

Critical analysis of pre-temporalis approach for pterional craniotomy.

S Dimou¹, J Laidlaw²

¹Department of Neurosurgery, Christchurch Hospital, Christchurch, New Zealand
²Department of Neurosurgery, Royal Melbourne Hospital, Parkville, Victoria, Australia

Introduction

Pterional craniotomy, with removal of the sphenoid wing for improved access to the basal cisterns, is the most common means of accessing intracranial aneurysms. However, the bulk of the anterior part of temporalis often obstructs the surgeon's anterior view, particularly of the medial Sylvian fissure. Dividing temporalis also predisposes to post-operative wasting of its anterior part and is poorly suited to orbitozygomatic (OZ) approach. Subgaleal or interfascial dissections risk injury to the frontalis nerves. We describe a subfascial, pre-temporalis approach for pterional craniotomy that improves line of sight to the cisterns, minimising retraction, and prevents temporalis wasting. It is also ideally suited for OZ craniotomy.

Technique

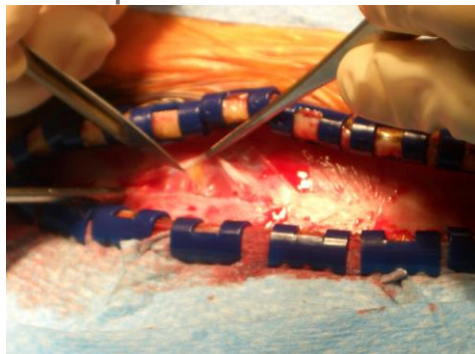


Fig. 1 - Temporalis fascia and frontal pericranium incised in line with scalp incision, protecting the intact temporalis muscle deep to temporalis fascia



Fig. 2 - Sharp periosteal elevator used to free temporalis and pericranium at superior temporal line – NB. temporalis remains intact

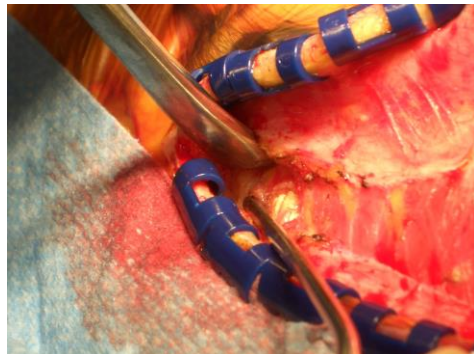


Fig. 3 - Temporalis fascia divided over zygomatic arch and then pushed anteriorly with periosteal elevator to mobilise scalp flap – can be continued to body of zygoma for OZ approach

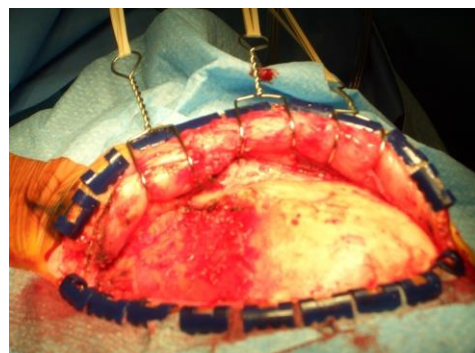


Fig. 4 - Following sharp subfascial dissection anteriorly, temporalis muscle has been exposed

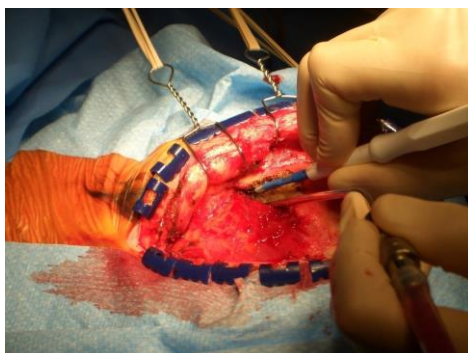


Fig. 5 – Temporalis is now detached anteriorly and superiorly with monopolar at very low setting – Note: no cutting of temporalis

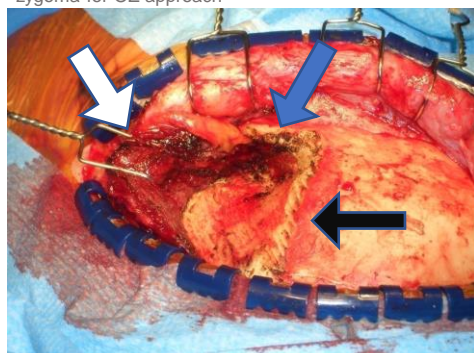


Fig. 6 – Temporalis detached. NB. Exposure of plane of lateral orbital wall (blue arrow); superior temporal line (black arrow) and temporalis (white arrow). Note no fascial cuff (poses high risk of frontalis nerve injury)

