

# *Self-Inflicted Gunshot Wound as a Consideration in the Patient Selection Process for Facial Transplantation*

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**Abstract:** Facial transplantation is emerging as a therapeutic option for self-inflicted gunshot wounds. The self-inflicted nature of this injury raises questions about the appropriate role of self-harm in determining patient eligibility. Potential candidates for facial transplantation undergo extensive psychosocial screening. The presence of a self-inflicted gunshot wound warrants special attention to ensure that a patient is prepared to undergo a demanding procedure that poses significant risk, as well as stringent lifelong management. Herein, we explore the ethics of considering mechanism of injury in the patient selection process, referring to the precedent set forth in solid organ transplantation. We also consider the available evidence regarding outcomes of individuals transplanted for self-inflicted mechanisms of injury in both solid organ and facial transplantation. We conclude that while the presence of a self-inflicted gunshot wound is significant in the overall evaluation of the candidate, it does not on its own warrant exclusion from consideration for a facial transplantation.

**Keywords:** facial transplantation; self-inflicted gunshot wound; patient selection; transplant outcomes

## Introduction

Of the 40 facial transplantations (FTs) that have been performed to date, 18 have been the result of ballistic trauma,<sup>1,2,3</sup> and at least five of these cases have been explicitly identified as intentionally self-inflicted gunshot wounds (SIGWs).<sup>4,5,6,7</sup> Five additional cases of SIGWs have been reported; however, it is less clear whether or not these incidents were intentional.<sup>8,9,10</sup> The events resulting in SIGWs vary widely, and details surrounding the incident of injury may make it difficult to identify a suicide attempt.

In the general population, attempted suicide carries an increased risk of subsequent attempts compared to those without a previous suicide attempt.<sup>11</sup> Of the ten SIGW patients who underwent FT, one recipient has committed suicide post-transplant.<sup>12</sup> Little is known about the risk of reinjury in FT recipients, and data on short- and long-term outcomes of SIGW FT recipients have not been consistently reported. As SIGWs are prevalent in a number of candidates evaluated for FT,<sup>13,14,15</sup> it is important to address how or if mechanism of injury (MOI) should be considered in the patient selection process.

The decision about eligibility could have a broad impact on organ donation. Some might be less willing to donate facial allografts for transplantation if they knew their donations could go to individuals with self-inflicted wounds.

As the issue of MOI has not been explored extensively in the FT literature, experiences in solid organ transplantation addressing the ethics of patient selection for those who self-harm may offer guidance. In addition, a better understanding of the association between mental health and suicide risk before and after transplant can help to ensure ethically sound approaches to patient selection for FT.

## **Background**

### *Suicide and Risk of Reinjury*

A history of attempted suicide presents as a strong risk factor for future suicide attempts and completed suicide.<sup>16,17,18</sup> The use of a firearm as the method of self-harm is similarly associated with higher risk of future suicide.<sup>19,20,21</sup> Although the number of individuals who commit suicide after an initial attempt is relatively low (1.3-5% at 5-year follow-up<sup>22,23</sup>; 6.7-12% at 14 or more years of follow-up<sup>24,25</sup>), these data suggest that concerns about reinjury risk after FT in SIGW patients are warranted. However, it is possible that the FT itself, or other factors, might actually diminish the likelihood of repeat attempt.

Mortality from SIGWs can be as high as 80%.<sup>26</sup> For those who survive, numerous long-term morbidities are often present as a consequence of the injury, frequently including: visual defects and/or motor, swallowing, speech, or hearing difficulties.<sup>27</sup> These morbidities leave patients with life-long disabilities.

