

PEER-REVIEWED CME ARTICLE: ORIGINAL RESEARCH

Facial Disfigurement and Identity: A Review of the Literature and Implications for Facial Transplantation

William J. Rifkin, Rami S. Kantar, MD, Safi Ali-Khan, Natalie M. Plana, J. Rodrigo Diaz-Siso, MD, Manos Tsakiris, PhD, MSc, and Eduardo D. Rodriguez, MD, DDS

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Abstract

Facial disfigurement can significantly affect personal identity and access to social roles. Although conventional reconstruction can have positive effects with respect to identity, these procedures are often inadequate for more severe facial defects. In these cases, facial transplantation (FT) offers patients a viable reconstructive option. However, FT's effect on personal identity has been less well examined, and ethical questions remain regarding the psychosocial ramifications of the procedure. This article reviews the literature on the different roles of the face as well as psychological and social effects of facial disfigurement. The effects of facial reconstruction on personal identity are also reviewed with an emphasis on orthognathic, cleft, and head and neck surgery. Finally, FT is considered in this context, and future directions for research are explored.

Introduction

"Self-concept" is an idea of the self that is constructed based on how one thinks about, evaluates, or perceives oneself as well as on the responses of others to the self. Baumeister et al. define it as "the individual's belief about himself or herself, including the person's attributes and who and what the self is" [1]. The relationship between self-concept, body-image, and appearance is well documented [2, 3], and thus facial disfigurement can have profound psychosocial implications. Substantial research has described the benefits of traditional facial reconstruction with respect to self-concept [4-10]; however, these procedures are often inadequate for more severe facial defects.

Facial transplantation (FT) has become a viable reconstructive option for many patients with severe facial defects, particularly victims of burns and trauma and those with benign tumors like neurofibromatosis. Despite early successes and promising outcomes, ethical concerns remain, particularly with regard to issues of self-concept and the psychosocial consequences of the procedure [11]. Complicating the risk-benefit ratio of this novel procedure, FT recipients require lifelong immunosuppression to prevent rejection, which is associated with renal toxicity, metabolic complications, opportunistic infections, and increased risk of malignancy [12]. FT thus creates a tradeoff between potential improved disfigurement and the chronic disease state associated with required lifelong immunosuppression.

This review will highlight the roles of the face, with a focus on self-concept, as well as the psychosocial impact of facial disfigurement and conventional facial reconstruction. Self-concept will then be evaluated in the context of severe facial disfigurement and FT, and the bioethical implications of the procedure will be considered with an emphasis on psychosocial issues.

Roles of the Face

The face serves a dual role as both a biological organ and an organ of identity. Like other organs, the face has unique anatomy and physiology that contribute to its biological functions [13]. Facial skin acts as an anatomic barrier, retaining body water and regulating heat [14]. Specialized structures perform distinct functions: the eyelids maintain ocular lubrication [15]; the nasal airway conditions and filters inspired air [13, 16]; and the lips form a tight seal around the mouth, allowing consumption of food or drink [16] and normal speech [13]. The face is also an important sensory organ, containing the highest density of free nerve endings in the body [17, 18]. Furthermore, facial proprioceptive information is integral to the sensorimotor processes of speech and other facial movements, and it has been suggested that facial nerve endings might also have immunoregulatory roles [19, 20].

As important as its physiological functions is the key role of the face in identity. Self-concept revolves around the face, as it is the primary means by which humans recognize and interact with each other [13] and the primary mode of self-expression, emotional expression, and social interaction [21]. The intimate relationship between self-concept and appearance is also well documented [2, 3], and the face is a major component of body image and self-worth [22]. It affects how one is perceived and evaluated by others, guiding their impressions and behavior. Important decisions such as life partner and job selection are influenced by biases that depend partly on facial appearance [23], as are criminal justice verdicts [24, 25] and congressional elections [26]. Facial features and skin qualities are major determinants of physical attractiveness and mate selection [13, 27, 28]. Unsurprisingly, attractiveness is the quality that has received the greatest focus in facial appearance research [29]. Those with attractive faces have proven social

advantages and are perceived as more popular, assertive, and self-confident [13, 29-33]. These important social consequences of facial attractiveness help to explain the pivotal role of facial appearance in self-concept.