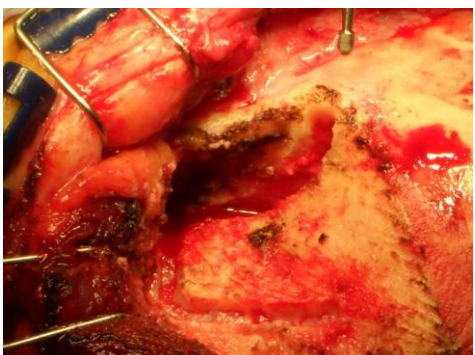


Fig. 7 – Small burr trough parallel to lateral orbital wall exposing anterior and middle fossa dura, and between these through base of sphenoid wing. Use craniotome or burr for other temporal cuts

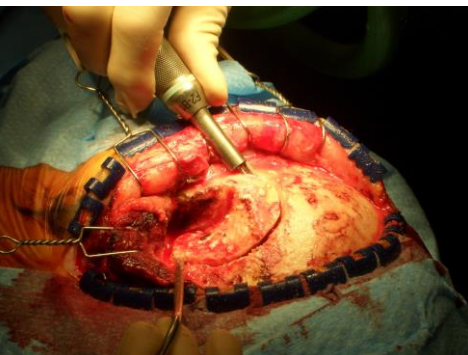


Fig. 8 – Frontal cut posterior to anterior with craniotome, angling it anterior-inferiorly to ensure external bone cut is within few mm of superior orbital margin



Fig. 9 - Bone deep to the anterior angled cut can be drilled in continuity with base of sphenoid wing with no cosmetic defect allowing improved subfrontal access

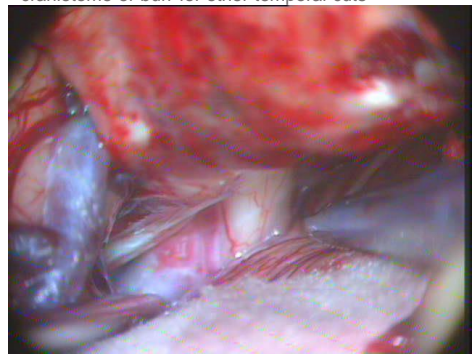


Fig. 10. Improved exposure of basal cisterns

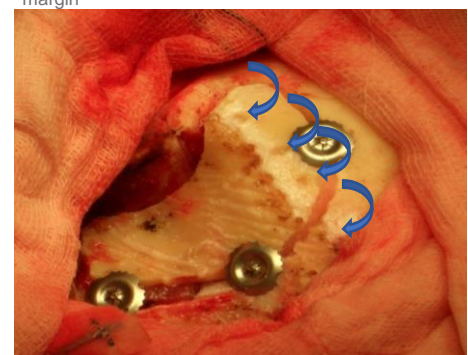


Fig. 11 – Cranioplasty. NB: holes drilled at superior temporal line (blue arrows), for secure temporalis re-attachment.

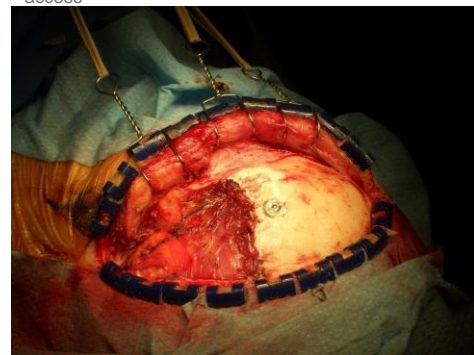


Fig. 12 – Anatomical reconstruction of temporalis, sutured into superior temporal line.

Discussion

While the original description of the approach to pterional craniotomy by Yasargil et al. (1976) advocated an interfascial dissection, some, argued that this approach placed the frontalis nerve at risk (Aoki, 1987). In addition, the need to coagulate middle temporal artery & vein in this technique has also been speculated as cause for frontalis nerve damage (Horimoto et al., 1992). Spetzler & Lee (1990) described a modified incision and reconstruction of temporalis but their technique saw temporalis divided & reflected anteriorly together with the scalp flap. A similar approach to ours has been previously described (Horimoto et al., 1992), but not gained widespread use. Our approach, in a single surgeon series over 2 decades, has seen only two cases of temporary frontalis paresis (thought to be due to scalp retraction hooks). Cosmesis has been dramatically improved with minimal temporalis atrophy, and the intracranial exposure improved.

References

- Yasargil MG, Antic J, Laciga R, Jain KK, Hodosh RM, Smith RD. Microsurgical pterional approach to aneurysms of the basilar bifurcation. *Surg Neurol*. 6:83-91, 1976
Aoki N. Incision of facial nerve branch at aneurysm surgery. *J Neurosurg* 66:482, 1987
Horimoto C, Toba T, Yamaga S, Tsujimura M. Subfascial temporalis dissection preserving the facial nerve in pterional craniotomy. *Neurol Med Chir (Tokyo)* 32: 36-37, 1992
Spetzler RF, Lee KS. Reconstruction of the temporalis muscle for the pterional craniotomy. Technical note. *J Neurosurg* 73:636-637, 1990