Uses of the Superficial Temporal Fascial Flap in Facial Paralysis

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Background: The superficial temporal fascia merits its popularity in reconstructive surgery for its large number of clinical applications. In this report, the authors present their experience with different uses of the superficial temporal fascial flap in facial reanimation.

Methods: Seventeen cases are presented. In 10 patients, the fascial flap provided a vascularized lining at the interface between the free muscle flap for smile restoration and the overlying skin. In six cases, it was utilized to correct small or moderate contour deficits in the paretic hemiface, using either the fascial flap alone or in combination with free adipose tissue. One patient presented with facial paralysis and Frey syndrome following parotidectomy, and the fascial flap was used to control gustatory sweating. Five independent observers graded aesthetic and functional outcomes on a scale from poor to excellent. Three patients were lost to follow-up, so 14 cases were evaluated.

Results: Follow-up ranged from 1 to 216 months (47 ± 60.49 months). The specific reconstructive goal for each patient was achieved and the overall symmetry was greatly improved, with all patients being granted higher scores by the panel of observers following the superficial fascia flap (Wilcoxon matched-pairs signed ranks, $p < 0.0001$). Transient or permanent alopecia along the temporal incision was the main complication observed.

Conclusions: Transfer of the superficial temporal fascia flap is a valuable technique with several potential applications in facial paralysis management and reconstructive surgery in general. The advantages of this highly vascularized, gliding, and pliable flap far outweigh the associated minimal complications. (*Plast. Reconstr. Surg.* 122: 176e, 2008.)

The highly vascularized scalp layers are increasingly gaining popularity in view of the wide spectrum of potential uses in reconstructive surgery.[1] Galeal, myofascial, fasciopericranial, and fascia-only flaps have been extensively described in the literature.[2–14] The superficial temporal fascia can be raised to an axial flap based on the superficial temporal vessels and transposed to reconstruct deficits in the face. Transferred as a free flap, it brings a vascularized lining to chronic wounds, exposed tendon, or bone and enhances a smoother gliding of the anatomical structures underneath.

No tissue of the temporal region goes to waste in reconstructive terms. The three scalp layers present in the temporal area (the "temporalis trilogy": the superficial temporal fascia, the deep temporal fascia, and the temporalis muscle) are highly valuable in facial reanimation. The isolated or combined use of these structures has several applications, including myofascial transfer, superficial fascia flap, or a double layered "sandwich" flap of superficial and deep temporal fascia. The present study was limited to the anatomical description of the superficial temporal fascia and its potential uses in facial paralysis management.

The concept of a scalp flap based on the superficial temporal vessels was fathered by Golovine[15] in 1889 and soon adopted by Dunham[16] and Monks[17]

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in 1893 and 1898, respectively. In 1919, Esser[18] popularized a temporal flap for eyelid reconstruction. Fox and Edgerton,[19] in 1976, broached the use of a temporal myofascial flap to cover part of the cartilaginous frame in ear reconstruction, while Tegtmeier and Gooding[20] described a fascia-only flap to cover the entire ear framework. For facial paralysis, Eden,[21] in 1911, and Gillies,[22] in 1920, reported on the use of temporal fascia strips for static support of the paretic hemiface. As an alternative to the temporal fascia, Stein,[23] Busch,[24] and Blair[25] utilized free fascia lata strips for supportive management.

In 1980, Smith[12] introduced the use of the superficial temporal fascia as a free flap that, once transferred to the lower extremity, yielded a vascular lining for nonhealing wounds. Thereafter, free fascia flaps were popularized by the work of Brent et al.[26] in 1985 and Upton et al.[27] in 1986. Extensive bipedicled fascial flaps based on the superficial temporal and posterior auricular vessels have also been described.[13] Recent reports on the uses of the superficial temporal fascial flap have been presented by Rose and Norris[28] (1990), Panje and Morris[29] (1991), Cheney et al.[30] (1993), Raffaini and Costa[9] (1994), Park et al.[5] (1999), and Biswas et al.[4] (2001).

In this article, we report on 17 cases of facial paralysis in which we used the superficial temporal fascia as an axial flap, with distinct reconstructive goals. In some cases, the fascial flap was intended as a vascularized interposition lining between the free muscle and the overlying skin, to resolve skin tethering at the cheek. In others, the superficial temporal fascia was used to augment small or moderate contour deficits in the face. In one case, this flap was used to control gustatory sweating following parotidectomy. There have been previous series on the use of the superficial temporal fascia for facial contour defects[10,11,28,31,32] and on its use for the management of Frey syndrome.[33–36] To our knowledge, however, this is the first report on the use of the superficial temporal fascia flap for vascularized coverage of a free muscle transfer in midface reanimation.

