

SUMMER UPDATE 2009

OKLAHOMA SPINE & BRAIN INSTITUTE

MINIMALLY INVASIVE BRAIN AND SPINE SURGERY

by Dr. Frank Tomecek, M.D.

Exciting new minimally invasive cranial and spinal procedures are offered at the Oklahoma Spine and Brain Institute. Currently OSBI, paired with Hillcrest, is one of only a few centers across the United States able to offer this exciting alternative to more invasive cranial procedures.

Several new technological developments have recently changed the options for brain and spine surgery. Many of the advancements are aimed toward creating more minimally invasive options while maintaining the same or better efficacy. The coupling of modern day visualization systems (HD endoscopes and microscopes) with computer guided imaging systems has dramatically improved the ability to access traditionally open surgical lesions in a more minimally invasive fashion. Endoscopic techniques have in particular allowed the development and advancement of minimally invasive cranial approaches. Endoscopy and the development of tubular spine retractor systems have enabled the advancement of minimally invasive spine surgery.

Minimally Invasive Brain Surgery

A new procedure allows neurosurgeons at the Oklahoma Spine and Brain Institute to remove tumors or other lesions without need for a skin incision. Rather than a major skin incision, the tumor is removed less invasively through a patient's nose with only internal nasal mucosal incisions. This procedure is called endonasal skull base surgery.

Endonasal skull base procedures allow patients diagnosed with some tumors and other lesions fewer complications and a quicker recovery. It is a well tolerated operation that allows patients a faster recovery and a quicker return to normal life. Traditionally, many brain tumors were removed through more invasive skin incisions and craniotomies. While effective, these traditional methods typically create more post-operative pain and require additional recovery time.

The foundation of endonasal surgery involves the use of endoscopy for the resection of pituitary tumors. The advent of high definition endoscopy and other modern day technology has caused the expansion of this approach to include many tumors and other lesions that would otherwise require a craniotomy to treat. In this application surgeons found it a smooth transition to expand the anatomical corridors to treat lesions far distant from the pituitary. As these techniques evolve,

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Figure 1: A view of the spectacular visualization provided by high definition endoscopy.

more and more intra-cranial lesions will be treated this way. For now, this option is limited to a few centers around the country with experience in these approaches. OSBI is proud to be one of these centers. Figure 1 shows an overview of the spectacular visualization offered with high definition endoscopy, while figure 2 shows a close up of the instrumentation working down the nasal passages.

Appropriate lesions for endonasal surgery include midline tumors, cysts, compressive rheumatoid pannus, bone lesions, or encephaloceles. These midline lesions can be located from the most anterior aspect of the cranium, all the way to 3 centimeters below the foramen magnum. Tumors in this area include meningiomas, chordomas, pituitary tumors, esthesioneuroblastomas, epidermoid cysts and Rathke's cleft cysts to name a few. Selected more lateral lesions can be treated as well, as long as they are anatomically appropriate. Figure 3 shows the image guidance that is critical to minimally invasive cranial surgery. This image shows a large and extreme lateral chordoma being removed through what would have previously required a facial splitting procedure. This patient went home on post operative day number two.

Patients who have tumors removed in this less invasive fashion typically have a sense of nasal congestion or a cold that resolves over a period of days, offering days of recovery rather than weeks, a quicker return to normal life, and a lack of cosmetically altering incisions.

Experience with endoscopic technology with the endonasal approaches has proven advantageous for mini-open approaches as well. The use of the endoscope allows better visualization in cases where previously a remnant of lesion may have gone unnoticed. This is particularly useful for the treatment of trigeminal neuralgia where it is important not to miss an offending vessel causing this horrific pain syndrome.

Minimally Invasive Spine Surgery

Endoscopic and tubular retractor systems have also allowed the advancement of minimally invasive spine surgery for degenerative, traumatic, neoplastic and other spinal disorders. Use of minimally invasive tubular retractor systems, percutaneous fusion systems and other novel minimally invasive techniques allows for less soft tissue dissection, smaller incision, less bleeding and often shorter operative times. All of these factors contribute to a quicker recovery and return to normal life.

Traditionally, surgeons have performed spinal fusion procedures such as the TLIF, using an open surgical technique that involves making a midline incision and then stripping bands of muscle away from the spine and retracting the surrounding soft tissues for clear access to the

Figure 2: Instrumentation accessing the skull base through the patient's nasal passage.



vertebrae to be treated. Recent advances in surgical techniques and instrumentation, however, now allow surgeons to use a less invasive approach with tubular retractors, endoscopy and special instrumentation, making open surgery unnecessary in many cases. The surgeon docks a small tube on the spine using X-ray guidance as seen in figure 4. Working through this small portal allows the surgeon to complete the same tasks to the spine with less disruption to the soft tissues around the spine. Other minimally invasive spine procedures include the extreme lateral or direct lateral interbody fusion. These procedures offer similar potential for bone fusion as compared with an open anterior procedure, but do so with small incisions on the side of the flank.

