

Evolution of Face Transplant: An Argument for a National Donor Registry

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Among the many talented surgeons working to resuscitate President John F. Kennedy after his gunshot wound at Parkland Memorial Hospital on November 22, 1963, was Dr. Paul Peters, a newly appointed urologist. Dr. Peters would 1 year later perform the first kidney transplant in Texas and then the first kidney transplant in Brazil. He became a pioneer and advocate in transplantation and helped to establish the kidney transplant program at Parkland and the University of Texas Southwestern Medical Center. In those early days of kidney transplantation, the process of organ allocation was largely unregulated and depended on the collaboration between transplant centers and hospitals dictating the availability of organ donation. In the case of organ donation, the system has changed dramatically since 1963. However, vascularized composite allotransplantation has yet to be defined as either an organ or a tissue, so the models of the 1960s persist.¹ Despite the good reasons for which the national Organ Procurement and Transplantation Network was established, programs are required to function together with a larger goal in the donation and transplantation process.

In its current state, donation of a vascularized composite allotransplant is akin to organ transplantation in the 1960s, in that it occurs through a relationship between the participating vascularized composite allotransplantation center and the regional or state organ procurement organization. As a result, the identification of a potential donor is dependent on and limited by the protocol established between these two organizations. There is no integrated database whereby specific

immunologic and anatomical criteria are matched for face transplant patients and potential donors beyond these relationships. The pool of donors is thus regionally confined, and the optimization of donor and recipient matching is thus limited. To the extent that these transplants are not life-saving, the recipient waiting times can be protracted if transplant centers wait for ideal donors.

However, there are instances where the collaboration of organizations beyond state lines has resulted in successful vascularized composite allotransplantation allocation. The University of Pittsburgh Medical Center procured a hand transplant from West Virginia by collaboration with that regional organ procurement organization and was able to perform the first above-elbow transplant in the United States. Moreover, the University of Louisville was able to successfully transplant a hand from a donor located in Fort Worth, Texas. This has been possible and is also limited to the extent that the regional organ procurement organizations foster relationships with vascularized composite allotransplantation centers and continue to demonstrate a commitment to vascularized composite allotransplantation as part of their organ allocation process.

Within the current framework, vascularized composite allotransplants are under the same immunologic matching criteria as all solid organ transplants. To be considered a possible match for facial allograft donation, the baseline criteria that need to be met are ABO blood type compatibility and a negative crossmatch.² Because of the smaller pool of potential donors and additional anatomical criteria, it is difficult to match for human leukocyte antigen. Although the significance in vascularized composite allotransplantation has yet to be established, the degree to which human leukocyte antigen matching affects solid

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organ transplantation has been shown in kidney and, to some degree, pancreas transplantation. Moreover, there is preliminary evidence to suggest that human leukocyte antigen matching has an association with decreased rejection episodes in vascularized composite allotransplantation.³ Incorporation into a national registry such as the United Network for Organ Sharing would expand the potential donor pool and may allow matching for human leukocyte antigen types in vascularized composite allotransplantation, which in its current state is not possible.

Specific anatomical considerations in facial vascularized composite allotransplantation include sex, acceptable skin tone discrepancy, size match, and approximate age match. The degree to which these are considered “soft” criteria, especially skin tone, is affected by the difficulty of locating suitable donors. Even hard numbers such as a maximum age discrepancy of 10 years between an otherwise suitable donor and recipient can be affected, and even disregarded, based on the limited availability of willing donors. On review of recent face transplant recipients with available donor information, the average age difference between the recipient and donor has been 12 ± 11 years. The greatest margin was in a 29-year-old recipient who received a 65-year-old donor’s face.⁴ A unified registry of potential donors should expand the possible pool of donors and help to maximize organ allocation.

Nonetheless, although a national waiting list may increase the potential donor pool, optimizing both immunologic and anatomical factors, the donor’s family may be unwilling to add face procurement to the donation of life-saving organs, organs that may be perceived as less mutilating. In fact, fear of mutilation, which is a factor in family refusal, may be further compounded by the visible nature of face procurement. In a recent survey, only 56 percent of respondents who were card-carrying organ donors were willing to donate their face.⁵ Furthermore, the potential for “mutilation” could decrease organ donation overall, especially in cultural subpopulations that have a lower overall incidence of organ donation.