Facial Disfigurement and Self-Concept

Perhaps more so than in the general population, in people with facial disfigurement appearance and self-concept are closely intertwined [34]. Whether congenital or acquired, facial disfigurement can have profound psychosocial implications, including altered body image, reduced quality of life, and poor self-esteem [35-38]. The most frequently reported difficulties relate to negative self-perception and impaired social interaction [39]. While there is not a complete consensus, most research shows that facial disfigurement results in lower self-confidence and a negative self-image that might persist throughout life. Social anxiety, fear of negative social evaluation, and social avoidance are common in those with facial disfigurement [40]. Cleft lip studies have shown that affected children are at greater risk for anxiety, general unhappiness, and self-doubt in interpersonal relationships [41] and that many affected adolescents believe their self-confidence remains affected by their disfigurement [42]. Perhaps most alarmingly, one study showed that the suicide rate among Danish adults with clefts was double that of the unaffected population [43].

Facial disfigurement can impede social interaction in many ways; those affected report challenges meeting new people and making new friends, with resulting difficulty developing long-term relationships [44]. Reactions among family members and peers towards people with disfigurement commonly include teasing, staring, commenting, asking unsolicited questions about the disfigurement, and exhibiting avoidant or negative behavior [45, 46]. Unsurprisingly, these negative interactions can lead to affected persons' preoccupation with their appearance in anticipation of future similar experiences. This preoccupation with appearance can in turn result in self-isolating behaviors that might exacerbate the psychosocial challenges of disfigurement by shrinking affected persons' available social support network. Facial disfigurement might also lead to substance abuse, changes in income or occupational status, and relationship problems [47]. Younger patients seem to adapt better to facial disfigurement, especially if it occurs prior to or during puberty [48]. Adults who become disfigured later in life seem to suffer the most and often express discordance between their "new faces" and "real selves" while remaining acutely conscious of how differently they are perceived by society [49]. Interestingly, while increased self-consciousness and decreased independence are common after facial disfigurement, especially if basic functions like speech and eating are affected, several studies have failed to demonstrate a correlation between age, gender, or severity of disfigurement and psychosocial distress [37, 50-52].

Moving forward, research should continue to identify factors predictive of successful adaptation to facial disfigurement. In facial paralysis, for example, family support, faith,

humor, strong sense of self, social skills, determination, and networking have been identified as protective factors [53]. While there is likely a complex interplay between physical, cultural, and psychosocial factors and successful adaptation to facial disfigurement, deeper understanding of these factors might help guide development of interventions that facilitate adaptation to facial disfigurement.

Corrective Facial Surgery and Self-Concept

Extensive research has evaluated the impact of corrective facial surgery on self-concept. Studies evaluating psychological outcomes of orthognathic surgery, which involves manipulation of the facial skeleton to restore anatomic and functional relationships in patients with dentofacial abnormalities, have shown the desire for improved appearance to be a major consideration for patients seeking such surgery [4]. Several studies report that patients receiving corrective facial surgery display improvements in measures of personality adjustment, such as psychosis or neurosis, as well as improvements in self-concept, self-identity, self-esteem, and self-conflict [4-10].

In facial disfigurement from head or neck malignancies or related interventions, the face plays a central role in an individual's self-concept and path to psychological recovery [54]. Costa et al. described how postsurgical facial disfigurement leads to damaged self-concept and how the repair of self-concept is a lengthy and gradual process [54]. After head or neck cancer surgery, patients must undergo a process of body image reintegration [55], which entails "reorganizing perception of self into a once again acceptable unity" [56]. These findings have been corroborated by multiple groups [57, 58] and translate to other forms of corrective facial surgery. For example, elder patients treated with cleft lip repair report experiencing a restored sense of personal identity [59]. Similarly, orthognathic surgery yields consistent improvements in patient quality of life through restoration of physical facial identity [4, 60, 61].

Nevertheless, aesthetic changes resulting from corrective facial surgery can pose a significant psychological burden, requiring patients to rapidly adapt to new facial features and incorporate them into their self-concept [4]. Patients describe this process as "confusing, frightening, and disorienting" but note that a strong support system can ease the challenge [62]. However, patients undergoing major combined orthognathic and cosmetic procedures report that even close friends and family members initially struggle with adapting to their new appearance [61].

Inherent psychological traits are important in the incorporation of postoperative facial changes into a person's identity. Positive preoperative patient self-concept seems to be a crucial predictor of postoperative patient satisfaction with facial features [63]. Similarly, patients with a realistic—as opposed to an idealized—mental representation of their facial appearance and self-perception are more likely to be satisfied with the results of cosmetic surgery than those with distorted self-perceptions [64]. Studies have

also shown that there is an adaptation period prior to patients' ultimate acceptance of their new facial appearance [65]. Frost et al. describe how patients undergoing orthognathic surgery report temporary depression and loss of self-esteem as they adapt to their new facial appearance [66], but Kiyak et al. report that these alterations in self-esteem and body image stabilize after a period of approximately two years [67]. To shed further light on this topic, outcomes-based research that uses or seeks to develop reliable, validated pre- and postoperative psychosocial assessment tools should continue to be prioritized in future psychosocial studies of conventional facial reconstruction.

