The Trans-zygomatic Trans-mandibular Approach: A Step-by-Step Cadaveric Study and Review of the Literature

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INTRODUCTION

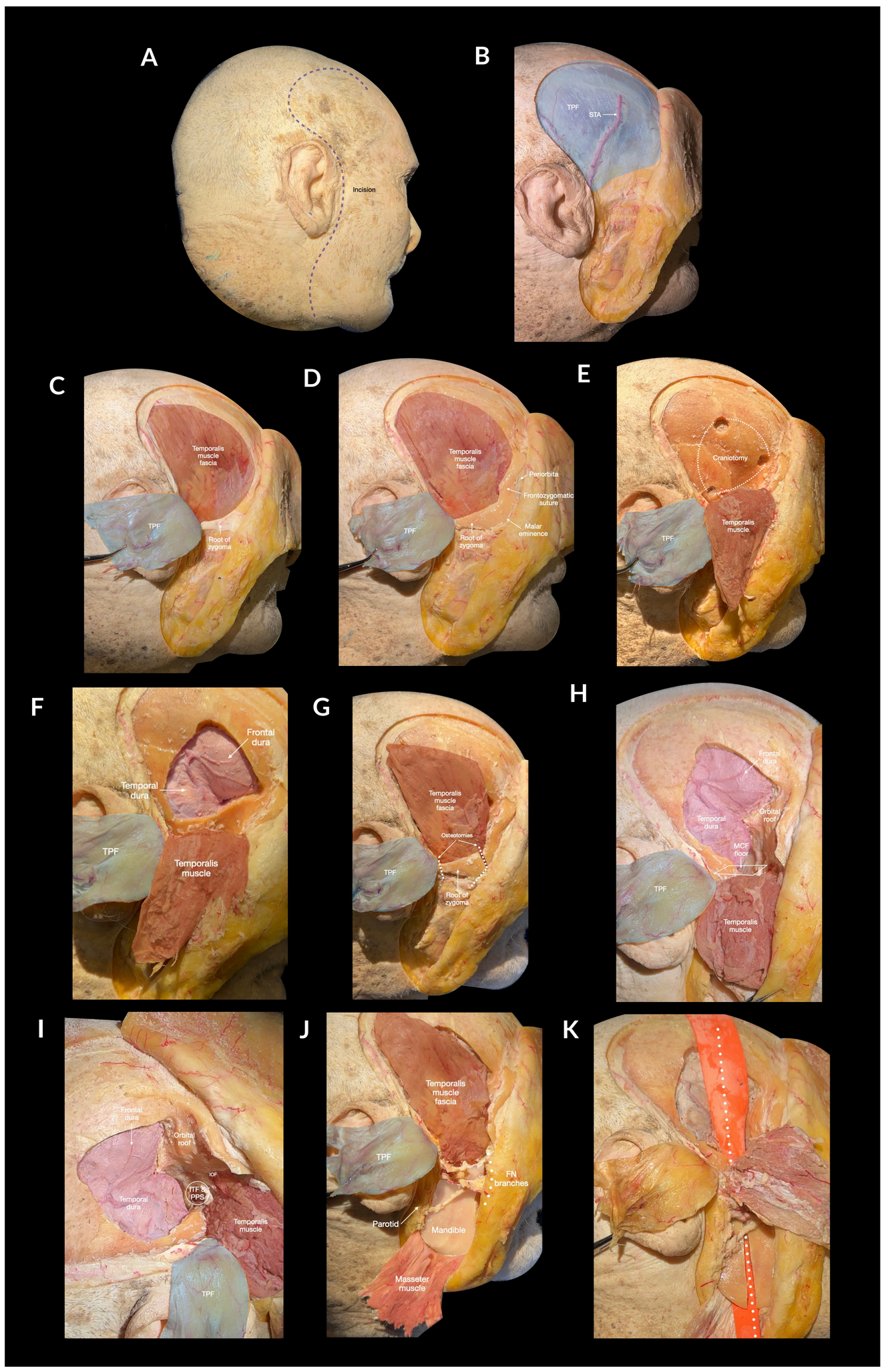
The trans-zygomatic trans-mandibular approach allows access to the infratemporal fossa and parapharyngeal space. It has been described with different adaptations based on the lesion's extension and each surgeon's technique. Relatively common, it has been described in conjunction with a frontotemporal craniotomy, allowing for dissection and control at the middle cranial fossa. With the inception of endoscopic skull base surgery, the indications for this approach are now limited; yet, with the ample range of maneuverability it offers, it should be considered for large lesion that cannot be handled within the restrictions of the endoscopic corridor.

