

Temporalis Muscle Transfer: A Vascular Bed for Autogenous Dermis - Fat Orbital Implantation

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Abstract: Nine patients with contracted avascular sockets who were unable to wear prostheses, and those who prospects for maintaining viable autogenous dermis-fat grafts were diminished, underwent temporalis muscle transfer into the orbit through a window in the lateral orbital wall. The temporalis transposition was used as a vascular bed for dermis - fat orbital implantation. Postoperatively, seven of nine patients were able to wear satisfactory prostheses and four of nine patients had amelioration of their superior sulcus deformities. [Key words: anophthalmic socket, dermis-fat grafts, temporalis muscle, temporalis transfer.] *Ophthalmology* 92:292-296, 1985

Scarred, contracted sockets with obliterated fornices are a particularly difficult problem to remedy. Although autogenous dermis-fat orbital implantation is an effective means of orbital reconstruction, there is a 30% chance of atrophy of at least half of the graft volume when it is implanted in an avascular socket.¹⁻² Introducing a pedicle flap into the orbit as a vascular bed for an autogenous dermis fat graft may increase the prospect of graft survival, as well as supply additional volume to fill the socket.

MATERIALS AND METHODS

Nine patients underwent combined temporalis muscle transfer and dermis-fat orbital implantation. The patients ages ranged from 35 years to 62 years. The follow up period ranged from 10 to 19 months. Each patient had a contracted socket with inadequate fornices, had at least two previous procedures, had an initial injury that did not affect the temporal fossa, and was considered to be at risk for dermis-fat graft atrophy (**Table 1**).

TECHNIQUE

The patients were given satisfactory general anesthesia. The surgically prepared area included both sides of the face, the nose, ears and the entire scalp. A 4cm preauricular incision was extended superiorly behind the hairline over the anterior aspect of the temporalis muscle; inferiorly it was curved anteriorly to the lateral palpebral canthal raphe, but did not reach the lateral, canthal angle (**Fig. 1**). The superficial muscular

Table 1. Preoperative Patient Data

Case No.	Age (years)	Previous Procedures	Initial Injury
1	62	E, R	Chemical Burn
2	59	E, R, M	Chemical Burn
3	35	E, R	Penetrating Injury
4	38	E, R, M	Chemical Burn
5	47	E, R, M	Thermal Burn
6	51	E, R, M	Chemical Burn
7	59	E, R	Chemical Burn
8	61	E, R	Penetrating Injury
9	47	E, R, M	Chemical Burn

E = enucleation; R = removal or orbital implant; M = mucus membrane grafting.

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Fig 1. The incision extends from the lateral palpebral raphe into the scalp.



Fig 3. The lateral wall of the orbit is exposed by retracting the temporalis muscle.

aponeurotic system (SMAS) of the face was exposed and reflected posteriorly (Fig. 2). The lateral orbital rim and lateral orbital wall were exposed (Fig. 3) by reflecting the temporalis muscle from the temporal fossa and releasing the fascia from the zygomatic process of the maxilla.

The orbital contents and the internal periosteum of the lateral wall were retracted medially while, a large burr mounted on an air drill was used to make a bony window. The lateral wall defect was enlarged with a Kerrison punch to a diameter of 15mm (Fig. 4).

The socket conjunctiva was opened centrally. Attempts were made to identify and isolate any rectus muscle remnants, and 5-0 Vicryl sutures were then placed through their stumps. A window corresponding to the bony defect was shaded in the temporal aspect of Tenon's capsule.

The temporalis fascia was dissected from the anterior one-third of the temporalis muscle. A 25mm wide pedicle of temporalis muscle attached inferiorly, extending the full length of the muscle and including its epicranial adhesions was developed (Fig. 5) transposed into the orbit (Fig. 6) and sutured to posterior Tenon's capsule and periosteum medially (Fig. 7).



Fig 2. The superficial muscular aponeurotic system of the face (SMAS) with its terminal branches of the facial nerve is reflected as a separate layer.

A suitable site in the upper outer quadrant of the buttock was selected, demarcated with methylene blue dye, and injected intradermally with sterile saline solution. The keratinized epithelium was removed in one layer with a #15 blade. The graft, with a diameter and depth of 20mm, was harvested with a #10 blade.