The association between mental illness and suicide, as well as repeat attempts,<sup>28,29,30,31,32,33</sup> has led to concern that recipients with self-inflicted injuries may have difficulty withstanding the rigors of the FT procedure and subsequent long-term treatment, particularly with regard to adherence. Inability to adhere to the post-transplant regimen can lead to adverse outcomes, including rejection and graft failure.<sup>34</sup> Patients in the general population who are struggling with significant mental health issues tend to require additional support when receiving medical care, including reminders to take medication, assistance in getting to and from appointments, or coping with treatment side effects.<sup>35</sup> Some data suggest that solid organ transplantation recipients with mental health issues who receive adequate psychosocial support do not fare worse than other recipients post-transplant.<sup>36,37,38</sup> Furthermore, patients who have attempted suicide are likely at lower risk of reattempt when given additional psychosocial support.<sup>39,40,41</sup> This evidence, combined with the possibility that FT may reduce depression and other psychological sequelae of severe facial injury, suggests that perhaps suicide attempts such as intentional SIGW should not serve as absolute contraindications to FT.

In some cases, an intentional SIGW may even be considered an indication that FT ought to be provided, along with adequate psychosocial support and treatment prior to the procedure and throughout post-transplant follow-up, as deemed appropriate by the transplant team's mental health practitioners. Practitioners should encourage a holistic approach to meeting patients' mental health needs by establishing ongoing contact with local mental health providers in the recipients' communities, as well as with members of their social support systems to better facilitate continuity of psychosocial support throughout the transplant process and long-term follow up. Transparency among centers in disclosing required mental health treatment before, during, and after FT is strongly encouraged to ensure optimal outcomes for these patients. Moreover, if the FT team determines that a patient has recurrent or ongoing mental health needs, expectations for mental health treatment should be communicated clearly to patients and their families, and reinforced throughout the transplant process, to facilitate adherence as well as to optimize patients' psychosocial functioning.

### **Patient Selection Process for Facial Transplantation: Psychosocial Assessment**

A standardized approach to the psychosocial assessment of FT candidates has yet to be adopted.<sup>42</sup> Possible psychosocial contraindications may include: active psychoses,<sup>43,44,45,46</sup> untreated and/or inappropriately managed psychiatric disorders resulting in psychological instability,<sup>47,48,49</sup> inadequate social support systems,<sup>50,51</sup> and inability to commit to immunosuppressive therapy and consistent follow-up care.<sup>52,53</sup>

The presence of an SIGW has not precluded patients from consideration for FT at most institutions. However, suicidal tendencies (including attempt history) have been cited as exclusionary criteria at some institutions.<sup>54,55,56</sup> Intentionally self-inflicted MOI is considered grounds for exclusion at one transplant center.<sup>57</sup> Currently, most institutions considering individuals for FT agree that patients should be evaluated on a case-by-case basis in terms of psychological stability.<sup>58,59,60,61</sup>

### **Facial Transplantation Outcomes for Self-Inflicted Gunshot Wounds—Limited Data**

One of the primary challenges in exploring whether or how SIGWs might be considered during the patient selection process is that, currently, little is known about long-term outcomes of FT recipients, including those of the five clearly intentional SIGW patients. Of these, one patient committed suicide three and a half years post-FT.<sup>62</sup> Three are alive and report somewhat mixed psychosocial outcomes<sup>63,64</sup> in regards to post-transplant quality of life, self-esteem, and social approval. At their most recent follow-up, one patient reported improved mental health and self-esteem compared to baseline, while another reported a decrease in mental health and self-esteem; the third patient reported an increased quality of life from baseline.<sup>65,66</sup> No long-term data have yet been reported on the fifth patient. Caution is required in interpreting data from such a small sample size, and evidence from these three patients cannot be generalized to all patients with SIGWs, nor can meaningful comparisons be drawn to the overall FT recipient population.

Though outcomes data have been reported for some FT recipients (with self-inflicted injuries or otherwise), it is difficult to directly compare outcomes among individuals due to the fact that each transplant center utilizes different scales for measuring psychosocial changes following FT. Across the FT population, reported outcomes appear generally positive in terms of improved quality of life, satisfaction with the procedure, and overall well-being.<sup>67,68,69,70,71</sup>

### **Ethical Considerations**

#### *Recipient Considerations*

*Personal Responsibility.* Whether suicide is an irrational act committed under the duress or coercion of an internal or external influence such as mental illness or extreme social pressure, or whether it may be viewed as an acceptable reasoned autonomous act remains the subject of considerable debate.<sup>72,73</sup> Because suicide resulting from ballistic trauma often involves the interplay of mental illness and,

frequently, substance abuse, the complexity of these factors can impede attempts to assess individual agency, further complicating perceptions of personal responsibility and the role that it plays in decision making.