Minimally invasive spine surgery, like traditional open spine surgery, requires careful planning and general anesthesia. Due to less soft tissue disruption, patients are often able to leave the hospital in 1-3 days versus 3-5 days for the open procedure. Studies from UCLA have shown a 5-10 fold reduction in blood loss, less post operative pain, shorter hospital stays and a quicker return to work.

Compared to traditional open spine surgery, minimally invasive spine surgery utilizes the knowledge of important anatomy, along with cutting-edge technology, to treat spinal conditions without causing undue injury to the surrounding soft tissues. Computer-assisted technology (such as computer navigation and nerve monitoring) and highly specialized tools and instrumentation, provide for safe and effective

Figure 4: Computer guided imaging allows safe and accurate localization of lesion.



treatment. While not indicated for every patient, those patients who are candidates for minimally invasive spine surgery have a wonderful opportunity for a more speedy recovery. The surgeons at the Oklahoma Spine and Brain Institute are

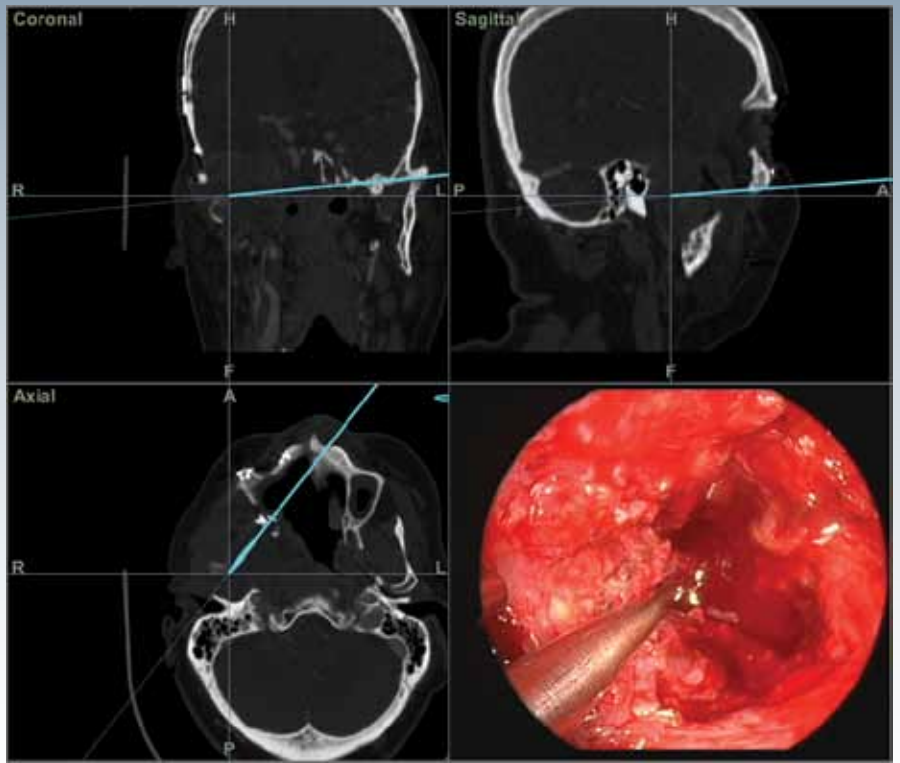


Figure 3: Computer guided imaging allows safe and accurate localization of lesion.

expertly trained in the indications and contraindications for the use of open and minimally invasive spine surgery.

In addition to his training at the Johns Hopkins Hospital Dr. Baird received additional training in cranial endoscopy under Amin Kassam, at the University of Pittsburgh Medical Center. There, he was able to learn the specialized techniques of endoscopic brain surgery and its full applications. For more information about new minimally invasive approaches to the spine and brain, contact us at this office or visit our website at www.osbi.net

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endoscopic and
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Here at Oklahoma Spine & Brain Institute, we are pleased to have served Eastern Oklahoma for the past 38 years from our Tulsa office. Since adding our Bartlesville office 14 years ago, we have recently added satellite offices in Miami, Pryor, Sallisaw, and Cushing, to grow and excel with high quality medical care.