Role of Temporalis Musculofascial Transposition for Obliteration of the Exenterated Orbit

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Abstract

An exenterated orbit left as such tends to encrust, become odorous and remains a potential source of infection besides looking unsightly. To overcome these problems we transposed the temporalis musculofascial complex through a lateral orbitotomy for primary and secondary obliteration of the orbit in two cases each. In each patient the orbit was exenterated to ablate a neoplasm. In all cases the procedure yielded a problem-free orbit with good cosmesis.

The temporalis musculofascial transposition complex is a simple means of obliterating the orbit particularly in the Indian context wherein prosthetic orbital devices are often unavailable.

INTRODUCTION

An empty orbit is a frequent disfigurement following orbital exenteration. Obliteration of the orbit by rotating the temporalis muscle and fascia primarily or at a later stage obviates the need for frequent wound toilet, crust removal, prevents odour and gives a better cosmesis. Rotation or transposition of the temporalis muscle was first described by Golocine (1898) and later popularized by Sir Harold Gillies (Speculand 1992) during the 1914-18 war for improving defects from depressed fractures of the zygoma. Use of the temporalis muscle for orbital obliteration was first described in 1954 by Naguin in 1954 and popularized by Reese (1958, 1961). In the recent past we have utilized the temporal musculofascial complex for a soft tissue fill-in of the orbit both as a primary as well as a secondary procedure in four patients. This paper

describes our technique and results.

Anatomy

The temporalis muscle is fan shaped, arising from the temporal fossa and from the medial surface of the temporalis fascia. The fibres converge and descend as a tendon to insert largely on the medial aspect of the coronoid process. The anterior and posterior deep temporal arteries situated anterior and posterior to the coronoid respectively, and originating from the second part of maxillary artery, enter the temporalis muscle from its medial aspect necessitating a subperiosteal dissection for mobilization of the muscle. The vascularity is supplemented by a few branches from the middle temporal arteries (branches of superficial temporal) which pierce the temporalis fascia to run between the temporal muscle and the skull.

Operative Procedure

Under general anaesthesia an incision is made just behind the hair line (fig. 1, insert) with care being taken to preserve the superficial temporal artery. It is advisable to incise straight down to the temporalis fascia and elevate the anterior flap along with the pre-fascia to ensure preservation of facial nerve branches to the orbicularis oculi muscle. Curving the incision superiorly and posteriorly allows a greater length of muscle to be mobilized. The anterior skin flap is elevated almost to the lateral orbital margin, exposing completely the depression of the temporal fossa just posterior to the lateral margin of the orbit. This exposure is vital to the creation of an adequately sized window in the lateral orbital wall. With the temporalis muscle fully exposed, a cutting diathermy is used to incise through the muscle upto the bone to include approximately the anterior half of the muscle from the level of zygomatic arch to its superior-most extent (fig. 1). By sub-periosteal dissection the muscle is mobilized until its insertion on the coronoid process is identified. The inferior part of the temporalis fascia should then be divided one cm above the zygomatic arch to preserve branches from superficial temporal artery. It is essential to divide this fascia to get free rotation of the flap (Holmes and Marshall 1979). The investing temporalis fascia is transposed along with the muscle facilitating dissection and providing a firm layer for retention for sutures.

Using a cutting burr, the lateral wall of the orbit is perforated. The orbitotomy is enlarged anteriorly leaving only a thin rim of marginal bone (frontal process of zygoma) for retaining lateral facial contour. Posteriorly the opening is extended to the greater wing of sphenoid. Superoinferiorly the orbitotomy extends from the orbital roof to the inferior orbital fissure. The muscle is then drawn into the orbit through the fenestrum in the lateral orbital wall (fig. 2) and secured in place by a few tacking sutures passing through holes drilled in surrounding bone. In absence of the eyelids the anterior aspect of the muscle can be skin grafted

Fig. 1. Diagram showing incision (inset), extent of muscle to be mobilized (broken line) and the lateral orbitotomy (dotted line).