Current Western research indicates a strong association between mental illness and suicide,<sup>74</sup> and the focus has shifted toward addressing suicide through a neurobiological lens.<sup>75</sup> Within this framework, uncertainty remains as to how best to characterize the pathway from mental illness to fatal suicide attempts. In fact, recent inquiry suggests that while mental illness is a good predictor of suicidal ideation, its predictive power does not extend to suicide attempts or to fatal suicide attempts.<sup>76</sup> It is also important to recognize that Western medicine's increasingly neurobiological approach to suicide reflects a specific medicalized and pathology-oriented paradigm that leaves less room for the socially, politically, and historically mediated nature of the phenomenon.<sup>77,78,79</sup> For example, in China suicide tends to be regarded as a reasoned, if desperate, response to unbearable social stress, thus locating suicide as a rational, contextually-driven sociocultural phenomenon, rather than an irrational act stemming from an internalized pathology at the individual level.<sup>80</sup> Acknowledging alternative paradigmatic interpretations of the act of attempting suicide can help frame ethical debate about the nature of personal responsibility, and its appropriate role in patient selection for FT.

In solid organ transplantation, an intentionally self-inflicted MOI is generally not sufficient to deny an individual a liver transplant,<sup>81,82,83,84,85,86,87,88,89,90,91,92,93</sup> nor does it serve as a criterion in liver allocation priority.<sup>94,95,96,97,98</sup> These conclusions are derived from data suggesting that long-term outcomes for those with intentional self-inflicted injury are comparable to those with non-self-inflicted injury, which supports ethical arguments that the circumstances creating the need for liver transplantation should not influence whether transplant will be offered as a treatment option. Furthermore, the ethical consensus in solid organ transplantation suggests that personal responsibility should be irrelevant in considerations of transplant eligibility because it is intrinsically subjective,<sup>99,100</sup> and the complex interplay of psychosocial, emotional, and economic factors contributing to a particular situation renders the concept of personal responsibility difficult to ascertain, much less endorse as an eligibility criterion.<sup>101,102</sup>

Moreover, personal responsibility as a construct may be used to mask personal bias toward stigmatized behavior,<sup>103</sup> and is not invoked in the distribution of healthcare resources across other medical fields—for example, in the decision to treat injuries resulting from contact sports.<sup>104</sup> The Council on Ethical and Judicial Affairs of the American Medical Association deemed it unethical to factor a patient's contribution to his or her disease into allocation criteria if the treatment involves a scarce resource, such as organs.<sup>105</sup> Therefore, it is unethical to utilize MOI in the patient selection process for liver transplantation.<sup>106,107,108,109,110</sup> Extending this line of argument to FT, it would thus be unethical to deny a face transplant to a patient on the grounds of an SIGW, especially if FT were determined the optimal treatment for functional, aesthetic, and quality of life improvement.

*Equity.* Justice considerations, including equitable access and fair distribution of resources, become more prominent as a procedure shifts from experimental to standard of care. If FT were to be considered the standard of care and the volume of procedures performed were to increase substantially, allocation decisions would take greater priority, likely leading to additional pressure to standardize

the assessment and allocation processes. As it is, donor scarcity in FT has far more to do with matching the appropriate donor face with a given recipient rather than an absolute shortage of available donor faces. Limited demand for the procedure means that it is highly unlikely that two potential recipients who are comparable in every way, with the exception of MOI, will compete for a single available donor face. Although fair distribution of resources with regard to allocation of facial allografts may not present a pressing concern at this point in time, programs should strive to generate consensus across the field about psychosocial eligibility criteria for FT (or absolute contraindications, at the least), and encourage transparency of the patient selection process to support equitable access to FT.

