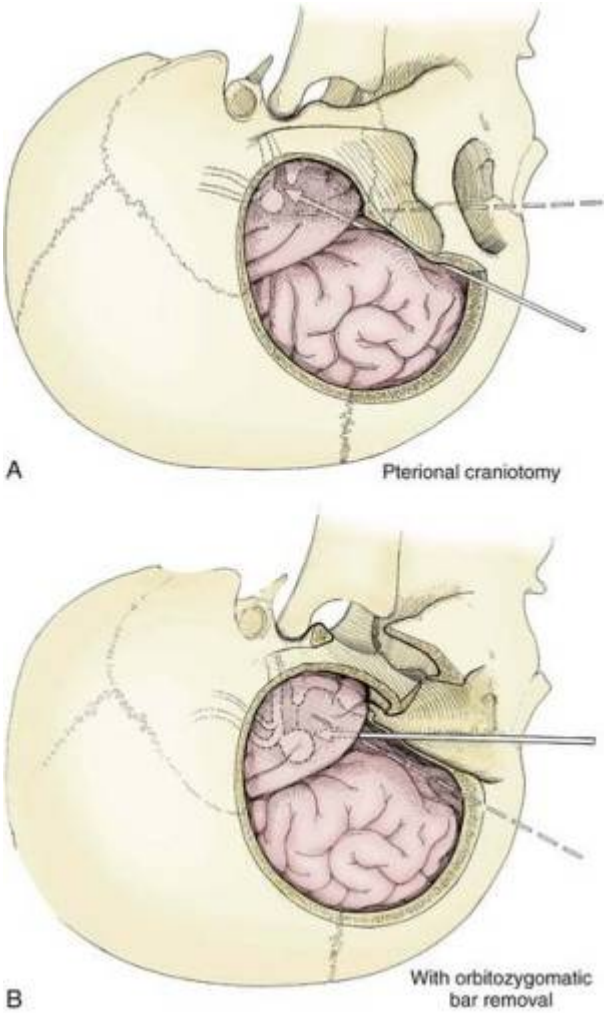
Orbitozygomatic approach

- Surgical treatment of orbitocranial and orbital cavernous venous malformations (ophthalmological aspects)
- Exoscopic Clipping of a Superior Cerebellar Artery Aneurysm via a One-Piece Orbitozygomatic Approach: Educational Operative Video
- Endoscopic transorbital approach for the management of spheno-orbital meningiomas: A systematic review and meta-analysis
- Volume of Operative Maneuverability as a New Measurement in Neuroanatomical Research: A Methodological Quantitative Study and Translational Use in the Operating Room
- Retrograde thrombosis of the superficial sylvian vein following liquid adhesive hemostat use during craniotomy: illustrative case
- Multiple Paraclinoid Aneurysms and Basilar Tip Clipped by the Same Orbito-Zygomatic Approach: 2-Dimensional Operative Video
- Approaches for the Minimally Invasive Resection of Chiasmatic Cavernous Hemangioma: Analysis of 56 Cases in the Literature
- Modified Orbitozygomatic Craniotomy Approach for a Recurrent Orbital Tumor in a Pediatric Patient



The orbitozygomatic approach (OZA), along with the pterional approach, is one of the most versatile anterolateral approaches to the skull base. The terms “unilateral transbasal” and “orbitozygomatic infratemporal” are synonyms of the term “orbitozygomatic”. Currently, orbitozygomatic approaches comprise a group of surgical approaches to the skull base that suggest involvement of elements of

the orbital walls (superior and lateral) and zygomatic bone into the bone block formed during osteotomy. The OZA, which has integrated several limited basal approaches (pterional, supraorbital, zygomatic), is a combined anterolateral approach that perfectly matches the conceptual principle of skull base surgery — to minimize brain retraction. Like any other approach to the skull base, the OZA provides a wide view, short distance to the target region, direct approach, and opportunity to work at various angles, with injury to and retraction of critical neurovascular structures being minima [1].

Indications

Orbitozygomatic Approach Indications.

Modifications

Currently, two classic OZA modifications are used: the one-piece (a bone flap includes the zygomatic process of the frontal bone, frontal process of the zygomatic bone, 1/2 or 1/3 of the zygomatic bone body, temporal process of the zygomatic bone, and zygomatic process of the temporal bone) and the two-piece OZA (an orbitozygomatic bone flap is supplemented by pterional and frontotemporal craniotomy). The two-piece OZA provides a better view of the basal portions of the frontal lobe and reduces the risk of enophthalmos and cosmetic defects [2].

Keyholes

The one-piece orbitozygomatic (OZ) approach is traditionally based on the McCarty keyhole.

