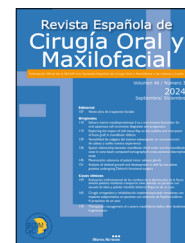




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Editorial

Twenty years of facial transplantation

Veinte años de trasplantes faciales

During the 27th Congress of the EACMFS (European Association for Cranio Maxillo Facial Surgery), held in Rome from 17 to 20 September 2024, a symposium entitled “220 years of facial transplantation” took place with the participation of distinguished speakers of renown prestige and experience. On the eve of the commemoration of the 20th anniversary of the first facial transplantation (FT) performed by Devauchelle et al. in France in 2005¹, the speakers addressed the main challenges that this unique procedure has brought to the field of transplantation and, in particular, the progress made in vascularised composite allotransplantation (VCA) of facial structures. January 2025 will also mark the 15th anniversary of the second FT in Spain and 11th worldwide, which was performed at the Hospital Universitario Virgen del Rocío in Seville²⁻⁷. Today, our patient, Rafael, continues to evolve favourably and is very satisfied with the result.

Among other issues, the symposium presentations highlighted three achievements that have been published in 2024 and that may mark the future progress of this procedure. On the occasion of this 20th anniversary, the present editorial aims to briefly review the recent articles published by pioneers in this field and to reflect on the progress and remaining challenges of this complex reconstructive technique.

In the article by Homsy et al.⁸, the consolidated results of the first 50 FTs are analysed for the first time. In this multicenter cohort study, updated and previously unpublished data were collected on the results obtained in multiple centers with different protocols and programs. Indications, anatomical composition of VCAs, immunosuppression regimens and outcomes are shared in this multi-authored paper. The 50 transplants involved 18 centres in 11 countries, 29 patients operated on in Europe, 19 in North America, 1 in China, and 1 in Russia. Thirty-nine transplants were performed in men (81 %) and 9 in women (19 %), with a median age of 35 years (range 19-68). Twenty-four were partial transplants and 26 were full transplants. Indications included trauma (29, 58 %), burns (11, 22 %), tumours (8, 16 %) and retransplantation (2, 4 %). The median follow-up time was 8.9 years.

Overall survival (defined as loss of the VCA or death of the patient) was calculated and factors that could influence acute rejection episodes were assessed. Six VCAs were lost, and two cases were retransplanted. Ten patients died, two of them having lost the transplant. The median number of acute rejection episodes per year in the lost FTs was 1.2 (range 0-5.3) and in the surviving was FTs 0.7 (range 0-4.6). No statistical correlation was found with any of the variables of patient characteristics or VCA type, either for transplant survival or for the number of rejection episodes.

Cumulative survival 5 and 10 years after transplantation was 85 % and 74 %, respectively. This global survival is encouraging, as these percentages are comparable to current solid organ transplantation. Importantly, a global learning curve was observed with improved survival over the years, so that the sequential number of transplants worldwide was a significant predictor of survival. Taken together, these data suggest that survival is acceptable in the long term and make FT an alternative reconstructive option for extensive facial defects and severe disfigurement. However, despite the good survival data, the last decade has seen a decline in transplant volume compared to the peak period between 2011 and 2014. This downward trend could be attributed to technical demands and the lack of logistical and financial support for FT programmes.

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In 2024, the first international consensus recommendations on FT were published (Longo et al.⁹). Due to the many challenges involved in FT, global collaboration between multidisciplinary teams became essential. VCA remains a relatively emerging field of innovation, with only 50 procedures performed worldwide in the last two decades. Therefore, global knowledge sharing and experience exchange between institutions aims to improve surgical techniques, immunosuppressive protocols, and long-term patient care strategies.

Fifty-two recommendations were developed and agreed upon on behalf of the majority of teams that have previously performed this procedure. A modified two-round Delphi study was designed involving 35 expert surgeons, internists, psychologists, psychiatrists, ethicists, policy makers, and basic researchers. The selected topics addressed critical aspects of FT such as initial assessment and patient selection, indications, clinical context, surgical considerations, outcome assessment and follow-up, definitions of success and failure, financial sustainability, and the public image, privacy, psychological and social support required by transplanted patients.

The release of this consensus is an international effort to establish common guidelines and protocols, promote a more uniform approach, and improve long-term success rates in these complex reconstructive surgical procedures. The recommendations represent a collaborative commitment among FT teams to further the development of the technique and provide a reference standard in practice. The next goal could be the promotion of an international, centralised registry to collect and analyse data from diverse cases around the world, which would provide valuable information to identify trends and problems that might be missed in isolated cases and establish long-term outcomes and complications in a transparent and standardised way.

Rodriguez et al.¹⁰ have reported the first FT combined with a whole eye. This pioneering achievement was performed in May 2023 by a multidisciplinary team at New York University Langone Health and constitutes a summit paradigm of innovation and progress in the field of VCA as it represents the first successful eye transplantation. This unprecedented case involves overcoming a number of new barriers: surgical planning using customised surgical guides and devices to obtain and position the VCA and preserve the eye viable (and in particular the retina and optic nerve) during donor extraction and recipient implantation, surgical preparation with donor and recipient optic nerve connection, and immune suppression to prevent rejection.

Although recovery of vision in the transplanted eye was not the primary goal of the transplantation, this clinical case has been a success in terms of survival of the VCA and facial reconstruction. This innovative procedure demonstrated the feasibility of restoring perfusion of the whole transplanted eye, optic nerve, extraocular muscles and adjacent tissues using a novel bypass technique by revascularisation of the ophthalmic vessels through the superficial temporal artery and vein. This technique ensured survival of the eye and its periorbital structures along with the transplanted facial tissues by reconstructing at the same time facial anatomy, oral competence, and airway function.

However, the possibility of restoring vision through eye transplantation remains a challenge that is beyond the scope of current knowledge. The authors suggest a possible pathway for restoring the patient's vision by finding partial retinal survival at 12 months along with a residual photoreceptor response to light through serial electroretinograms. Although the patient reported no light perception in the transplanted eye, functional MRI revealed a clear and significant response in the primary visual cortex of the occipital lobe. While the MRI data are not conclusive enough to indicate regenerative growth of retinal function, the successful revascularization of the transplanted eye is certainly a necessary first step toward the future challenge of transplanting the whole eyeball with restoration of vision.

In summary, as the 20th anniversary of the first FT is commemorated in 2025, it is timely to reflect, analyse and discuss the milestones achieved. In view of the presentations at the 27th EACMFS Congress and the recent publications, there is no doubt that this procedure has become a clinical reality that offers satisfactory aesthetic and functional results and an undoubtedly positive impact on the quality of life and psychological aspects of the recipients. In these two decades we have witnessed a remarkable progress and consolidation of VCAs of facial structures. As with any new and developing scientific field, FT has faced problems and challenges, but it has also brought new hope to patients with severe facial disfigurement. This procedure constitutes the pinnacle of reconstructive surgery by offering an innovative and alternative solution for complex facial defects that could not be treated with conventional techniques. Despite the difficulties inherent to this complex technique, the risk of immunological rejection and the need for lifelong immunosuppression, the progress achieved in the last decades is remarkable and evident as supported by the latest articles. International collaboration, standardization of protocols and the creation of international patient follow-up registries would be essential to optimize the results and expand the indications for this revolutionary intervention.

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