Limitations of Conventional Reconstruction for Severe Facial Defects

While surgical correction of certain facial defects like cleft lip is often successful, reconstruction of severe facial defects remains a challenge, as both functional and aesthetic deficits must be addressed to recreate the ["normal" face](#). Notably, functional deficits—particularly impaired verbal and emotional communication—often affect mental well-being more negatively than the aesthetic impairments [68]. In cases of extensive soft-tissue or composite soft-tissue and skeletal defects, conventional reconstruction remains largely unable to restore both facial and aesthetic function, and patients are often left with life-long handicaps [68]. Conventional reparative surgery options include multiple rungs of the reconstructive ladder, such as skin grafts, local flaps, distant pedicled flaps, and free flaps, although all have limitations that can result in incomplete functional restoration and aesthetic outcomes. These limitations are most pronounced for defects involving the most critical components of the face with regard to self-concept: central structures like the eyelids, lips, and nose [69]. These facial subunits and midface structures remain nearly impossible to completely reconstruct. For example, recreating the sphincter-like muscle surrounding the lips is sufficiently challenging to render a functional outcome unlikely; it is often complicated by microstomia, oral incompetence, and suboptimal tissue texture and color [70, 71]. Reconstruction of the nose and adjacent facial subunits can also yield disappointing aesthetic results [71]. In severe cases, anatomical repair might be unachievable, and free flaps are used to obliterate the resulting dead space and to seal nasal and sinus cavities and intracranial space [68].

Facial Transplantation, Self-Concept, and Bioethical Implications

FT offers patients new possibilities of repair for these severe defects. Functional outcomes have been promising, especially considering the impaired pretransplant state of most recipients; sensory recovery is common [72, 73], and motor recovery can restore many "social" facial functions [74] and the ability to breath, eat, drink, and speak intelligibly [75, 76]. Aesthetic outcomes have been equally favorable, albeit to varying degrees, exceeding expectations in many cases. Beginning with the first face transplant in 2005, delicate anatomical structures like the eyelids, nasal unit, and lips have been successfully *replaced*, rather than reconstructed [77, 78].

Nonetheless, over the last decade, various groups have scrutinized and explored the ethical [79-85] and psychosocial [11, 49, 82, 83, 86-88] aspects of FT along with its effect on self-concept. Concerns are rooted in the knowledge that the face plays an essential role in personal identity and self-recognition [11, 49, 82, 83, 87-89] and is a critical mediator of self-expression and interactions with others [82, 90]. Advocating that the face is as an irreplaceable symbolic entity, the Royal College of Surgeons of England [87] and the French National Consultative Ethics Committee for Health and Life Sciences [82] did not initially support FT. A review of all scientific literature related to FT published between 2005 and 2012 found that the majority of articles cited negative "identity change" and resulting psychological effects as the primary concern [11]. Robertson argues that skepticism about FT stems partially from the fact that it involves continuation of the deceased donor in a unique way that does not apply to solid organ donors [84]. The symbolic significance of the face can create an emotionally charged and complicated situation for donor families, who might ultimately refuse donation for this reason [84, 90]. Some virtual studies suggest that donor-to-recipient transfer of facial appearance is minimal in two- [91] and three-dimensional [92] analyses; however, the reproducibility of this result remains uncertain in clinical practice, and ethical obligations towards donors and their families prevent extensive research on the subject.

Another crucial aspect of FT involves ensuring that recipients embrace their new faces. Emotional acceptance of the transplanted face is critical for recipients' whole-body image integration and self-concept adaptation and for avoiding complex psychosocial issues [85, 88, 90]. Acceptance can also lead to greater participation in postoperative care and compliance [82, 90]. Interestingly, recipient personality traits appear to play an important role in acceptance of the transplanted face. FT patients who demonstrate a strong preoperative self-concept seem better equipped to adapt to changes in physical appearance and suffer fewer negative psychosocial consequences than FT patients lacking a strong preoperative self-concept [86, 88]. Proponents of FT argue that for these psychologically prepared recipients, the procedure allows the regaining of their lost identities [89, 90]. Furthermore, facially disfigured patients report that, in pursuit of regaining their personal identity, they would be more willing to accept the risks of immunosuppression and would tolerate greater risk for FT than for kidney transplantation [88].

