



UNC
SCHOOL OF MEDICINE

Image Guided Endoscopic Tumor Surgery

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SOUTHERN STATES
RHINOLOGY FOUNDATION

Disclosures

- **Consultant**
 - » Sinuwave
 - » Laurimed
 - » Entrigue
 - » Nasoform
 - » Olympus Gyrus
- **Speaker**
 - » Stryker
 - » Genentech
- **Stockholder**
 - » Entrigue
 - » Remedease
 - » Nasoform

Objectives

- To discuss general advantages and limitations of use of image guidance in sinus surgery and endoscopic skull base surgery in:
 - ***Everyday Use***
 - ***Pushing the Limits of Current Technology***
 - ***What the Future Holds***

The Problems with Endoscope...

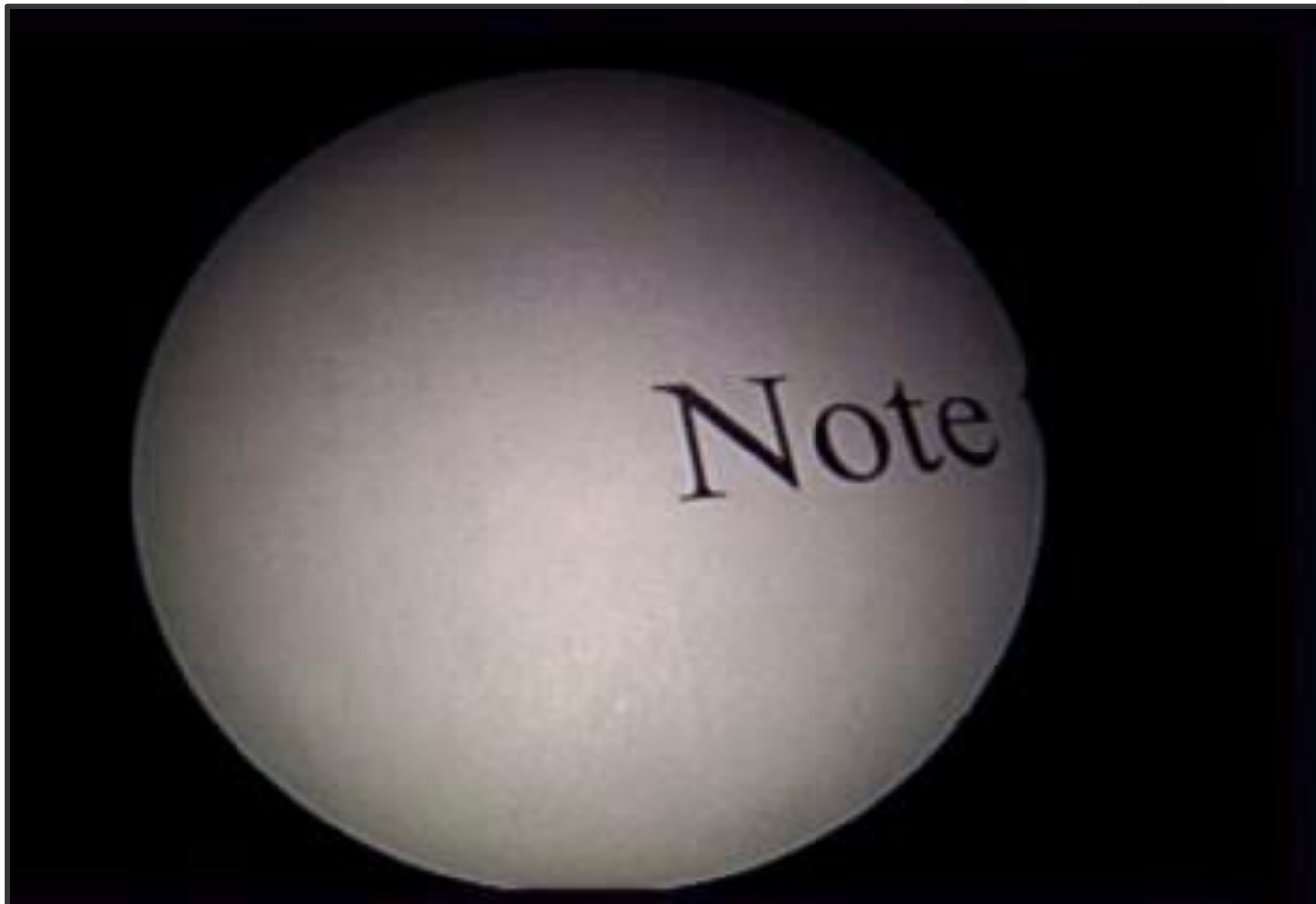
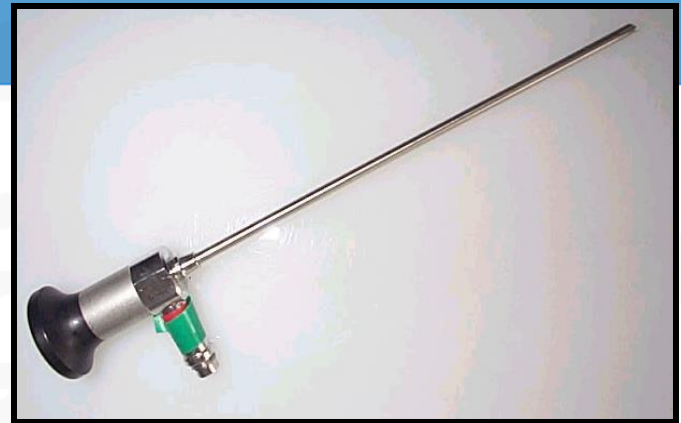
Perspective and Orientation:
“Seeing the Forest through the Trees”



