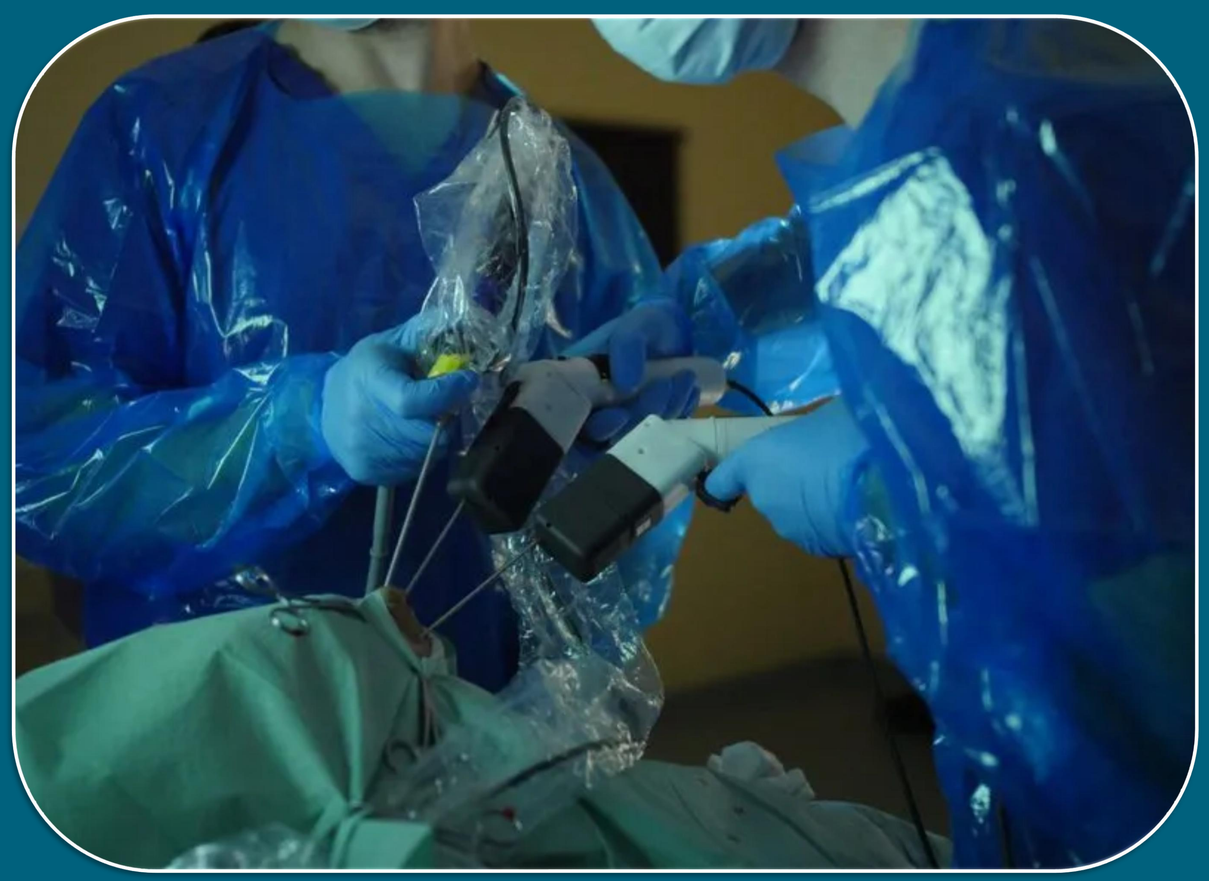
The **Panda Surgical Handheld Robot** for increased **dexterity** and **easier tissue manipulation** across 360° endoscopic skull-base approaches



# Applicability of a Dexterity-Enhancing Handheld Robot for 360° Endoscopic Skull Base Approaches: An Exploratory Cadaver Study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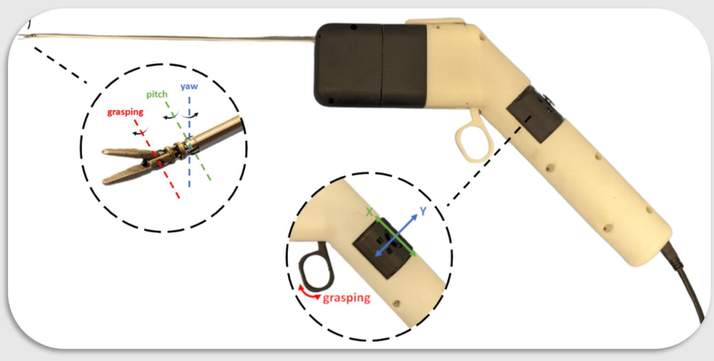
## BACKGROUND

- Endoscopic skull base surgery aims to reduce surgical morbidity
- However, anatomical constraints present technical challenges due to reduced dexterity.
- This study evaluates the applicability of a novel dexterity-enhancing handheld robot for endoscopic skull base approaches



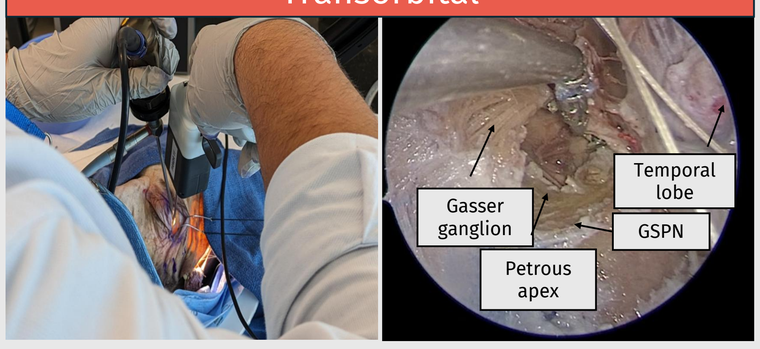

## METHODS

- **Design:** Preclinical Cadaveric study
- **Sample:** Four skull-base surgeons performed **eight skull-base approaches** on cadaveric specimens. Spanning **360-degree approaches**. Conventional instruments were used to expose anatomical landmarks, followed by intraoperative tasks using the handheld robot.
- **Data:** Surgeon interviews assessed 1) the robot's **feasibility** (ability to safely reach and perform its objective of manipulating tissue at the operative site) and 2) **usefulness** (ability to perform desired objectives well).