(fig. 3). The temporal wound is closed in layers and a drain left in situ.

Case Material

We utilised the temporalis flap as a secondary procedure in two cases while another two it was performed concomitantly with ablative surgery (Table I). Each case underwent orbital exenteration either for primary orbita neoplasm or for spread of tumour from an adjacent site. Cases undergoing the procedure secondarily had been free of disease for atleast one year.

Fig. 2. Temporalis muscle drawn into the orbit

Fig. 3. Result after skin grafting. The eyelids were excised (case 2).

In cases 1 and 2 (table 1) the end result was good as the muscle flap provided adequate soft tissue fill upto the orbital margins. In case 3 where the zygoma was removed the muscle helped reduce depression of the malar region and partially obliterate the orbit. As removal of the zygoma greatly increased the volume of the defect, the flap was only partially successful. In case 4 where the orbital floor had been excised at the initial operation, the infe-

rior aspect of the transposed muscle was left unsupported. This, coupled with a partial muscle necrosis reduced the effectiveness of the flap, though some reduction in size of the orbital cavity did occur, making it less prone to crusting.

Follow up ranged from one to three years. Results of obliteration have been successfully maintained in each case.

Discussion

The temporalis muscle is versatile being amenable to a number of uses like repair of buccal defects (Panje 1987), soft tissue supplement for depressed tripod fractures (Gillies 1917), reanimation of paralysed face (Conley and Baker 1979) and for providing orbital support after maxillectomy (Ghosh 1987). Obliteration of the orbit though known is not widely practised.

Although technically a simple procedure a few precautions are advisable. The base of the muscle flap should not be narrowed more than absolutely necessary to avoid jeopardizing its vascularity. A subperiosteal dissection while

TABLE 1
SUMMARY OF CLINICAL MATERIAL

S. No.	Lesion	Site	Ablative Surgery	Timing of Procedure	Result
1.	Adeno-carcinoma	Nose	Medial maxillectomy +orbital exenteration —>RT	Secondary	Good
2.	Melanoma	Conjunctive	Orbital exenteration + Excision of Lids —>RT	Primary	Good
3.	Adeno-carcinoma	Lacrimal gland	Orbital exenteration + Excision of zygoma and lids—>RT	Primary	Reduced disfigurement
4.	Adenoid-cystic carcinoma	Maxillo ethmoid complex	CFR + orbital exenteration+ suprastructure maxillectomy —>RT	Secondary	Early parti muscle resorption

CFR - Craniofacial resection

RT - Radiotherapy

releasing the muscle from its origin also help ensure its viability as must vessels enter the muscle from its medial surface. The superficial temporal artery must not be damaged in order to preserve its middle temporal branches. Unlike Antonyshyn et al (1988) we do not consider it necessary to remove the lateral margin as the resulting defect offsets any gain in cosmesis. We concur with Holmes and Marshall (1979) that a lateral orbitotomy is adequate for permitting nearly half the muscle to be transposed. Rotation of the muscle over the lateral orbital margin produces an unsightly bulge besides diminishing length of muscle available for obliteration.

Results of transposition are best in presence of an orbital floor which can support the transposed muscle. In absence of the floor as after

suprastructure maxillectomy, though the inferior aspect of the muscle can be skin grafted, chances of muscle resorption remain high as the floor provides a scaffolding for growth of fibrous tissue.

Use of the temporalis muscle results in no added morbidity as the incision is hidden behind the hair-line, no depression in the temporal fossa occurs and masticatory function is undisturbed. Also it is not compromised by prior radiotherapy.

Freedom from crusting, a reasonable cosmesis and a problem-free orbit are the benefits derived from this procedure, which adds only an hour to any surgical ablation in this region. We advocate its use in our circumstances where a harsh dry climate often makes the empty orbit a significant cause of morbidity.

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