

# 8.1 Practical Tips to Perform the Subcranial Approach

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### PEARLS

- The subcranial approach is a multidisciplinary team effort.
- Use broad-spectrum antibiotic treatment perioperatively to reduce complications.
- Insert a lumbar drain after administering anesthesia to facilitate frontal lobe retraction and to reduce the risk of postoperative cerebrospinal fluid leak.
- Improve patient satisfaction by performing surgery without facial incisions, tracheostomy and shaving the hair.
- In cases of massive involvement of the palate, the pterygomaxillary fossa or the orbital apex, use combined approaches.
- Whenever possible, preserve one or both sides of the olfactory filaments.

### PITFALLS

- Avoid impairment of nasal breathing by preserving the distal third of the nasal bone.
- Confirm a tight dural seal in order to prevent cerebrospinal fluid leak.
- Immediate extubation is required to allow continuous neurological monitoring.
- Never ventilate a patient with a positive pressure after extubation in order to avoid life-threatening tension pneumocephalus.
- Admit the patient to an intensive care unit for 24 h after surgery.

### Introduction

The concept of a broad subcranial approach to the entire anterior skull base was first introduced as an alternative to the traditional craniofacial approach. The subcranial approach has several major advantages. (1) It affords a broad exposure of the anterior skull base from below rather than through the transfrontal route. (2) It provides an excellent access to the medial orbital walls and to the sphenothmoidal, nasal and paranasal cavities. (3) It allows simultaneous intradural and extradural tumor removal and safe reconstruction of dural defects. (4) It does not require facial incisions. (5) It is performed with minimal frontal lobe manipulation.

### Practical Tips

① *Preoperative Evaluation and Anesthesia.* All patients scheduled for surgery should be evaluated preoperatively by a multidisciplinary surgical team. Radiological evaluation should include computed tomography (CT) and magnetic resonance imaging. Positron emission tomography-CT is also recommended [1]. Broad-spectrum antibiotics consisting of a combination of cefuroxime, vancomycin and metronidazole are instituted perioperatively. No tracheostomy is required unless free flap reconstruction is performed [2]. A lumbar spine catheter is inserted for cerebrospinal fluid drainage after administering anesthesia.

② *The Surgical Technique of the Subcranial Approach.* The skin is incised above the hairline and a coronal flap is created in a suprapariosteal plane [2]. The flap is elevated anteriorly beyond the supraorbital ridges. The pericranial flap is elevated up to the periorbits, and the supraorbital nerves and vessels are carefully separated from the supraorbital notch. The lateral and medial walls of the orbits are exposed, and the anterior ethmoidal arteries are clipped. Titanium mini-plates are applied to the frontal bones and removed before performing the osteotomies to ensure the exact repositioning of the bony segments. An osteotomy of the anterior and posterior frontal sinus walls, together with the nasal bony frame, part of the medial wall of the orbit, and a segment of the superoposterior nasal septum is performed [3]. Part of the nasal bone is preserved in order to support the nasal valve. The tumor is extirpated at this stage and the dura or brain parenchyma is resected if involved by tumor. A unilateral or bilateral medial maxillectomy is performed from above if indicated, allowing direct visualization of the maxillary sinus [4]. By means of this approach, it is possible to safely and reliably access tumors involving the medial or superior walls of the maxilla. Multilayer fascia lata flaps are routinely used for reconstruction of the dura and skull. A centripetal compression method is used to reduce the telecanthus, and stenting of the nasolacrimal duct is performed.

③ *Postsurgical Treatment.* After surgery, the patient is extubated and transferred to the critical care unit for 24 h. Stool softeners are administered to reduce the risk of Valsalva-induced increased intracranial pressure. The lumbar drain is removed 3–5 days later and the nasal packing 7 days postoperatively. Routine CT is performed at the end of the procedure and again 1 week later.

### Conclusions

The subcranial approach is routinely used for extirpation of tumors involving the anterior skull base, allowing wide exposure, minimal brain retraction and no facial incisions. Detailed preoperative imaging, appropriate reconstruction, intensive postoperative care, and the cooperation of multidisciplinary teams are crucial to assure successful tumor resection and improved quality of life [5].

### References

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