However, this represents an opportunity whereby education can be provided to decrease this anxiety regarding face donation. Organ procurement organizations are an invaluable educational resource for the community in this regard and can be outfitted with information on donor reconstruction. In fact, it is the responsibility of the organ procurement organization to gain authorization for donation and coordinate the recovery of all teams involved with the process.

Their involvement may help alleviate the anxiety of a faceless donor even if a closed casket funeral is decided on. However, their involvement is essential as the conduit through which to approach next of kin in the authorization process.

An advantage for vascularized composite allotransplantation to participate in the national organ donation and transplantation system exists outside of increasing donor availability. Currently, organ donation has a well-established sequence, with minimal interruption and established protocols in case of donor instability. Hand allotransplantation does not contribute significantly to the procurement process, as it can be performed relatively quickly, with minimal on-table dissection and with the hands/arms physiologically isolated from the rest of the body by tourniquets.⁶

Procurement of a facial allograft, in contrast, is a longer and much more complex process that requires on-table dissection of structures, greater potential for blood loss, and the manipulation of the airway in the surgical field.⁷ It is essential that face recovery be coordinated with other organ recovery. To the degree that vascularized composite allotransplantation allocation is made through the Organ Procurement and Transplantation Network, visceral transplant surgeons will need to work with recovery vascularized composite allotransplantation surgeons to optimize the donation gift. As with all donations, processes must be established regarding hemodynamic stability and support therapies. Thus far, life-saving solid organ recovery has not been compromised by face allograft procurement, and the protocols from successful centers can be used as a template. Organ Procurement and Transplantation Network participation would allow to a greater extent the standardization of facial allograft recovery and promote donor safety and acceptance by solid organ transplant surgeons.

As mentioned, a national waiting list for face allotransplantation should directly increase the donor pool and have beneficial secondary effects on establishing criteria for donation and standardizing the procurement process. However, the price of participating in the national transplant system would be that all vascularized composite allotransplantation centers would have to become members of the Organ Procurement and Transplantation Network/United Network for Organ Sharing, as only members can participate in transplanting organs from dead donors. Transplant centers must establish, at a minimum, expertise in all aspects of transplant surgery and medicine, with protocols germane to quality performance

and recipient safety. An application is submitted and approved only after the minimum collective qualifications of the multidisciplinary team are met. These include the prerequisite training or experience qualifications for the transplant surgeon, physician, and appropriate personnel, and resources to care for the face recipient. This is necessary to ensure optimal care and safety of the transplant recipient. For instance, many of the issues related to the postoperative care of a vascularized composite allotransplant recipient are related to the infectious and metabolic complications from transplant immunosuppression. Prescreening by a central entity would ensure that centers meet the minimum criteria to manage these postoperative episodes.

In addition to expertise in transplant medicine, establishment of the minimal criteria specific for face allotransplantation will also need to be discerned. For example, a vascularized composite allotransplantation center must have the surgical expertise in microvascular surgery, head and neck reconstruction, and oral and maxillofacial reconstruction. Although most centers would not have the opportunity to demonstrate prior face transplantation, minimum requirements in microsurgical head and neck reconstruction and even proctored sessions with established centers can be mandated. Incorporation into an existing framework like this will ensure that all transplant centers meet the qualifications and that the safety of the recipient is optimized.⁸

A national waiting list for face allotransplantation would not only increase the availability of donors but also improve the transplant process overall. Just as the United Network for Organ Sharing collects data on the solid organ transplant process, the Organ Procurement and Transplantation Network experience would serve as a database for face transplantation. As yet, there have been only a handful of face transplants performed in the

United States, and only through directed study and data collection can we accurately evaluate both the immunologic and technical aspects. The field of transplantation has advanced remarkably since 1963, and the doctors who attempted to save President Kennedy's life have also contributed to a legacy of innovation in transplantation that continues today.

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