



Lateral-Central Skull Base Tumor (Infratemporal Fossa/Middle Fossa)

Lateral-Central Skull base tumor:

Most tumors of the Lateral-Central skull base anatomy are benign and may arise in the jaw joint, from chewing muscles, from the saliva (spit gland), from nerves that go through the skull base (Schwannoma), from brain lining (meningioma), from skull base bone (cholesterol granuloma or cholesteatoma of petrous apex) and from other sources. Some tumors in this region are malignant, originating from tissue in the area or as a result of metastatic spread from other parts of the body. The absence of early symptoms may allow these tumors to become fairly large before discovery. Some cause pain, areas of numbness in the mouth, throat, or face, and some interfere with chewing. Double vision, hearing loss, dizziness, imbalance, facial weakness, swallowing problems, recurring headaches and many other symptoms are possible, depending on the tumor and what it affects. Lateral-central skull base tumors may extend into the eye area (orbit), may erode bone of the facial skeleton, may affect or destroy a portion of the jaw bone, may extend into the area behind the nose, may extend into the neck, and may involve major blood vessels and nerves of the region. Hearing may not be affected early, but the Eustachian tube can be blocked by the tumor causing ear fluid, pulsing noise and/or hearing loss. Tumor growth may eventually affect hearing, balance, facial muscle function, swallowing, tongue movement, shoulder movement, facial sensation, chewing function, and other nerve functions. As the tumor grows, it compresses and may invade the swallowing nerve, the voice nerve, the balance and hearing nerves, the facial nerve, and other nerves. Some extensive tumors may fill the middle ear, portions of the mastoid, extend deeper into the skull base and commonly extend into the upper neck. Some larger tumors grow into or may rupture into the brain cavity causing brain compression and/or chemical meningitis with headache. With larger tumors, deafness, imbalance, vertigo, facial paralysis, facial numbness, jaw movement dysfunction, and pain may also develop. Large tumors may also surround and invade the main artery to the brain, the internal carotid artery.

Methods of Surgery:

Removal of tumors from the skull base may be accomplished in several ways. An incision in front of the ear may extend into the scalp above and behind the ear into the neck below the ear. Moving the jaw out of its socket, sometimes sacrificing the hinge-joint of the jaw may be necessary in some cases. This is often done in conjunction with temporarily displacing a bony arch over the jaw bone, the zygomatic arch. Removal or mobilization of the saliva gland on the side of the face (parotid gland) may be necessary in order to find and protect the nerve that makes the face to smile. When the brain cavity is involved, additional bone removal above the outer ear may be necessary. Less commonly, an approach goes through the ear canal. The tumor along the course of the skull base pathway of the main artery to the brain may require relocating this artery, removing it, or even replacing it in unusual cases. More extensive highly specialized approaches may sometimes be employed for tumors that have extended more deeply into the skull base and adjacent areas of the brain cavity or skull base. In some cases, tumor removal from the brain covering or from inside the brain cavity may enter spinal fluid spaces which may require tissue, fat or muscle covering (fascia) from the leg or abdomen for repair. The common goal of all of the surgical approaches is to remove tumor while preserving as much normal or near normal nerve function as possible. Ask the surgeons for the specific details that apply to your tumor situation.

Alternatives to Tumor Removal:

Some tumors in the skull base may not grow or may grow only very slowly. For these, observation rather than surgery may be a reasonable choice. **Radiotherapy (radiation)**, also called **radiosurgery**, may stop the tumor from continuing to grow but does not remove the tumor and typically does not change tumor size. Some skull base tumors may not be appropriate for radiotherapy. Damage to the bone of the ear canal, **osteoradionecrosis**, may be a delayed complication of radiotherapy and may necessitate later surgical correction that would close the ear canal and cause a severe hearing loss in the radiated ear.

General Considerations:

In some cases, the incision extends into the lateral-mid neck. In larger tumor cases, the facial nerve may need to be mobilized which may result in temporary facial paralysis. In unusual cases, a portion of the facial nerve may need to be removed and replaced by a nerve graft because of tumor invasion. The facial nerve recovers function in almost all cases, but frequently not back to perfect. Some facial weakness may be permanent. In such cases, specialized eye care may be necessary. Feel free to ask the surgeon to demonstrate the surgery pathway on a plastic skull.

For some tumors, a radiologist may perform an **arteriogram with embolization** in order to plug up the blood supply of the tumor. Plugging up the blood vessels inside the tumor decreases blood loss with tumor removal and improves the surgeon's ability to work around the tumor. You may be a candidate for **preoperative blood donation** in order to lessen the potential need to use someone else's blood, should you need a blood transfusion. Please feel free to ask about autologous blood transfusions, directed blood donations from friends and family, and ask about alternatives to use of blood transfusions.

Surgical Considerations:

Before Surgery: Avoid aspirin, Advil, Motrin, Aleve, Celebrex, Vioxx, or similar non-steroidal anti-inflammatory medication for at least five days and preferably two weeks before surgery. These medications increase bleeding risk. Ask the doctor if any other medications will need to be changed before surgery.

After surgery: Do not use aspirin, Advil, Motrin, Aleve, Celebrex, Vioxx, or similar non-steroidal anti-inflammatory medication for two weeks after surgery. These and other **arthritis medications may cause bleeding. No nose blowing** for a minimum of two (2) weeks. Open mouth to **sneeze** for two (2) weeks. Do not stop a sneeze by squeezing your nose. You may wash the incision with soap and water and coat it with antibiotic ointment. Some patients are **dizzy** and have some **headaches** for a while after surgery. **Chewing** may be painful or tender right after surgery.