*Unique Nature of FT.* Transplant recipients must be able to incorporate a new organ or tissue into their sense of identity and bodily integrity.<sup>111</sup> Inability to do so can lead to serious psychological and emotional distress, resulting in adverse clinical outcomes such as graft removal and even attempted suicide.<sup>112,113,114</sup> Psychological concerns related to transplantation (e.g., fear of allograft rejection and immunosuppression side effects) might be compounded in FT because of the relationship between the face and self-identity, communication, and social relationships.<sup>115</sup> Facial allografts tend to be more closely associated with one's sense of identity, in part owing to the visible nature of the tissues and to the status of the face as the locus of identity.<sup>116</sup> Thus, FT teams must be carefully attuned to recipients' post-operative psychosocial functioning and provide ample psychosocial support to facilitate this period of adaptation to the new graft. While the particular nature of FT may require unique post-operative psychosocial adaptation processes, currently, there is no evidence to suggest that an FT recipient with an SIGW would be less able to adapt to a new face post-transplant than other FT recipients.

*Public Scrutiny.* Finally, the novelty of FT may predispose the recipient to media scrutiny and intense public attention. For these reasons, FT necessitates a candidate who is both psychologically and socially prepared for the "limelight," and prepared for this attention to wane when the next high-profile procedure is performed. While navigating public scrutiny may present a challenge for recipients, individuals with SIGWs cannot at this point be deemed more or less capable of coping with these psychological pressures than other FT candidates solely on the basis of their MOI. Thus, it would be unethical to deny them an FT on these grounds alone.

#### *Public Perception and Donor Considerations*

While a majority of the general public in the United States supports solid organ donation, some individuals may be less willing to donate tissue for vascularized composite allotransplantation<sup>117,118</sup> due to lack of awareness<sup>119,120</sup> or understanding of these procedures, and of the possibility of donating tissues for this type of transplantation. Additionally, the close association of these grafts with one's personal sense of identity and bodily integrity may lower willingness to donate for vascularized composite allotransplantation.<sup>121,122,123</sup>

Depending on the general public's perception of self-inflicted injuries, it is possible that potential FT donors and their family members may object to the idea of donating tissues for transplantation in recipients with an SIGW, even if they are

willing to donate for vascularized composite allotransplantation procedures overall. In solid organ transplantation, self-inflicted MOI draws mixed reactions from the public, with support dwindling in some, while in others it does not influence willingness to donate.<sup>124,125</sup> Studies that assess how the public's willingness to donate facial allografts may change if it were known that the recipient had intentionally injured him or herself have not yet been performed. Thus, donation requests would need to be undertaken with great caution and sensitivity until potential donors' attitudes and beliefs are better understood.

Our donation system in the United States prioritizes donor autonomy, allowing each individual to decide whether to participate in organ donation, which organs to donate, and for what purposes (research, education, transplant). However, there are limits on the donor's choice; aside from direct donation to a specified individual, registered donors are not allowed to restrict their transplant donation to particular "types" of people, according to race, age, gender, MOI, or any other category.<sup>126,127</sup> This reflects the moral belief that it is not the public's responsibility to determine who is worthy, but instead that participation in the system is a commitment to every person in need. To respect the autonomy of donor families, they should be informed about the potential causes that lead to the need for FT, including SIGW, as well as the benefits and risks of receiving an FT, which should inform their decision whether to participate in FT, solid organ transplantation, or both. To prevent the insertion of personal judgment regarding recipient worthiness, the donor family should not automatically be informed regarding a specific recipient's MOI when deciding whether to approve the donation, which is consistent with the policy of the Organ Procurement and Transplantation Network.<sup>128</sup> However, in the event that family members inquire about MOI, withholding information might betray the trust relationship with the donation team and dissuade the family from agreeing to donation. Furthermore, the current media attention around FT means that donor families will inevitably obtain information about the recipient and MOI through news reports, which behooves the team to provide this information prior to donation. The authors are familiar with at least two cases in which donor families requested to know MOI, were informed of the recipient's SIGW, and chose to donate.