PATIENTS AND METHODS

Anatomy

With the expanding use of the superficial temporal fascial flap and other scalp layers comes the need for international consensus on the surgical anatomy.[8] Over the last three decades, many groups[37–40] have dedicated their efforts to the study of the anatomy of this region, including the senior author (J.K.T.) back in 1988.[41,42] The confusing nomenclature that has been utilized to indicate the different layers and their derivative flaps makes any meaningful literature review an arduous and frustrating experience.[30]

When working on the temple, we routinely nominate the scalp strata in this region as skin, superficial temporal fascia, loose areolar layer, deep temporal fascia, and temporalis muscle (Fig. 1). It is difficult to justify those terms as being more appropriate than the ones used by other groups; we prefer them, however, as they simplify the anatomy of this area and ease surgical dissection. The superficial temporal fascia is also referred to in the literature as the temporoparietal fascia, galeal extension, or epicranial aponeurosis.[37–40,43]

The superficial temporal fascia lies deep to a nonanatomical subcutaneous plane,[28] and it is continuous with the galea superiorly and the superficial musculoaponeurotic system inferiorly. Its vascular supply comes from the superficial temporal artery, a branch of the external carotid artery. The superficial temporal artery branches approximately 2 cm above the zygomatic arch into an anterior division and a posterior division. The close relationship between the anterior vessels and the frontal branch of the facial nerve limits the dissection of this layer anteriorly. The superficial temporal vein lies immediately underneath the hair follicles, and unless this is borne in mind, it stands a greater risk of damage. The deep tem-

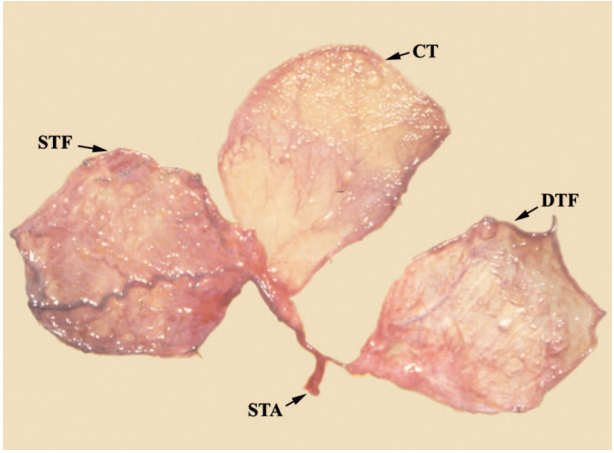

Fig. 1. Anatomy of the scalp layers on the temporal region: terminology in use at our center. The two fascial layers covering the temporalis muscle are shown, with a layer of loose areolar tissue in between. The three layers depicted correspond to the superficial temporal fascia (*STF*), loose connective tissue layer (*CT*), and deep temporal fascia (*DTF*) (*STA,* superficial temporal artery). Reprinted with permission from Kaplan, I. B., Gilbert, D. A., and Terzis, J. K. The vascularized fascia of the scalp. *J. Reconstr. Microsurg.* 5: 7, 1989.

poral fascia is in turn vascularized by the middle temporal artery, while the loose areolar layer, or "innominate layer," has no axial vessel running within its substance. The superficial fascia relatively easily "peels off" from the underlying deep temporal fascia on blunt dissection. The superficial fascia is approximately 2 to 3 mm wide, and reliable flaps of up to 12 × 14 cm and 14 × 17 cm in size have been reported.[4,8]

Surgical Technique

Before skin incision, the hair is washed, parted, and braided along an imaginary coronal line. The course of the superficial temporal artery is then identified with Doppler ultrasound. A classic face lift approach is extended into a modified coronal incision. At the zygomatic arch, this incision is deepened to identify the first hair follicles. A subfollicular dissection starts at this point and extends in a cephalad direction; any bleeding from the subdermal plexus is controlled with bipolar cautery. Once the required estimated size is exposed, the superficial temporal fascia is separated from the deep fascia by blunt dissection. Once the superficial fascia is raised, the superficial temporal artery can be visualized within it (Fig. 2, *above*). The second part of the surgical technique depends on the reconstructive objective of the fascial flap and is described below. Informed consent was obtained from all patients.

