

Reconstructive Face Transplant after Burn Injuries

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Abstract: Facial transplantation has emerged in recent years as a promising treatment option for patients with severe facial burns especially to those who are suffering crushing injuries and result in various physical and psychosocial effects. Structures affected, for example, the nose and teeth might get twisted because of irregular outside strengths brought about by contractures. Genuine inconveniences, for example, impediment amblyopia and microstomia must be expected and desperately tended to deflect lasting results, though other reconstructive techniques can be postponed until scar development happens. Reconstruct complex facial injuries is still a challenge regardless of the development of microsurgical techniques. The reconstructive options for conditions such as facial burns are very limited. But it's very important since it might be a surgical intercession with the possibility to lessen the psychiatric suffering connected with individuals suffering burns injuries. This study comes to evaluate and discuss the success and safety of face reconstruction transplantation after burn accidents. To do this we have conducted systemic review search for similar previous studies mainly in Medline (PubMed), the studies were included which are concerning Facial transplantation after burn injuries.

Keywords: Burn, Transplant, Reconstruction, Microsurgery, Face.

1. INTRODUCTION

The face is one of the most critical parts for the human life: it assumes a notable part in essential physical activities and passionate expressions; such as swallowing, breathing, seeing, hearing, smelling, smiling, etc. [3] It also tells us a bit of one's characters and feeling of self. Extremely harmed patients with crushing facial distortion in appearance and function, endure a gigantic everlasting physical disability, as well as mental and social sequelae. [1] Although conventional procedures in plastic and reconstructive surgery might incompletely cure those staggering injuries [2], the reproduction of more than one upscale and practical facial unit still identifies with unpredictable challenges. More than half of the burn injuries to the head and neck region can be brought on by flame, electrical current, or chemicals.

Surgery managing inconveniences of facial burns can be a great challenge to plastic surgeons. As the reconstructive specialists, should consider an expanding level of complexity in strategies of the reconstructive stepping tool; as one might consider using "The Reconstructive Elevator" rather than using "The Reconstructive Ladder". Those techniques, growing recently to include extra strategies to approaches a good outcomes from the facial reconstruction transplant, which in combination can greatly expand the possible options for treatment of the complications [4], the challenge in reconstruction is less concerned with the technical aspects of the surgery and more with the decision-making process.

Facial transplantation is a very complex operation in reconstructive procedures field that is intended to transform severely deformed features to near-normal appearance and function of the face affected by burn injuries with the use of different techniques. The first facial transplantation reconstructive surgery was performed in 2005 [9], transplantation consisted of revascularization of right and left facial arteries and veins, mucosal repair of oral and nasal vestibules, bilateral anastomoses of infraorbital and mental sensitive nerves, joining of mimic muscles with motor nerve suture on mandibular branch of the left facial nerve, and skin closure, with No surgical complication occurred.

Recently, more developments have been achieved in the field of facial transplantation using composite tissue allografts. As a very recent event in the field of reconstructive plastic surgery, the autologous bipediced, scapular and parascapular; these operations are confronting extensive investigation in regards to their defence from a therapeutic, moral and societal point of view. Moreover, while without a doubt requiring colossally innovative and talented surgical procedure, facial allograft transplantation (FAT) operations show the entire multidisciplinary group with novel patient management challenges, and development of best practice in this area is ongoing. [21] Especially in extremely burned patients, with facial burn injuries especially at the area of perioral and periorbital, and when neighbouring skin is not suitable as a donor site and where free flaps tend to prompt an unacceptable corrective appearance and absence of outward appearance, the facial transplantation using composite tissue allografts based not on so much hypothetical but rather on more genuine remedial surgical technique, ready to help numerous seriously distorted patients where different methodologies have failed. [8]

based on a previous studies that showed, human facial transplantation using composite tissue allografts have been performed in many countries and the first one was in France (the pioneering country in 2005 in Amiens as it was mentioned previously in this study, the second one was performed in China in 2006, , the third world-wide facial transplant in 2007 in Créteil, United States [13] in Cleveland, the fourth one, and in 2008 and 2011 in Boston), and Spain ,2009 and 2010, three cases in three different hospitals and cities, Valencia, Sevilla, and Barcelona; the latter was the first full-face transplant in March 2010 [12]. Altogether, the first four facial composite tissue allotransplantations were performed in four different centres in three different countries. [14]

2. MOST POPULAR TECHNIQUE USED IN FACIAL TRANSPLANTATION

The expansion intending to restore both the feel and functional capacity of the human face prompted the advancement of various surgical and alloplastic systems, for example, skin graft, nearby flaps, free tissue exchange and maxillofacial prostheses. Facial composite tissue allotransplantations have been the most common procedure in the facial transplantation filed which are more than 19 face transplant surgeries since the beginning of the first face transplantation in the early of 2005, and this procedure was helpful and faced some difficulties which will be discussing shortly. Composite tissue allotransplantation (CTA) is currently being performed with increasing frequency. (Table 1.)

