

## Scarless Brain Surgery is New Option for Patients

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Surgeons at the University of California, San Diego, School of Medicine and University of Washington Medical Center have determined that transorbital neuroendoscopic surgery (TONES) is a safe and effective option for treating a variety of advanced brain diseases and traumatic injuries. This groundbreaking minimally invasive surgery is performed through the eye socket, thus eliminating the removal of the top of the skull to access the brain. These findings were published in the September issue of *Neurosurgery*. "By performing surgery through the eye socket, we eliminate the need for a full craniotomy, gain equivalent or better access to the front of the brain, and eliminate the large ear-to-ear scar associated with major brain surgery," said Chris Bergeron, MD, assistant professor of Surgery, Division of Head and Neck Surgery, at UC San Diego Health System. "This novel technique is also critical to protecting neurovascular structures such as the optic and olfactory nerves."

To achieve access, the surgeons make a small incision behind or through the eyelid. A tiny hole is then made through the paper-thin bone of the eye socket to reach the brain. This pathway permits repairs to be made without lifting the brain. The TONES approaches also protect the optic nerves, the nerves for smell, as well as the carotid and ophthalmic arteries.

"This approach has opened a new field of brain surgery," said study investigator, Kris Moe, MD, chief of the Division of Facial Plastic and Reconstructive Surgery and professor of Otolaryngology at University of Washington Medical Center. "The advantages to this transorbital approach are many, including reduced pain and decreased recovery time for the patient."

Transnasal surgery, a technique performed through the nose, offers similar access to some areas of the brain but means a more crowded operating environment for the surgeon than TONES. Moe, who pioneered the TONES in 2005, said the novel technique builds on the nasal approach but offers increased maneuverability and visibility for the surgical teams which usually require four sets of hands. In a traditional craniotomy, a large portion of skull bone is removed. With TONES, the area of bone removed is only two to three centimeters. The operating time is much shorter since the skull does not need to be repaired and there is no need to close a large incision.

Patients underwent the TONES procedure to repair cerebral spinal fluid leaks, optic nerve decompression, repair of cranial base fractures and removal of tumors. Given further research, the surgeons believe that TONES may serve as a means to treat pituitary tumors, meningiomas, and vascular malformations. TONES is currently performed at two of the world's top medical institutions: UC San Diego Medical Center and the University of Washington Medical Center.

Researchers included Kris Moe, MD, Chris Bergeron, MD and Richard Ellenbogen, MD.

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