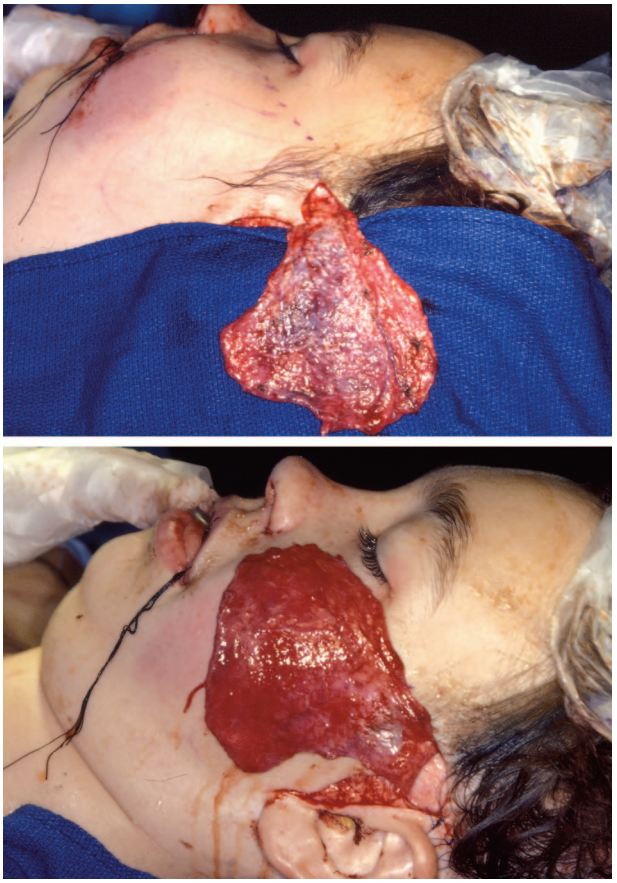

Fig. 2. (*Above*) The superficial temporal fascia is raised with the superficial temporal artery lying within its substance. (*Below*) The size of the superficial temporal fascia flap is designed to cover the entire free muscle over which it is transposed.

CASE REPORTS

Group A: Vascularized Interposition Lining of the Cheek and Wrapping of the Free Muscle Transfer ($n = 10$)

Adhesions between the free muscle flap and the overlying skin are not uncommon, and they can progress into marked tethering of the skin, causing unnatural pleats and creases on animation. Rarely, these fibrous bands significantly restrict the free muscle function or maintain a lateral pull of the commissure, resulting in oral sphincter incompetence. Cases of severe trauma, extensive maxillofacial reconstructions, oncological interventions, and so on are particularly prone to this type of complication. The skin on the paretic side is extremely delicate and its blood supply is often compromised by previous insults. Resection alone of these adhesions would not guarantee long-lasting results. The reconstructive objectives in this group were to release and prevent further adhesions, and to facilitate a smoother gliding of the free muscle underneath the skin envelope. All patients in this group underwent the standard two-stage cross-facial nerve grafting and free muscle transfer for midface reanimation, and to differing degrees of severity, they all developed postoperative adhesions. Table 1 summarizes the demographic details of this group of patients, including details of any previous surgery.

In nine cases, a generous superficial temporal fascia flap was raised as a pedicle on the superficial temporal artery and folded over the zygomatic arch to wrap the entire free muscle graft (Fig. 2, *below*). In the remaining case, preoperative angiography indicated damage to the superficial temporal artery, thus the deep temporal fascia and loose areolar tissue were utilized for the same purpose. It is utterly important to ensure adequate exposure, so that the fascial flap is laid evenly on the anterior surface of the muscle graft. A subcutaneous tunnel from the zygomatic arch to the oral commissure and along the nasolabial fold is dissected, while protecting the skin above and the structures underneath it. All adhesions are released, and the entire overlying skin cheek flap is undermined under direct vision. Dissection is guided by detailed drawings, intraoperative photographs, and videotapes from previous operations. The fascial flap is subsequently flipped over the zygomatic arch to drape the external surface of the muscle, especially at the area of previous adhesions and skin creases. Once the vascularized fascia is secured in place with 4.0 Vicryl sutures (Ethicon, Inc., Somerville, N.J.), it maintains its original structure with minimal tissue reaction. Exemplary cases of this group are depicted in Figures 3 and 4.