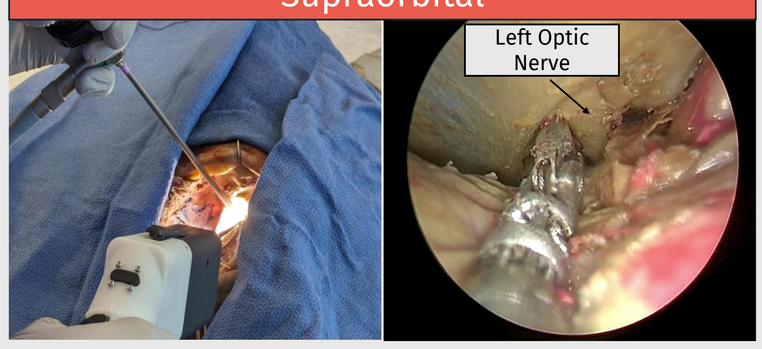
## RESULTS

- **Feasibility:** Achieved across all eight neurosurgical approaches.
- **Workspace Reach:** Superior reach in six out of eight approaches.
- **Tissue Manipulation:** Rated satisfactory in all approaches.
- **User Feedback:** 4/4 surgeons reported potential clinical utility across all approaches.
- **Advantages:** Expanded dexterous workspace, particularly beneficial for long working channels (e.g., endonasal approach).
- **Challenges:** Limited performance in transcranial approaches (trans-sylvian, sub-temporal) due to the absence of shorter, curved shafts, impairing visualization.

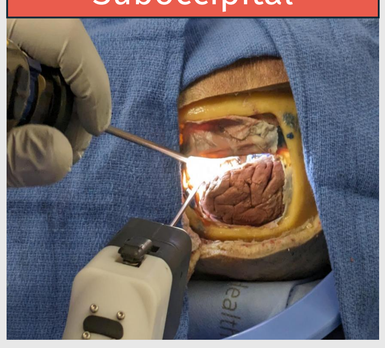
### Transorbital



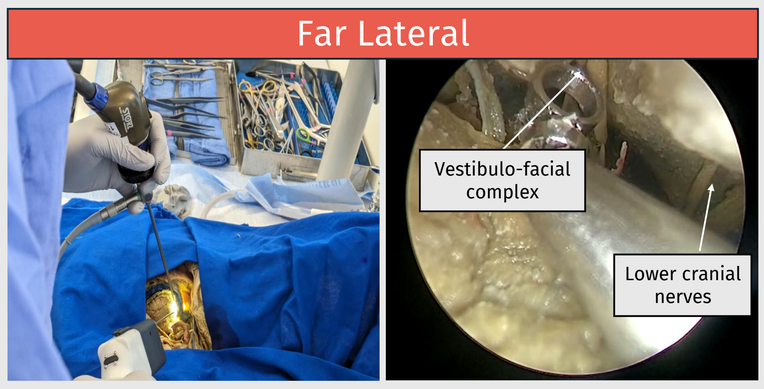

### Supraorbital



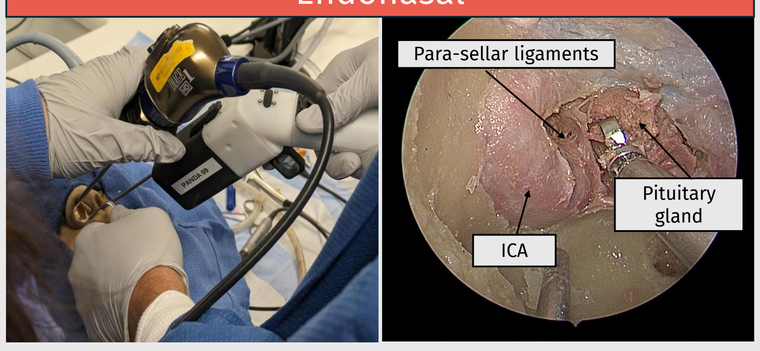

### Suboccipital



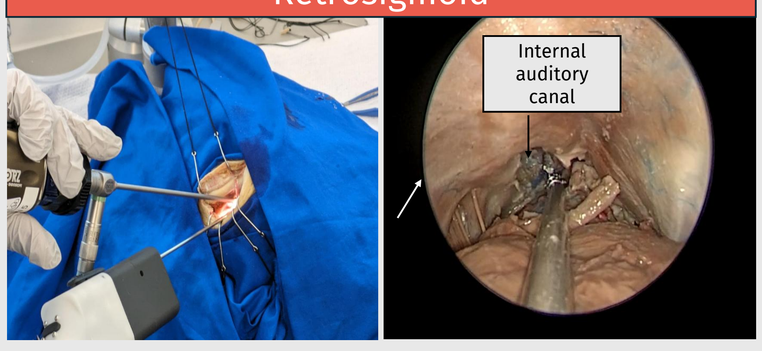
### Far Lateral




### Endonasal




### Retrosigmoid

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