With regard to public perception and media scrutiny, knowledge of a given FT recipient's MOI, publicized by the media, might influence how a recipient is regarded post-transplant in his or her community. If the general public is wary of performing FT on recipients with an SIGW, current challenges in safeguarding FT recipients' anonymity could result in undesired and harmful attention for this particular recipient population following FT, especially given the social stigma surrounding suicide.<sup>129,130</sup>

### *Cost and Self-harm*

FT is a resource-intensive procedure combining expenditure on the surgery itself and long-term costs associated with lifelong immunosuppression.<sup>131</sup> In the general population, suicide attempters have an increased likelihood of repeat attempt,<sup>132</sup> which raises the question of whether it is ethical to perform such an expensive procedure on individuals who may be at greater risk of reinjury than other FT recipients. In solid organ transplantation, the observed rate of fatal suicide following liver transplantation in acetaminophen overdose patients appears



comparable to that of the general nontransplant population following a failed suicide attempt;<sup>133,134,135,136,137,138</sup> however, owing to limited data on long-term FT outcomes, the same cannot yet be said conclusively for FT recipients. In solid organ transplantation, rates of retransplantation resulting from reinjury in alcoholic liver disease have been compared among acute liver disease recipients and nonacute liver disease recipients, with the former population being retransplanted at comparable or lower rates than those observed in the latter population.<sup>139,140</sup> This leads to the consensus that retransplantation in patients with acute liver disease is justified,<sup>141</sup> though recidivism does complicate the clinical and ethical picture.

Exorbitant costs of other medical procedures such as heart valve replacements in intravenous drug users with high rates of recidivism<sup>142,143,144</sup> have raised similar debates.<sup>145,146,147</sup> These patients are often uninsured or receive health insurance through the government-funded Medicaid program, where costs are ultimately passed along to taxpayers.<sup>148</sup> Arguments made in support of repeating valve replacements suggest that individuals, regardless of personal responsibility for the illness, have a right to medical treatment because (1) it is not the responsibility of medical providers to decide who is worthy of care, and (2) there are often circumstantial events beyond the individual's control that led to the drug use, which ultimately contributed to the need for treatment; thus, refusal of surgical treatment would be unethical.<sup>149,150,151</sup> By contrast, those not in favor of repeat valve replacements for intravenous drug users maintain that the procedure is too costly, and the financial burden that typically must be absorbed by the healthcare system renders it untenable as routine treatment for those at risk of relapse, perhaps multiple times.<sup>152,153</sup> Some surgeons have ultimately exercised their right to refuse to perform a repeat valve replacement in these patients.<sup>154,155</sup> While the cases of valve replacement for intravenous drug users and FT for those with SIGW have many salient differences, it is possible that echoes of a similar debate may resurface for FT recipients.

## Conclusion

An ethical argument justifying the use of MOI as a criterion in listing decisions should be grounded in clear evidence that MOI has a significant impact on recipient outcomes. To determine this impact, evaluation should not strictly compare FT outcomes of those with SIGW to those undergoing FT for other reasons, but should also consider outcomes in SIGW patients who do not undergo FT. If data suggest that SIGW patients fare better with FT than without, this may support FT as optimal treatment for this population. In the absence of these data, it would be unethical at present to deny a patient access to FT solely on the basis of MOI.

Careful tracking and dissemination of long-term outcomes data will ultimately help inform the relevance and potential use of MOI in the patient selection process. Moreover, transparency of the patient selection process, including reasons for both acceptances and declines, will help to promote equitable access across the field. Until robust outcomes data are available, FT programs should make every effort to ensure fair and equitable patient selection based on the best available information, and should continue to focus on optimizing recipients' clinical and psychosocial functioning both pre- and post-transplant.

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