The teeth may not fit together in a normal fashion, particularly if the jaw bone has to be moved or cut in order to do the surgery. You may need to see an oral surgeon, dentist, or oral prosthetics person to assist with jaw motion if tumor removal has a major impact on jaw

motion. If the **face** is paralyzed or weak after surgery, eye drops and eye ointment and eyelid surgery may be necessary in order to resume normal activities. **Tiredness** commonly follows major surgery. Resume **driving** and **return to work** when dizziness and/or lightheadedness have improved sufficiently and if your job activity fits within lifting restrictions, listed below.

Dizziness after surgery usually improves more rapidly the more active you are. Avoid ladders, step stools, and unprotected heights until you can move quickly in any direction without dizziness or lightheadedness. The more quickly you work back into normal routines, the more quickly you will feel better and energy will return. **Avoid lifting** more than 10 pounds for two weeks after surgery. Then, you may resume normal lifting the activity unless the doctor has indicated a reason to continue to avoid lifting. If spinal fluid spaces were entered during the surgery, you will need to avoid lifting over 10 pounds for six weeks and not over 30 pounds until the doctor releases you.

General Risks of Lateral-central skull base tumor removal:

Numbness in the scalp above and around the ear is common and may improve in a couple of years. **Jaw movement** may be impaired after surgery and may require the services of a dental specialist with or without dental appliances or dental surgery. **Headache** may be bothersome for a while, particularly if jaw movement is impaired, but generally settles down in days to weeks. **Numbness** inside the cheek and floor of the mouth, numbness of the chin, and numbness along the external lower jaw line may be permanent after surgery. **Weakness** or **paralysis** of the nerve that makes the **face to smile** can be a side effect of tumor surgery. A delayed onset facial paralysis can develop after leaving the hospital. The face recovers to normal or nearly normal in most cases, but, in some, facial movement may be permanently impaired. In some cases, the facial nerve may need to be repaired or replaced either at the time of the tumor surgery or on a delayed basis in a separate operation. In the event of facial nerve weakness or paralysis, **special eye precautions** will be necessary and more surgery to protect the eye may become necessary. **Dizziness** is common after surgery and usually improves within a few weeks. More persistent dizziness bothers some patients permanently, especially if the other ear also has a major hearing and balance problem. **Ring**ing in the ear is sometimes a noticeable nuisance after surgery, but may also be improved by surgery. Further **hearing impairment or even deafness** in the operated ear may occur even when the surgeon attempts to save. **In some skull base approaches**, the residual hearing is sacrificed as part of the surgery. A **hearing aid** may not be an option on the operated side, but sometimes, a hearing aid that routes the hearing to the residual hearing ear may be possible. A **cochlear implant** to restore some hearing may sometimes be possible if both ears are deaf. **Taste** for sweet, sour, salt, and bitter on the side to front of the tongue may be altered by surgery and may not recover back to normal, but symptoms usually settle down within six months. Ability to smell is not affected by ear surgery. **Infection** called meningitis may develop after surgery with a general risk of less than 1% of our tumor surgery experience. ***If you think you have an infection, with wound swelling wound drainage, or fever, call the doctor right away.*** **Spinal fluid may leak** through the wound or through the mastoid bone into the nose. If spinal fluid leakage persists, the surgeon may elect to place a spinal fluid drain into the lower back for a few days. If the drain does not solve the problem, more surgery may be necessary to stop the spinal fluid leakage. Spinal fluid leakage may predispose to infection and other serious problems. **Other uncommon problems** after medium to large tumor removal may include trouble swallowing, weakness of the voice and shoulder because of surgical removal of tumor from these nerves. Walking and/or coordination problems may occur if the tumor must be removed from the brain-cerebellum. **Stroke**, excessive bleeding and blood collection inside the head, and death are possible but unlikely. **Blood transfusions** are not usually needed, but would pose transfusion related risks (see the hospital blood transfusion informed consent document for more details). When an **arteriogram with embolization** is necessary, potential, uncommon side effects may include facial weakness, stroke, and other nerve problems. **Anesthesia** has its own risks that the anesthesia doctor will discuss with you. **General medical conditions** that affect the heart, circulation, breathing, and urination can all be aggravated by surgery of any kind. Men who have bladders and prostate glands sensitive to certain medications may need bladder catheterization after surgery of any kind.

Patient/Guardian Statement: The patient or patient's guardian and/or legal representative state by signing below that the doctor has discussed the surgery, alternatives, and major risks, that the above information has been communicated to the patient, guardian, and/or legal representative and that an opportunity to ask questions has been given. The consent form should not be signed until the patient, guardian, and/or legal representative have obtained a layman's understanding of the surgery and have obtained satisfactory answers to all questions. By signing the consent form, the patient, guardian, and/or legal representative indicate a layman's understanding of the surgery, potential alternatives to surgery, and reasons for surgery and indicate a desire to proceed. If the surgery has been explained in another language, the person who has translated must indicate by cosigning the document that all information from the doctor and from this consent form have been communicated to the patient, guardian, and/or legal representative and that all questions have been answered satisfactorily.

Patient printed name			Patient/guardian signature		Date Signed
Circle Ear to be operated	R	L	Doctor: Loren J Bartels MD FACS	Date of Surgery	
Witness			Guardian printed name		Translator
					Language