Group B: Contouring of Defects in the Cheek ($n = 6$)

Contour asymmetries are part of the challenges of facial paralysis reconstruction. In this group, the reconstructive goal is to restore symmetry by augmenting the contour deficits in the face. Use of fascial tissue in facial contouring is not a new

Table 1. Superficial Temporal Fascia for Vascularized Interposition Lining in the Cheek*

Patient	Age (yr)	Etiology	Side	Grade	DT (mo)	Previous Surgery	Stage 1	Stage 2	Stage 3	Follow-Up (mo)
1	11	Parotid hemangioma	L	Partial	132	Excision hemangioma	CFNG ×3	Pectoralis	STFF	216
2	41	Bell's palsy	L	Partial	120	Mini-temporalis	CFNG ×4	Gracilis	STFF	0
3	17	Measles	Bilateral	Partial	216	Fascia lata Masseter transfer	IPNG to XI, IPNG to XII	Gracilis	STFF	28
4	45	Glomus jugulare	R	Partial	7	Glomus jugulare	CFNG ×2	Pectoralis	STFF	36
5	9	Developmental	R	Partial	104	CFNG ×1	CFNG ×3	Gracilis	STFF	84
6	18	Traumatic	R	Partial	30	Maxillofacial reconstruction	CFNG ×4	Gracilis	STFF	12
7	56	Acoustic neuroma	R	Complete	8	Cerebellopontine tumor excision	CFNG ×4	Gracilis	STFF	0
8	34	Traumatic	R	Partial	10	Maxillofacial reconstruction	Repair VII, neuroma resection	Mini-temporalis and STFF		4
9	38	Neuroma VII nerve at parotid	R	Partial	60	Excision VII neuroma	CFNG ×2	Gracilis	Deep temporal fascial flap	0
10	6	Developmental	R	Partial	72	No	CFNG ×2	Gracilis	STFF	1

DT, denervation time; CFNG, cross-facial nerve grafting; XII-VII, partial hypoglossal to facial nerve transfer; STFF, superficial temporal fascia flap; IPNG, ipsilateral nerve grafting.
*All patients were female.

concept, and it is well documented in the literature. Alternatives include fat or bone grafts and different fillers. When reconstructing contour deficits in the face, several factors must be taken into account, such as the estimated volume of the defect and the donor,[31] tissue vascularity, gravity, allowance for facial expressions, potential resorption/need for overcorrection, and, whenever possible, replacing like with like.[44] At our center, the senior author has used superficial temporal fascia or vascularized posterior calf fascia to manage these deficits. A folded-over superficial fascia flap can be used for small defects. For moderate-sized defects, or for those in which an appreciable amount of soft tissue is missing, a combination of vascularized fascial flap with free adipose tissue or other materials has been used. Demographic details of the patients in this second group are listed on Table 2.

Three of six patients presented with developmental facial palsy, absence of mimetic musculature, and, hence, soft-tissue asymmetry of the paretic hemiface. Placement of a free muscle flap for smile restoration can accentuate these deficits, producing a visual impression of hollowing of the malar region or preauricular area. These contour asymmetries were corrected with a pedicled "sandwich" flap of superficial temporal fascia enveloping fatty tissue. The composite pedicled flap was laid over the medial zygoma in two cases and on the preauricular area in one case (Fig. 5).

Two patients in this group did not require a free muscle transfer and underwent segmental temporalis transposition for smile restoration. A free fat graft enveloped in superficial temporal fascia was used in these two cases to treat or prevent hollowing of the temporal donor site (Fig. 6). The last patient of this group was a 31-year-old woman who presented with bilateral partial facial paralysis as sequelae of a motor vehicle accident. She required maxillofacial reconstruction and had several interventions elsewhere for static support of her bilateral paralysis, with an acceptable result. A marked bilateral periorbital hypoplasia was initially managed with bone grafts; however, when she consulted our center, a contour deficit over the right zygoma was still noticeable. This was corrected with a "sandwich" flap consisting of hydroxylapatite granules wrapped in superficial vascularized temporal fascia. The temporal fascia served the purpose of maintaining the material in place, and provided a vascular lining to an area poorly vascularized by repeated insults. This composite flap successfully filled the concavity and improved the overall cosmetic result.