Nevertheless, the risk-benefit ratio of FT is unique in that, unlike solid organ transplantation (SOT), it does not prolong survival. FT is typically performed only after conventional reconstructive methods are exhausted, with a focus on improving aesthetic, functional, and quality-of-life outcomes. However, like SOT, FT requires lifelong immunosuppression to prevent rejection, which is associated with many adverse effects, including increased risks of malignancy, infection, and metabolic complications. For FT to be ethically acceptable, these risks, along with FT's effects on self-concept and

their psychosocial implications, must be weighed against expected benefits. Indeed, there is widespread acceptance that quality of life of severely disfigured candidates should be considered along with survival [11]. Given the effects of facial disfigurement on patient self-concept and psychosocial well-being and the superior functional and aesthetic outcomes achieved with FT, for select patients, the benefits of the procedure might outweigh the risks.

Despite FT's encouraging early functional and psychological outcomes, ethical concerns about the procedure remain. Understanding of the long-term psychosocial effects of FT is limited [76, 93-96], and additional data are needed to better evaluate the risk-benefit ratio of the procedure. There are also potential issues of consent, given that face transplant recipients are such a vulnerable patient population. Furthermore, while still technically an experimental procedure, FT is unique, from a research ethics perspective, in that "withdrawal" from any trial is essentially impossible. Future research should focus on identifying emotional and psychological factors that correlate with better psychosocial outcomes. Complementing substantial psychological research on the *qualitative* outcomes of FT, recent cognitive neuroscience advances on the neural correlates of self-recognition [97-99] could aid multidisciplinary efforts to better understand how reorganization of brain networks supports self-face recognition and how self-processing supports the gradual development of a new facial identity and its mental representation.

Conclusion

The impact of conventional facial reconstruction on self-concept and its resulting psychosocial effects have been heavily researched, but FT has not been studied in this context in similar depth due to the relative infancy of the field. Facial transplant recipients represent a vulnerable patient population given the significant burden of their pretransplant disfigurements as well as the unique posttransplant psychosocial consequences. While FT raises many ethical considerations, for some patients, it provides an effective reconstructive option that can achieve aesthetic outcomes unattainable through conventional techniques. In their intensive preoperative evaluation and postoperative follow-up, FT teams should focus on [identifying suitable candidates](#) and educating them within their available support systems regarding FT's possible impact on self-concept and its psychosocial consequences.

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William J. Rifkin is a predoctoral research fellow in the Hansjörg Wyss Department of Plastic Surgery at NYU Langone Health in New York City, where he is also pursuing his medical degree. His research interests include vascularized composite allotransplantation, facial transplantation, microsurgery, wound healing, and transplantation immunology.

Rami S. Kantar, MD, is a surgery resident and current postdoctoral research fellow in the Hansjörg Wyss Department of Plastic Surgery at NYU Langone Health in New York City. He is interested in academic and outreach craniofacial reconstructive plastic surgery.

Safi Ali-Khan earned his undergraduate degree in Romance languages from New York University and is now completing his MD at NYU School of Medicine in New York City. His professional interests include plastic and craniofacial surgery, with a special focus on pediatric and transgender populations, as well as medical ethics and the relationships between medicine and identity.

Natalie M. Plana completed her undergraduate studies with a major in natural sciences at Fordham University and is currently pursuing her MD at NYU School of Medicine in New York City. She is also a predoctoral research fellow at the Hansjörg Wyss Department of Plastic Surgery at NYU Langone Health, focusing her efforts on facial transplantation, craniofacial surgery, academic issues in medicine, and surgical education and simulation.

J. Rodrigo Diaz-Siso, MD, is a postdoctoral research fellow in the Hansjörg Wyss Department of Plastic Surgery at NYU Langone Health in New York City. Dr. Diaz-Siso's clinical interests include craniofacial surgery, microsurgery, and general reconstructive surgery, and his research interests include vascularized composite allotransplantation, facial transplantation, and surgical education.

Manos Tsakiris, PhD, MSc, is a professor of psychology at Royal Holloway, University of London. His interdisciplinary research, based on neuroscientific and psychological experimental paradigms as well as on neurophilosophical approaches to selfhood, focuses on empirically identifying the basic neurocognitive principles governing the sense of agency and body-ownership and the interaction between them.

Eduardo D. Rodriguez, MD, DDS, is the Helen L. Kimmel Professor of Reconstructive Plastic Surgery and chair of the Hansjörg Wyss Department of Plastic Surgery at NYU Langone Health in New York City. He has performed two full-face and scalp

transplantations to date, and his research interests include the technical refinements of facial transplantation as well as ethical aspects of the procedure.

William J. Rifkin and Rami S. Kantar contributed equally to this work.

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