The periphery of the graft was sutured to any identifiable rectus muscle stumps. Anterior Tenon's capsule and conjunctiva was sutured to the dermal edge of the graft. Suturing the graft into place one quadrant at a time facilitated the insertion of the largest possible volume. The graft was not trimmed until the final quadrant was sutured. A light dressing was applied.

The SMAS layer at the temporalis donor site was closed with 5-0 chromic sutures after a Hemovac drain was placed in the muscular defect. The skin was closed with 4-0 nylon sutures and covered with a Kling headroll.

The dermis-fat donor site was closed with vertical mattress sutures of 4-0 silk and reinforced with 7-0 silk sutures. A dressing of fluffs and elastoplast was applied.

RESULTS

Although the follow up period remains short, (10-19 months) in seven of nine cases the patient was able to wear a prosthesis six months after surgery (Table 2). In four patients there was improvement of the superior sulcus deformity (Fig. 8). In none of the patients did conjunctiva cover the anterior surface of the graft until 10 weeks after surgery. In one case the conjunctiva did not completely cover the surface of the graft until the 18th postoperative week.



Fig 5. A 35 mm wide pedicle of temporalis muscle and epicranium is developed and released with a periosteal elevator. The SMAS layer is retracted.

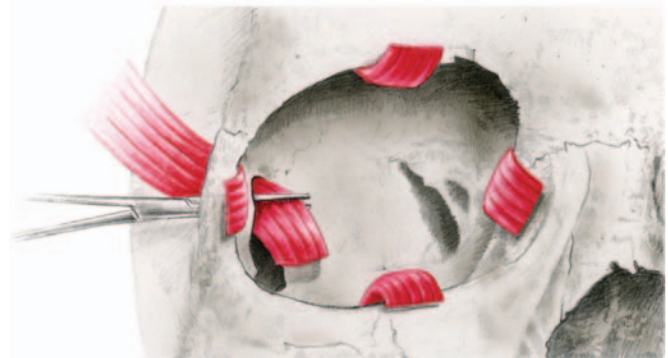


Fig 6. The band of temporalis muscle and epicranium is transposed into the orbit through a window in the lateral orbital wall.



Fig 7. Photograph of orbital bone structure.

Table 2. Postoperative Patient Data

Case No.	Superior Sulcus	Fornices	Conjunctival	Follow-up (months)
			Coverage (weeks)	
1	Improved	Formed	10	19
2	Improved	Formed	14	18
3	Not Improved	Inadequate	12	16
4	Not Improved	Obliterated	16	16
5	Not Improved	Formed	14	14
6	Not Improved	Formed	14	13
7	Improved	Formed	12	11
8	Improved	Formed	14	11
9	Not Improved	Inadequate	18	10

DISCUSSION

The short period of follow up and the small number of cases limit the conclusions that can be extrapolated from this series. Obviously more cases and longer follow up are necessary before the effectiveness of this procedure can be adequately assessed.

Several points, however, seem apparent. Although autogenous dermis-fat orbital implantation is an effective technique for adding soft tissue volume to the orbit as well as recessing the existing conjunctiva and preserving the fornices, the poorest results are achieved in those cases of contracted sockets with obliterated fornices following severe trauma or burns. Presumably their sockets are filled with relatively avascular fibrous tissue that is incapable of sustaining a viable free graft of dermis and fat. The technique described in this paper brings vital tissue on a pedicle flap into the orbit through a window in the lateral wall. The temporalis muscle

adds volume to the orbit and hopefully provides a vascular bed for the dermis-fat implantation.

There are several drawbacks to this procedure, but these may be outweighed by the potential benefits. This procedure is technically more complicated than a dermis fat graft alone. It also leaves the patient with a slight depression over the temporalis fossa (**Fig. 9**)

Naguin,³ Reese,⁴ and Jones⁵ described filling the orbital cavity with temporalis muscle after exenterations. They transplanted the anterior one-third of the muscle through an opening in the lateral wall of the orbit. Postoperatively they described transient difficulty in opening the jaw widely and slight retraction of the lid skin when the patient was chewing.

CONCLUSION

Avascular, contracted sockets have a decreased chance of maintaining an autogenous dermis-fat graft without significant atrophy. Transposing a pedicle flap of temporalis muscle into the orbit through an opening in the lateral orbit wall as a vascular bed for dermis-fat graft may decrease the rate of atrophy of these grafts in difficult cases.

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