Group C: Treatment of Frey Syndrome ($n = 1$)

It is widely believed that Frey syndrome, or gustatory sweating, is the result of aberrant innervation of the sweat glands in the dermis by cholinergic parotid fibers interrupted following parotidectomy. The afflicted patients exhibit variable degrees of food-related flushing, sweating, or discomfort over the parotid region.[45] In most cases, the mild symptoms do not warrant surgical intervention. Guntinas-Lichius and colleagues[46] published the largest series in the literature on risk factors for Frey syndrome, and reported an incidence of severe symptoms in 4 percent of patients. In these cases, fascial flaps, such as the superficial temporal fascia or superficial musculoaponeurotic system, have been utilized as a barrier between the postganglionic nerves and the sweat glands.[33,45]

A 63-year-old woman presented 35 years after resection of a benign mixed parotid tumor. The tumor was first removed when the patient was 28 years old and recurred 3 years later. After the second intervention, she developed left-sided facial paralysis and Frey syndrome. She was a smoker and had other significant comorbidities, factors that in addition to her age contraindicated a free muscle transfer. Thus, she underwent a

Fig. 3. A 9-year-old girl presented to our center with a diagnosis of developmental facial paralysis on the right side. She had placement of four cross-facial nerve grafts, followed by a free gracilis transfer 9 months later. On subsequent follow-up visits, she developed tethering of the free muscle flap to the skin, which resulted in unsightly creases on the midface on animation (*left*).Twelve months later, she underwent transfer of the superficial temporal fascia over the free muscle flap. (*Right*) Resolution of the skin creases at the 3-year follow-up visit. She was awarded the following scores by the panel: 2 (fair) preoperatively, 3.2 (moderate) after free muscle, and 4 (good) following superficial fascia transposition.

Fig. 4. An 11-year-old girl presented with left-sided iatrogenic facial paralysis following resection of a parotid hemangioma. She was first assessed by the senior author in July of 1985. In the first stage, in May of 1986, she had three cross-facial nerve grafts, followed by a free pectoralis minor transfer at the second stage, 13 months later, in June of 1987. Postoperatively, she developed skin creases on the lower cheek in close proximity to the oral commissure (*left*). In July of 1988, a pedicled superficial temporal fascia flap was transposed over the free pectoralis minor flap. (*Center*) Resolution of the skin creases at 2-year follow-up. (Right) The long-term maintenance of the correction, 18 years after the fascial flap procedure. The independent evaluators rated her smile as follows: 2 (fair) before surgery, 3.4 (moderate) after free muscle transfer, and 4.4 (good) after the superficial temporal fascia flap procedure.

two-stage reconstruction, which consisted of placement of a cross-facial nerve graft in the first stage and segmental temporalis transposition to the oral commissure, with transfer of the superficial temporal fascia over the parotid bed, in the second stage. At 7-month follow-up, the gustatory sweating was efficiently controlled, and the overall contour of the midface improved (Table 3).

EVALUATION AND DATA ANALYSIS

Patients were reviewed in clinic at 6 weeks, 3 months and 6 months, and as needed thereafter. On each visit, patients were photographed and videotaped at rest and while animated using a standard protocol. Five independent observers separately graded the patients' videotapes using the Terzis Facial Grading System published in 1997[47] and shown in Table 4. None of the observers had any information about the patients' characteristics or the procedures used. The aesthetic and functional appearances of the midface were graded on a scale of 1 to 5, corresponding to a five-category scale of poor to excellent.

The outcome measure of interest was defined as the averaged scores awarded by the panel of observers at the successive points in time. The effect of the fascial flap was tested using the Wilcoxon matched-pairs signed ranks test. Significance level was set at 0.05.

RESULTS

Of the 17 patients, three were lost to follow-up and 14 were evaluated. Follow-up ranged from 1 to 216 months (47 ± 60.49 months). All patients increased their mean score following the fascial flap in comparison with the mean value awarded by the panel after the second stage of reconstruction (Wilcoxon matched-pairs signed ranks test, $p < 0.0001$) (Fig. 7). In group A, the new fascial interface successfully resolved skin tethering and cheek creases, improving the overall aesthetics and muscle gliding function. Group B patients exhibited an improved contour of the paretic hemiface with the use of a fascia-only or composite fascial flap.

Most of the complications in these patients were related to the coronal incision. Three cases of transient alopecia were seen that did not require any intervention, and three cases of permanent alopecia necessitated scar revision at a later stage. In the only patient in group C, a Silastic spacer was inserted to prevent hollowing of the temporal fossa after mini-temporalis transposition. Postoperatively, she developed an infection that prompted removal of the implant and anterior advancement of the posterior third of the temporalis to fill the donor site.