As Devauchelle stated, that composite tissue allotransplantation (CTA) involves simultaneous transplantation of the skin, muscle, nerves, bones, ligament and veins. At the point when compared with the ordinary system that uses autologous tissue exchange, the CTA gives more significant favourable circumstances to the seriously damaged patient, giving complete anatomic compensation, mending the skin affectability with palatable useful and tasteful results. [9]

The facial allotransplantation which was performed in China in 2006, was not only face skin transplant but also contained bone, besides skin and other soft tissues. A disfigurement happening because of compressions in the interface between the graft tissue and skin is another restriction of the surgical method. Thus CTA made it conceivable to lessen the immunosuppression; in this way, CTA could be presented in the clinical situation. [13]

New grafts are regularly performed to repair the deformation; yet this can prompt inconsistency of the adjoining tissues giving a "fold appearance" of the restored face. So as to decrease this danger and expand the style, numerous experts join the surgical strategies with maxillofacial prostheses. [15]

Table 1. Cronological History of CTA Transplants.

Author	Year of Publication	type	Long-Term Evaluation	Success
Thomas et al.	1994	Facial tissue and scalp transplants	yes
Devauchelle et al.	2006	Facial transplant	4 months	yes
Guo et al.	2006	Facial transplat	2 year	yes
Dubernard et al.	2007	Facial transplant	18 months	yes
Lantieri et al.	2008	Facial transplant	12 months	yes
Siemionow et al.	2009	Facial transplant	6 months	yes
Pomahac et al.	2011	Facial transplant	yes

The second facial transplant in the United States and the first one on a burn patient in America was performed in April 2009, the patient was a 59-year-old male with a complex bony and soft tissue mid-facial defect caused by high-voltage electrical burn damage, and He was previously treated by a free anterolateral thigh free flap. The patient was still not able to inhale and still had enormous disabilities. The allograft incorporated the maxilla and zygomatic bones and the delicate tissues of the midface, with facial, buccal, and infraorbital nerves.

3. CHALLENGE OF PRESERVATION OF FUNCTIONAL UNITS IN FAT

None the less, disappointment of facial allografts can happen. Disappointment might be intense and because of vascularity or optionally because of intense or persistent rejection. Disappointment of the facial allograft would command surgical removal. Removal is due to protect the patient's life, and if done it might prompt the same post-harm, pre-transplant condition of functional capacity. [16] Clinical application of facial composite tissue allograft transplants opened discussion on the restoration of facial burns injuries by allotransplantation, which was the most successful technique in all face transplants. It was stated that most of face transplantation is an elective operation went for improving personal satisfaction and conceivably taking extremely deformed patients back to a close typical appearance and practical status, beneficial lives, and dynamic support in family and society. The clinical volume of face transplantations to date is little, and it is just anticipated that would rise if the consideration criteria can be securely widened. [17]

A published review which discussed the longest follow-up available on face transplantation that was up to 5 years after the transplantation was performed, and this follow up discuss some manageable complications that showed at the end very great results such as an excellent function, patient satisfaction and social reintegration. In spite of these encouraging results, the long-term outcomes of face transplantation remain unknown, also, even though far-fetched, allograft misfortune is constantly possible. The rescue arrangement must address safe scope of the imperfection left after loss of the allograft, and it ordinarily includes autologous skin graft or fold remaking. [18] [19] They designed a full face allograft where the useful musculature of the temple, cheeks, and eyelids were saved, yet the whole face was resurfaced, and the muscles and nerves that give full functional capacity to the lips were restored.

4. COMPLICATION OUTCOMES AFTER FACIAL TRANSPLANT FOLLOWING BURN INJURIES

The limitation due to the complication of the Facial transplant especially after burns injuries are still leading factor that many authors and researchers tries to resolve them to overcome the limitations of the conventional techniques, an alternative treatment has been developed to treat patients with facial burn injuries. The immunosuppressive state after transplant is one of the most stressful complications in Facial transplant reconstruction; therefore high immunogenicity of the skin tissue did not allow this type of transplantation without the use of immunosuppressive drugs.

Another complication in face transplants operations after burn injuries In case of complex transplants, which is the psychological acceptance of the graft by the patient, is very complicated and it may be considered as a deciding element for the transplantation achievement. Psychological issues are identified with the patient's, the trouble of re-insertion in the general public, non-verbal correspondence deficits, uneasiness, apprehension and hyper vigilance connected with graft disappointment. [20] Nevertheless, to comprehend the mental ramifications of facial transplants, psychosocial sequelae of the patients who have endured facial mutilation must be considered. The mutilated patients lose their original personality, leading to social isolation, unhappiness, depression, stress and an increased risk of suicide. In the second worldwide face transplant, there were no intra-operative complications, Post-operative complications included: venous anastomoses thrombosis, acute orocutaneous fistula and two acute rejection episodes, which were resolved by surgical revision of the anastomosis, profuse irrigation, and immunotherapy adjustment (bolus administration of prednisone). The patient was discharged from the hospital at 4 months post-transplant with near-total sensation and partial-motor recovery, no psychological complications, and excellent acceptance of his new facial appearance. Psychological and physical therapy has continuously been provided.

5. CONCLUSIONS

Facial transplantation is a very complex operation in reconstructive procedures field that is intended to transform severely deformed features to near-normal appearance and function of the face affected by burn injuries with the use of different techniques. The reconstruction of more than one aesthetic and functional facial unit still represents a complex challenge. The aforementioned techniques often imply multiple surgeries and increasing morbidity due to the harvesting of donor areas and usually offer poor aesthetic and functional outcomes, e.g. color and thickness mismatch and potential residual scar contractures.

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