

Preservation of the Temporal Branch of the Facial Nerve in Pterional-Transzygomatic Craniotomy

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Summary

The temporal branch of the facial nerve may be saved in a pterional-transzygomatic craniotomy if the dissection is carried beneath the superficial temporal fascia. The anatomical and technical aspects of this exposure are described in this report.

Keywords: Surgical technique; facial nerve; pterional-transzygomatic craniotomy.

Introduction

Soft tissue dissection in the pterional-zygomatic area carries a significant risk of injuring the temporal branch of the facial nerve with resulting cosmetic deformity due to the loss of function of the frontalis and orbicularis oculi muscles, among others. The facial nerve branches are at risk while traveling in the sub-galeal space. The potential for injury of these branches is maximum in the classical sub-galeal pterional dissection while it is less if the temporal muscle is elevated together with the scalp^{10, 11}. However, a myocutaneous flap decreases the exposure due to the bulky temporal muscle^{10, 11}. Yaşargil modified the classical sub-galeal pterional dissection, proposing a dissection between the two layers of the superficial temporal fascia^{10, 11}. Yaşargil's inter-fascial pterional approach has been described in the context of a pterional craniotomy^{10, 11}. In the past few years many modifications of pterional craniotomy to include zygomatic arch resection have been reported^{1, 2, 5-8}. Preservation of the temporal branch of the facial nerve is desirable in these approaches as well.

We have recently described the surgical anatomy of the temporal branch of the facial nerve and have suggested a dissection strategy that seemed anatomically

suited to preserve this nerve in pterional or transzygomatic approaches³. The present report describes a surgical technique derived from our anatomico-surgical study. The initial results obtained using this dissection technique are also reported.

Anatomical Consideration

We have described in detail in a previous report the anatomy of the pterional-zygomatic region vis a vis the temporal muscle fasciae, the temporal fat pads and the temporal branch of the facial nerve³. Briefly stated the galea from the fronto-temporal region thins out toward the zygomatic arch to blend with the subcutaneous tissue. The superficial temporal fascia, a relatively thick fascial investment of the temporalis muscle, attaches inferiorly to the fronto-zygomatic bone and to the zygomatic arch. The antero-inferior portion of the superficial temporal fascia splits into 2 layers in between which there is some adipose tissue (intrafascial fat pad). Small vessels and, occasionally, a twig of the temporal branch of the facial nerve are also contained in this intrafascial fat pad. The deep temporal fascia, very thin, covers the temporalis muscle. Other authors refer to the galea of the temporal region as to the temporo-parietal or superficial temporal fascia and to the superficial temporal fascia as to the deep temporal fascia⁸. In addition to the intrafascial fat pad there are 2 other fat pads in the region. One is found superficially in the subcutaneous tissue (superficial fat pad), while the other one is found beneath the superficial temporal fascia, between this fascia and the temporalis muscle (deep fat pad). The temporal branch of the facial nerve pierces the parotid fascia slightly anterior to the middle

of the zygomatic arch, always anterior to the superficial temporal artery stem. From there on this nerve is located in the subgaleal space, always superficial to the superficial temporal fascia³.

Surgical Technique

A bicoronal or a reverse question mark skin incision may be used. The lowermost portion of the incision extends 1 cm below the zygomatic arch immediately anterior to the tragus. Inferiorly, below the zygomatic arch, the incision is carried only through the skin and subcut, remaining posterior to the superficial temporal artery trunk while superior to the zygomatic arch, the incision is carried to the superficial temporal fascia.

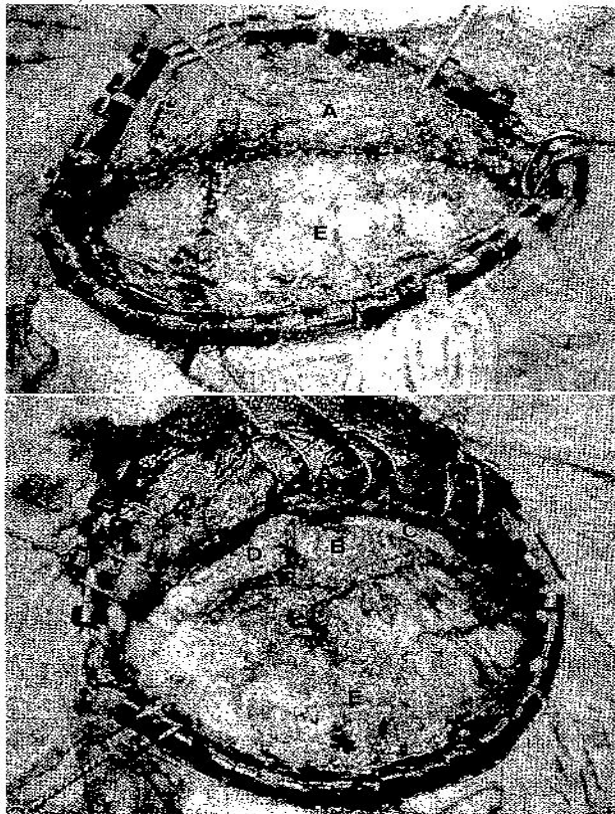


Fig. 1. Intra-operative photograph showing the soft tissue dissection to expose the pterional-zygomatic area. Initial stage (top); final stage (bottom). *A* superficial temporal fascia; *B* deep fat pad; *C* zygomatic arch; *D* fronto-zygomatic bone; *E* temporalis muscle

The superficial temporal fascia is then incised and separated from the temporalis muscle covered by the deep temporal fascia. Inferior to the zygomatic arch the incision is carried deeper to the parotid fascia and is carried only inferiorly enough to have control of the inferior border of the arch (Fig. 1). The dissection is then carried anteriorly, always remaining in this subfascial plane. In doing so one develops a combined scalp and superficial temporal fascia flap that may be extended all the way to the orbit after having released the anterior insertions of the superficial temporal fascia. This flap fully exposes the temporal muscle covered by the deep temporal fascia (Fig. 1). The zygomatic arch may then be transected and the temporal muscle dealt with in the usual way.

Results

This subfascial approach has been used 10 times in various lesions requiring a pterional or pterional-transzygomatic craniotomy, including neoplastic and vascular lesions. There was no evidence of temporal branch paralysis (Fig. 2).

Discussion

Subgaleal dissection of the pterional region is associated with a 30% incidence of temporal branch palsy¹⁰. In order to avoid this paralysis Yaşargil developed and proposed a dissection route between the 2 layers of the superficial temporal fascia¹¹. His results have not always been reproducible⁴ probably due to anatomical variation in the subgaleal course of the temporal branch of the facial nerve and to difficulties in exactly defining the 2 layers of the superficial temporal fascia³. Exposure of the pterional region obtained via a myocutaneous flap virtually eliminates facial nerve palsy at the expense of a decreased exposure due to the bulky temporalis muscle¹¹.

The surgical technique that we have described is easy to perform due to the obvious anatomical landmarks used (superficial temporal, temporalis muscle) and has not been associated, in our initial experience, with paralysis of the temporal branch of the facial nerve. In addition this surgical technique may provide wide exposure of the pterional-zygomatic arch region.

Conclusion

We submit this subfascial technique as a useful adjunct to standard exposures of the pterional-zygomatic arch region. Its advantages lie in its simple execution



Fig. 2. Preoperative photograph showing functional preservation of the temporal branch of the facial nerve

completed with preservation of the temporal branch of the facial nerve and with extensive exposure of the pterional-zygomatic arch area.

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