Table 2. Superficial Temporal Fascia for Contouring of the Cheek

Patient	Age (yr)	Sex	Etiology	Side	Grade	DT (mo)	Previous Surgery	Stage 1	Stage 2	Stage 3	Follow-Up (mo)
1	13	F	Developmental	R	Partial	161	No	CFNG ×3, IPNG from XII to depressor	Gracilis	STFF	28
2	3	F	Developmental	L	Partial	36	No	CFNG ×4	Pectoralis	STFF and fat to fill malar/cheek	108
3	31	F	Traumatic	Bilateral	Partial	144	Maxillofacial reconstruction and static sling	Pedicled STFF hydroxylapatite granules to malar/cheek deficit			28
4	3	Male	Developmental	R	Partial	36	No	CFNG ×4	Gracilis	STFF and fat to fill preauricular deficit	96
5	16	F	Iatrogenic	L	Partial	19	Mandibular osteotomy ×2	CFNG ×3, XII-VII transfer "babysitter"	Mini-temporalis	STFF and fat to fill donor site	6
6	46	F	Cavernous malformation pons	R	Partial	19	Resection of cavernous malformation	CFNG ×4, XII-VII transfer "babysitter"	Mini-temporalis transfer; STFF and fat to donor site		4

DT, denervation time; CFNG, cross-facial nerve grafting; XII-VII, partial hypoglossal to facial nerve transfer; STFF, superficial temporal fascia flap.

Fig. 5. A 3-year-old boy presented with developmental facial paralysis on the right side in May of 1994 (*above, left*). He had four cross-facial nerve grafts in February of 1995. Twelve months later, he underwent a free gracilis muscle transfer to the right cheek. (*Above, center and right*) At the follow-up visit after the free muscle transfer, a contour deficit is apparent in the preauricular area (*arrow*). In May of 1997, this concavity was corrected by the transposition of the right superficial temporal fascia and free fatty tissue. (*Below*) There was adequate augmentation of the preauricular defect at 3-year follow-up. The independent evaluators rated his smile as follows: 1.2 (poor) preoperatively, 3.2 (moderate) after the free muscle transfer, and 4.4 (good) after correction of the contour deficit.

DISCUSSION

Importation of vascularized tissue has been used extensively to achieve a healthy lining for cartilage, tendons, and bone, with effective and reliable results. In a 1988 report by Kaplan, Gilbert, and the senior author,[41,42] use of the superficial temporal fascia to cover exposed tendons on the dorsum of the hand and open joints on the foot was described. O'Sullivan et al.,[48] in 1998, reported the same healing attributes in nerve regeneration. The vascularized fascial flap not only enhances healing but facilitates a natural gliding

Fig. 6. A 13-year-old girl suffered from right-sided developmental facial paralysis, and was first evaluated in our clinic in May of 1995. She underwent "the babysitter procedure" (cross-facial nerve grafts and mini– hypoglossal to facial nerve transfer) in August of 1995, followed by free gracilis transfer to the oral commissure in June of 1996. Postoperatively, a hollowing of the right malar area was noticeable (*left*). This contour deficit was corrected using free adipose tissue wrapped in the superficial temporal fascia, in May of 2002. (*Right*) Postoperative result at 2-year follow-up.

Table 3. Superficial Temporal Fascia for Management of Frey Syndrome

Patient	Age (yr)	Sex	Etiology	Side	Grade	DT (mo)	Previous Surgery	Stage 1	Stage 2	Stage 3	Follow-Up (mo)
1	63	F	Benign mixed parotid tumor	L	Partial	420	Parotidectomy CFNG ×1	CFNG ×2	Mini-temporalis and pedicled STFF		7

DT, denervation time; CFNG, cross-facial nerve grafting; STFF, superficial temporal fascia flap.

Table 4. Terzis Functional and Aesthetic Grading System for Smile

Grade	Description	Score
Excellent	Symmetrical smile with teeth showing, full contraction	5
Good	Symmetry, nearly full contraction	4
Moderate	Moderate symmetry, moderate contraction, mass movement	3
Fair	No symmetry, bulk, minimal contraction	2
Poor	Deformity, no contraction	1

of the anatomical structures beneath it. Functioning of a successful free muscle transfer might be significantly limited if extensive adhesions to the skin envelope develop. A vascularized interface between the muscle graft and the overlying skin has efficiently controlled skin tethering and cheek creases and eased the contractions of the free muscle, improving the overall functional and aesthetic result.

