Surgeons Partner In Unusual Surgery

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Otolaryngology surgeon Jayakar Nayak (left), and Stefan Mindea, neurospine surgeon, collaborated on a very unusual procedure to reach patient Sandi Wearing's brain stem by going through her sinuses. Here, Nayak begins a checkup on Wearing's sinuses as Mindea follows along. Norbert von der Groeben

You could easily say that Sandi Wearing's ability to speak — and she is as forthright as a 67-year-old can be — was saved by a football game and two Stanford Hospital [1] doctors who weren't afraid to try a surgery whose rarity belied its impeccable logic.

During a routine test, Wearing's local doctors had found a mass at the very top of her spinal column, where the brain stem, the body's neurological headquarters, begins its climb into the skull. That mystery lesion, they thought, might be what was causing Wearing's tongue to be crooked and her arms to be weaker.

Something was pressing on the nerves to her tongue and arms. Once Wearing arrived at Stanford, she found two physician-scientists, Stefan Mindea [2], MD, and Jayakar Nayak [3], MD, PhD, who would save her speech with a surgical procedure that reached her spine through her sinuses. Never before done at Stanford, the endonasal odontoidectomy has probably been done fewer than three dozen times worldwide. There are just a handful of medical centers anywhere that can accomplish this level of endonasal surgery.

"My husband and I decided we just couldn't let things get worse, that no good would come out of waiting," Wearing said. "I'm a pretty pragmatic person; you'll never see me agonizing over a paint color."

Last year, on the day of her procedure, 25 other physicians gathered for the chance to see the surgery on a live video, visible on monitors outside the OR. “It turns out a lot of our colleagues had heard about it,” Nayak said, “and were asking ‘What the heck are you guys doing?’”

Surgery of any kind near the brain stem carries precipitous risks of damage with catastrophic consequences. Traditionally, neurosurgeons have taken their instruments to that area only through the mouth or the side of the neck, although both procedures risk adverse effects on swallowing, breathing and speech and require a long recovery. Surgery on the frontal side of the spine has traditionally been done through the mouth, too, with longer recovery, more post-operative pain and increased risk of adverse effects.

At Stanford, however, endonasal surgery is thriving, with collaborations between several departments and programs. Mindea, who arrived in 2008, has been working to advance the development of new treatments for spinal tumors and metastases from other cancers. A clinical assistant professor of neurosurgery [4], he directs the Neurosurgery Department’s minimally invasive spinal surgery program and co-directs the spinal oncology surgery program. “Because I know what a difference a minimally invasive approach can mean to a patient,” Mindea said, “my goal is to incorporate such techniques for as many spinal disorder treatments as possible — for people who’ve been told their tumors can’t be removed, and for cancer patients whose bodies have been bombarded with all sorts of medications and radiation. For them, a much smaller incision has a better chance to heal quickly and that means a faster return to full activity.”

Nayak, an assistant professor with the Stanford Sinus Center [5], brings special advanced training in surgeries through and inside the nasal cavity and sinuses. He arrived at Stanford’s Otolaryngology Department [6] in 2009. He joined internationally-known endoscopic skull-base surgeon, Peter Hwang [7], MD, chief of the Division of Rhinology and Sinus Surgery. He and Nayak are co-directors of Stanford’s Sinus Center.

Surgeries like Wearing’s, and those that go through the sinus to the eye and the brain, have only been possible in the last decade or so, with new imaging technologies and new, extended surgical tools that were made to be more flexible, optically sharper and much smaller. The advantage of any such transnasal approach is that “for the right patient, you can get to a site of interest with much less pain and dissection through normal tissues,” Nayak said. “For the patient, this can translate to going home sooner and with much less pain and possibility of issues that go along with more traditional surgery.”

But serendipity also plays a big part in Wearing’s story. Mindea and Nayak didn’t know each other until they met by accident in a faculty lounge one evening, both awaiting the start of surgeries. They started talking about the football game on television and soon moved to other topics. Mindea, as it happened, had read the paper Nayak wrote about the transnasal spine work he’d done with key figures in transnasal surgery before he came to Stanford.

“I had no idea that Stanford brought you here,” Mindea told Nayak. He started talking about the challenge of a patient like Wearing and shared his frustration with the transoral route to the spine.

“There’s got to be a better way to do this,” he told Nayak. When Nayak said, with great enthusiasm, “I can get you there,” Mindea realized he’d finally found a partner to conduct a safer, more direct route to restore Wearing’s speech and remove the mass. The surgery’s official name: endonasal odontoidectomy.

Recent technology and techniques in endonasal surgery, Nayak said, made Wearing’s surgery possible, “and, my meeting with Dr. Mindea.”

Using extra-long tools, Nayak followed the landmark clivus bone through Wearing’s sinus about 12 centimeters from the nostril margins, until he neared her skull base and the first spinal vertebrae, C1. Then, Mindea took the lead. “I’m not an expert at where the vertebral arteries are like Stefan,” said Nayak, “and those are important for blood supply to the brain.”

All along the way, the optical scopes were being washed with automated irrigators to keep the view clear. Extended ultrasonic aspirators were rapidly vibrating diseased bone and soft tissues to be removed at such high frequency that they disintegrated and were easily suctioned up.

“I remember being on the table,” Wearing said. “When I came to, there were several doctors standing around and shaking each other’s hands.”

She knew her surgery had gone well, and she had much better sense of just what surgical artistry had been accomplished. She went home after just three days, walking comfortably, and barely using pain medications, but Nayak and Mindea forbade her to go on a scheduled camping trip. “You are our prize patient,” she said they told her.

And she’s again speaking freely.

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