

## Background

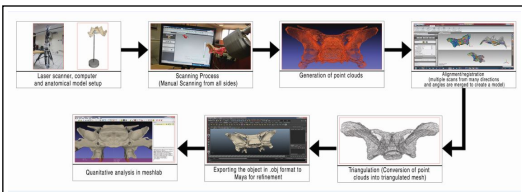
- Guarded bone resection with minimal brain retraction is **basic principle** for micro-neurosurgical skull-base approaches.
- Traditional methods:** CT/MR guided stereotaxy
- 3D Laser scanning of bones with finite element analysis **accurately estimates area and volume** for comparison of resection and exposure.

## Introduction

- An established modality in computer designing, **antropology, dental & plastic surgery cast and forensic investigation**
- A novel method for **accurate volumetric evaluation** with due consideration to shape and surface details
- A promising tool to analyse **quantitative comparative evaluations in different surgical approaches**

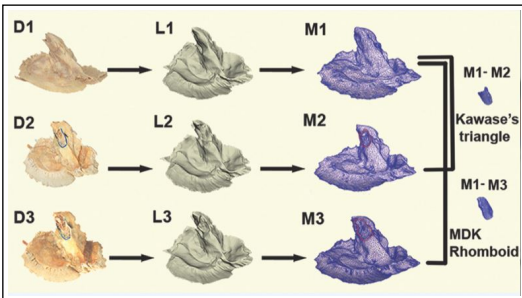
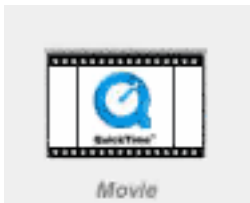
## 3D Laser Scanning Technique

- A process to digitally acquire shape of a complex 3D structure
- We have used **non-contact triangulation based hand held laser scanner**
- High accuracy:** probing point repeatability 0.044 mm and probing volumetric accuracy 0.061 mm
- A non-invasive modality for generating accurate surface image by formation of triangulated meshes with facilities of **auto-calibration & image distortion correction**



## Objective

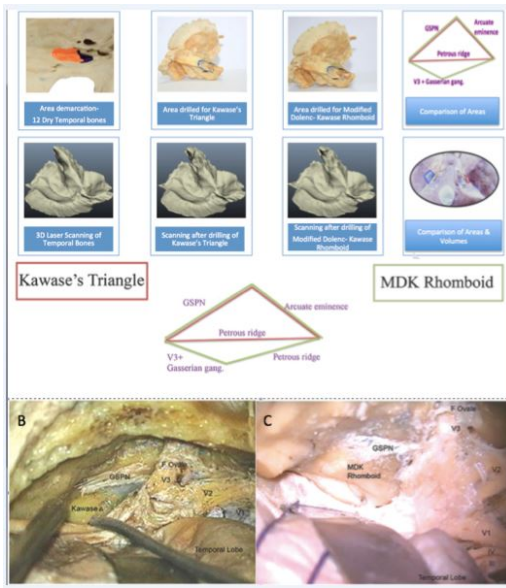
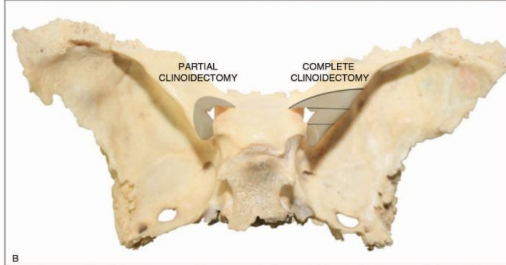
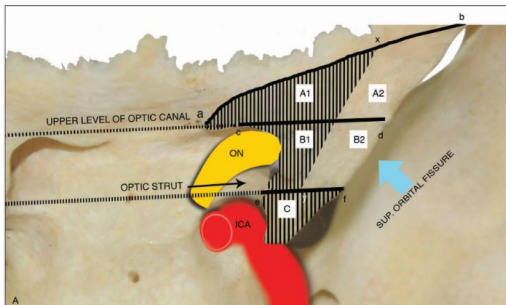
- Comparison of **Kawase & Modified Dolenc-Kawase (MDK) approach** to analyse area exposed at ant petrous apex & prepontine area
- Comparison of **exposed length of optic nerve and ICA** after partial/total anterior clinoidectomy
- Comparison of **angulation** of drilling & dissection
- Validation of techniques** by cadaver dissection



## Observation

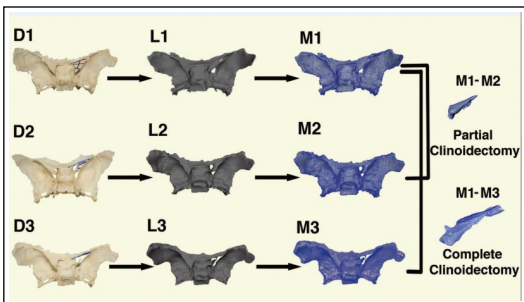
MDK approach provides 1.5X larger area & 2X larger volume at ant petrous apex than Kawase's triangle

## Anatomical Subclass of ACP



## Results

- Reliable volumetric assessment with **inter-observer and intra-observer variability of 0.2 & 2%**
- Acts as a prototype for **Objective assessment of different surgical approaches**
- Cadaver dissection validates the **translation of this research at traditionally difficult areas of skull base**
- Translation into clinical research**
- Laser scanned data helps in development in design for **rapid prototyping**



## Conclusion

- 3D laser scanning can be used as a **tool for validation & objective assessment** for development of surgical approaches
- In comparison to conventional stereotaxy, laser scanners hold promise in terms of **cost, resolution and probability**
- Slightly **longer processing time & limited expertise** in data-acquisition forbids its role in intraoperative settings in present form