METHOD

Using an embalmed human cadaveric specimen, a step-by-step dissection of the trans-zygomatic trans-mandibular approach was performed. Additionally, a review of the literature was conducted using the search terms "Zygomatic transmandibular approach" AND "Infratemporal fossa" in Pubmed, Google Scholar, and Cochrane. Articles published until 2024 were screened based on the following criteria: (1) Contains a description of the surgical approach and (2) Presents at least one clinical case with description of the lesion's extension and histology. From the included articles, surgical approach, combination of techniques, and postoperative morbidity variables were assessed.

RESULTS

A step-by-step dissection of the zygomatic trans-mandibular approach was performed through the following sequence: (A) curvilinear frontotemporal incision with preauricular and neck extension, (B-D) harvest of temporoparietal fascia and temporalis muscle flaps, (E-F) frontotemporal craniotomy, (G) zygomatic root osteotomies, (H-I) drilling of the greater sphenoid wing and (J-K) detaching the masseter and medial pterygoid muscles, exposing the mandible for osteotomy and mobilization. A total of 63 articles were encountered through the search. Of these, 16 articles were reviewed following abstract screening. After full-text anaylsis, 5 articles met inclusion criteria. Data from 16 patients were reviewed, with a mean age of 35.2 years (±17.7). The cohort included 9 females and 7 males. Pathologies surgically managed through this procedure commonly included clivus chordoma, meningiomas, and trigeminal schwannomas. Greatest tumor dimension presented a mean (SD) of 9.8 cm (2.4 cm). Postoperative morbidity was related to trigeminal and facial nerve dysfunction in addition to mastication complications.



Tumor Type	M	(SD)
Trigeminal schwanoma	4	(25)
Invasive melanoma	1	(6.25)
Giant cell tumor of bone	1	(6.25)
Ameloblastoma	1	(6.25)
Aneurysmal bone cyst	1	(6.25)
Clivus chordoma	3	(18.75)
Plexiform neurofibroma	1	(6.25)
Nasopharyngeal angiofibroma	1	(6.25)
Dermatofibrosarcoma protuberans	1	(6.25)
Adenoid cystic carcinoma	1	(6.25)
Malignant meningioma	1	(6.25)

Presenting symptoms	M	(SD)
Local growth	8	(50)
Dysphagia	7	(43.75)
Dysphonia	7	(43.75)
Dyspnea	1	(6.25)
Hearing loss	3	(18.75)
Headache	3	(18.75)
Seizures	1	(6.25)
Proptosis	1	(6.25)
Facial palsy	1	(6.25)
Diplopia	1	(6.25)
Facial deformity	2	(12.5)
TMJ discomfort	1	(6.25)
V2 hypoesthesia	2	(12.5)
V3 hypoesthesia	3	(18.75)
Trismus	1	(6.25)
Tinnitus	1	(6.25)

Extent of resection	M	(SD)
Total	12	(75)
Subtotal	3	(18.75)
Partial	1	(6.25)

Complications	M	(SD)
Chewing problem	6	(37.5)
Facial palsy	4	(25)
Hypoglossal palsy	1	(6.25)
Epidural hematoma	1	(6.25)
Skin flap necrosis	1	(6.25)
V3 hypoesthesia	2	(12.5)
V3 anesthesia	1	(6.25)
V2 hypoesthesia	3	(18.75)
Cosmetic difigurement	1	(6.25)
Diplopia	1	(6.25)
Airway occlusion	1	(6.25)

CONCLUSION

The trans-zygomatic trans-mandibular approach allows resection of large lesions with parapharyngeal and infratemporal fossa extension, including clivus chordomas, cutaneous malignancies, parotid tumors, and juvenile angiofibromas. This approach offers a visual and operative trajectory that improves vascular control. In addition, it allows management of dumbbell like lesions that occupy both the middle cranial fossa and infratemporal fossa, as is the case of some trigeminal schwannomas.