Different strategies have been proposed to manage contour deficits in the face. Fascia, fat, and cartilage have been extensively reported on, as have collagen and alloplastic implants.[28] With the advent of microsurgery, other options, such as vascularized fascia and omentum flaps, have become available.[49,50] Vascularized tissue proved superior to other methods as it tends to retain its original volume.[31,32] Avelar and Psillakis,[13] in 1981, and Fukuta et al.,[31] in 1991, reported on the use of galeal and superficial temporal fascial flap for facial augmentation. Matsuba et al.[11] described a

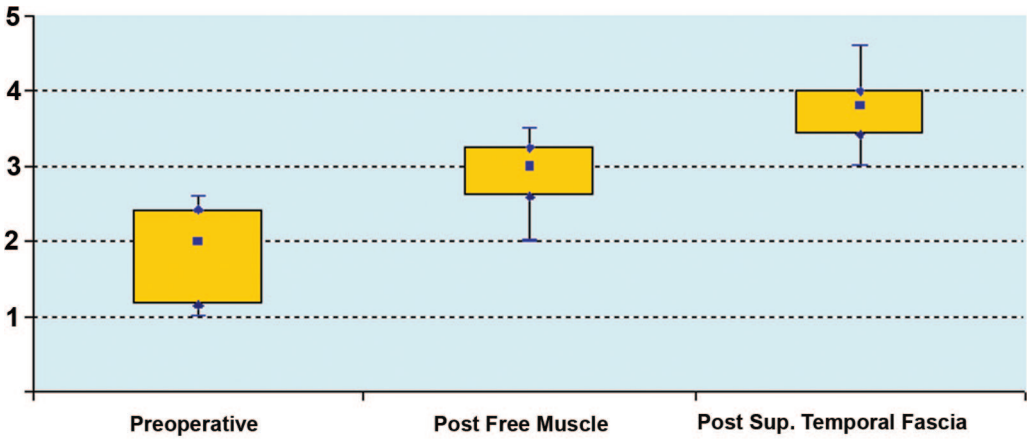

Fig. 7. This box plot graph illustrates the scores awarded by the panel of independent observers to the patients included in this study ($n = 14$). All cases were evaluated by the panel at three stages: preoperatively, after free muscle transfer or temporalis transposition, and after the superficial temporal fascial flap procedure. Use of the temporal fascia flap successfully corrected skin creases and contour deficits, and all patients obtained significantly higher scores following the superficial temporal fascia flap transfer (Wilcoxon matched-pairs signed ranks test, $p < 0.0001$, compared with both the preoperative and post–free muscle status). Scale scores: *1* = poor; *2* = fair; *3* = moderate; *4* = good; *5* = excellent.

bilateral superficial temporalis fascial flap for the management of severe facial atrophy secondary to lipodystrophy.

Use of the superficial temporal fascia for facial augmentation has several advantages. Besides its robust and dependable vascularization, it is a highly pliable tissue that is easily folded to fit the demands of a specific deformity. When larger volumes are needed, different composite flaps can be harvested through the same incision (e.g., myofascial flap, double fascial flap, fascia–loose areolar tissue flap). Previous use of temporal fascial strips for static support of the paretic face has demonstrated this tissue's ability to maintain its original structure.[32] Fukuta et al.[31] warned of the difficulties in precisely estimating volume requirements, which often results in subsequent revisions to debulk or further augment the area treated. They recommended using the fascia-only flap when the volume required is less than 40 cm^3; for larger deficits, the superficial temporal fascia should be used in combination with free fatty tissue or alloplastic material.

Finally, in the management of Frey syndrome, the superficial temporal fascia is often preferred to the superficial musculoaponeurotic system or a free muscle transfer. The superficial temporal fascia permits clear resection margins and yields better contouring of the parotid bed than a muscle graft. The main drawback of the superficial temporal fascia flap is transient or permanent alopecia, an occurrence that can be reduced with careful subfollicular dissection.

CONCLUSIONS

For the specific reconstructive problems discussed in this article (skin tethering and skin creases, facial contour defects, and gustatory sweating), the superficial temporal fascial flap provided effective and reproducible results with minimal donor-site morbidity. Further studies will open new clinical applications for this versatile and reliable fascial flap tissue.

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