Spiriev et al., present the use of the sphenoid ridge keyhole and its possible advantages as a keyhole for the one-piece OZ approach. Using transillumination technique the osteology of the sphenoid ridge was examined on 20 anatomical dry skull specimens. The results were applied to one-piece OZ approaches performed on freshly frozen cadaver heads. We defined the center of the sphenoid ridge keyhole as a superficial projection on the lateral skull surface of the most anterior and thickest part of the sphenoid ridge. It was located 22 mm (standard deviation [SD], 0.22 mm) from the superior temporal line; 10.7 mm (SD, 0.08 mm) posterior and 7.1 mm (SD, 0.22 mm) inferior to the frontozygomatic suture. The sphenoid ridge burr hole provides exposure of frontal, temporal dura as well as periorbita, which is essential for the later bone cuts. There is direct access to removal of the thickest (sphenoidal) part of the orbital roof, after which the paper-thin (frontal) part of the orbital roof is easily fractured. The sphenoid ridge is an easily identifiable landmark on the lateral skull surface, located below the usual placement of the McCarty keyhole, with comparative exposure [3].

Indications

The approach has been widely adopted by skull base centers for the management of neoplastic lesions [4]. , but has seen only limited use in vascular surgery [5].

The orbitozygomatic approach (OZA) has been useful in accessing basilar apex aneurysms, especially in cases where it is in a high position, because this approach can facilitate upward and oblique viewing from below through the wide operative space.

However, the OZA needs additional removal of the orbital rim and zygomatic arch, in addition to standard pterional craniotomy, which increases invasiveness, the risk of facial nerve palsy, temporal muscle atrophy, and deformity after surgery, and results in an extended operative time. Appropriate selection of the OZA requires indications that have yet to be established. The trajectory to BX aneurysms in the interpeduncular or prepontine cisterns has been suggested to be related to not only the height of the apex of the basilar artery (BA), but also the height and lateral breadth of the bifurcation of the internal carotid artery (ICA).

Simulation using 3D-CTA appears to be important for planning the surgical approach for the treatment of BX aneurysms [6].

Sphenoid wing meningiomas undergoing extensive skull base approach (FTOZ) and gross total resection (GTR) had a low recurrence rate and higher recurrence-free (RFS) survival . Even though FTOZ with GTR is preferable to resect the sphenoid wing meningiomas, the procedure should be tailored to each patient depending on the risks and surgical morbidity [7].

Reconstruction

The reconstruction after the OZ approach is as important as the performance of the surgical technique. Attention to anatomical details and the stepwise reconstruction are a prerequisite to the successful preservation of function and cosmesis [8]

Complications

Oculocardiac reflex OCR occurs in nearly one-third of patients who undergo the OZ approach. However, simple cessation of orbital manipulation is sufficient to normalize the patient's heart rate. Rarely is medical management required or does there appear to be any significant postoperative ramifications [9].

The mini-pterional and mini-OZ approaches, as currently performed in select patients, provide less tissue traumatization (i.e., less temporal muscle manipulation, less brain parenchyma retraction) from the skin to the aneurysm than standard approaches. Anatomical quantitative analysis showed that the mini-OZ approach provides better exposure to the contralateral side for controlling the contralateral parent arteries and multiple aneurysms. The mini-pterional approach has greater surgical freedom (maneuverability) for ipsilateral circle of Willis aneurysms [10].

Case series

2016

Twenty-seven patients had vascular lesions and twenty-two suffered for intracranial skull base tumors. The vascular lesions varied from cavernous angiomas inside the mesencephalum, high

bifurcation basilar tip aneurysms, superior cerebellar arteries aneurysms and arteriovenous malformations in the interpeduncular cistern. Skull base tumors as meningiomas, interpeduncular hamartomas and third ventricle floor gliomas were among the neoplastic lesions approached. We had no permanent injuries and minimal transient complications had occurred.

It is a descriptive text, organized in the sequence of the main stages in which such a craniotomy is performed, describing in details the technique in which this group of evolutionarily authors came to accomplish the task [11)].

1998

In 1998, J. Zabramski et al. presented a large study (83 cases) on the use of their own OZA modification, in which the bone block was separated with a minimal bone loss, which enabled full restoration of the facial skeleton contours at the end of surgery.

At a follow-up evaluation after a period averaging 14 months, all patients were pleased with the cosmetic results of this approach [12)].

Case reports

A nasopharyngeal carcinoma arose in a 52-year-old patient and occupied the right middle skull base extending to the ICA. We first identified and dissected the ICA from the posterolateral part of the tumor using a transcervical approach. Then, the tumor was approached and removed by an orbitozygomatic technique with hemifacial dismasking. The surgical defect was filled using a temporal muscle flap, which was divided into two parts according to the blood supply from either the anterior or the posterior deep temporal artery.

The postoperative course was uneventful and favorable cosmetic results were obtained. The patient has been free of carcinoma for more than 40 months after the surgery.

This new combined approach might be a good option for selected patients with nasopharyngeal tumors [13)].

A 52-year-old male with progressive, marked unilateral proptosis due to a multilobulated orbital mass, secondary to biopsy-proven plexiform neurofibroma (PN). Acute worsening of proptosis leading to corneal abrasion, diplopia, and pain required debulking surgery, for which an orbitozygomatic approach was utilized. Genetic testing for NF-1 revealed no mutation. This rare case of NF-negative orbital PN and multidisciplinary treatment considerations for expansile orbital tumors are discussed [14)]

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