Improvement of visualization tools in neurosurgery such as the exoscope has raised the question of how this technology compares to the conventional microscope for surgeon ergonomics, discomfort, and patient outcomes. Exoscopes have the advantage of greater optical zoom, resolution, and illumination at a lower light intensity. Heads-up display for both the primary surgeon and other assistants permits neutral positioning of the surgeons while placing the camera in more angled positions. In a survey sample, this study assesses the surgeon's experience utilizing a 3D exoscope in general neurosurgery cases.

Data were recorded by 8 surgeons at 5 separate hospitals utilizing a mobile phone application survey. Surgeons recorded information about case type, intraoperative clinical outcomes such as blood loss and extent of resection, whether fluorescence visualization was used, as well as surgeon pain when compared to matched cases using conventional tools.

A total of 155 neurosurgical cases were recorded in this multisite study, including 72% cranial cases and 28% spinal cases. Of the cranial cases, 76% were brain tumor resections (31% of which were brain metastases). Surgeons reported significantly less neck ($P < 0.0001$) and back ($P < 0.0001$) pain in cases when using the robotic exoscope compared with the conventional microscope or surgical loupes. Surgeons did not convert to a microscope in any case.

The exoscope provides excellent delineation of tissue with high resolution. Surgeon pain was markedly reduced with the robotic exoscope when compared with conventional technology, which may reduce work-related injury and fatigue, potentially leading to better patient outcomes [1].

1)
Schupper AJ, Eskandari R, Kosnik-Infinger L, Olivera R, Nangunoori R, Patel S, Williamson R, Yu A, Hadjipanayis CG. A Multicenter Study Investigating the Surgeon Experience with a Robotic-Assisted Exoscope as Part of the Neurosurgical Armamentarium. World Neurosurg. 2023 May;173:e571-e577. doi: 10.1016/j.wneu.2023.02.094. Epub 2023 Feb 25. PMID: 36842529.