaller defects may be amenable to local flaps, more extensive defects often require free tissue transfer or large split-thickness skin grafts. These techniques may suffice to provide coverage and occasionally restore function. However, in terms of both cosmesis and functionality, traditional reconstruction options fall short for patients with the most severe whole face deformities, often resulting in a patchwork appearance that reflects the sometimes dozens of surgeries these patients endure in pursuit of the elusive goal of achieving an acceptable appearance and quality of life (**Fig. 1**).

Over the last 10 years, facial transplantation, a form of composite tissue allotransplantation (CTA), has emerged as a viable option for reconstruction of the most severe facial deformities in carefully selected patients. There have been 31 cases of facial transplantation reported in the world literature since the first case in 2005, with good results overall (**Table 1**). However, facial transplantation was controversial at its

inception; despite growing experience with this procedure, significant controversies persist.

In this article, the authors focus on the current controversies, challenges, and questions that confront facial transplantation while highlighting the lessons learned and challenges overcome through experience thus far. The discussion focuses on 3 main topics: technical issues, issues of facial transplantation immunology, and ethical concerns.

## TECHNICAL ISSUES

Facial transplantation is undoubtedly a highly technical and complex surgical undertaking that requires a cohesive team approach. Because of the complexity of the undertaking, only a handful of centers worldwide have the expertise and infrastructure necessary to perform facial transplantation. As the worldwide experience has grown over the last decade, technique has been refined, though some controversies and challenges remain.

Because facial CTA requires revascularization via microvascular anastomoses, a detailed understanding of the recipient vascular anatomy is

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**Fig. 1.** A 37-year-old man before injury (A), before face vascularized composite allotransplantation (B), 6 days (C) and 7 months (D) following allotransplantation of the face. (From Murphy BD, Zuker RM, Borschel GH. Vascularized composite allotransplantation: an update on medical and surgical progress and remaining challenges. *J Plast Reconstr Aesthet Surg* 2013;66(11):1453; with permission.)

paramount to determine if a given individual is an acceptable facial transplantation candidate and, if so, to create a viable surgical plan. This understanding is especially important because most

patients who are considered for facial transplantation have undergone numerous prior reconstructive surgeries, usually including prior free tissue transfer, which may limit the availability of viable

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