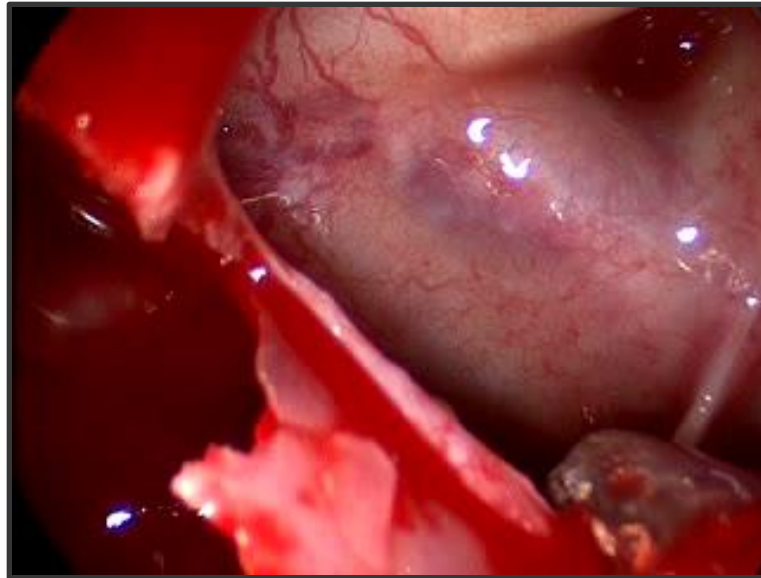
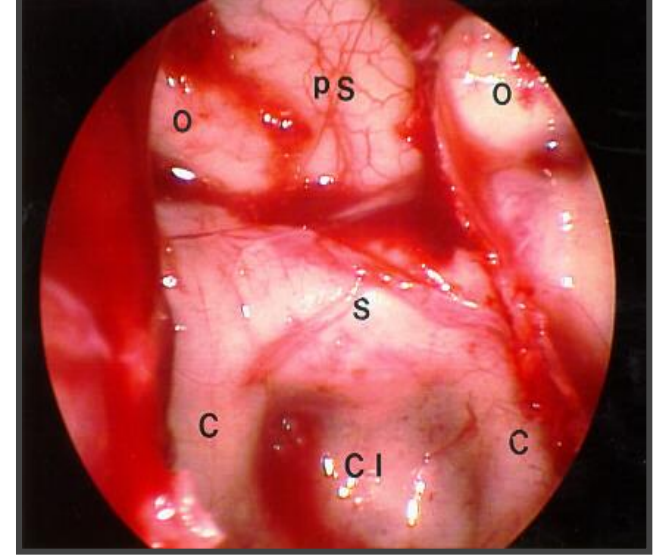


The Problems with the Endoscope...

- Distortion



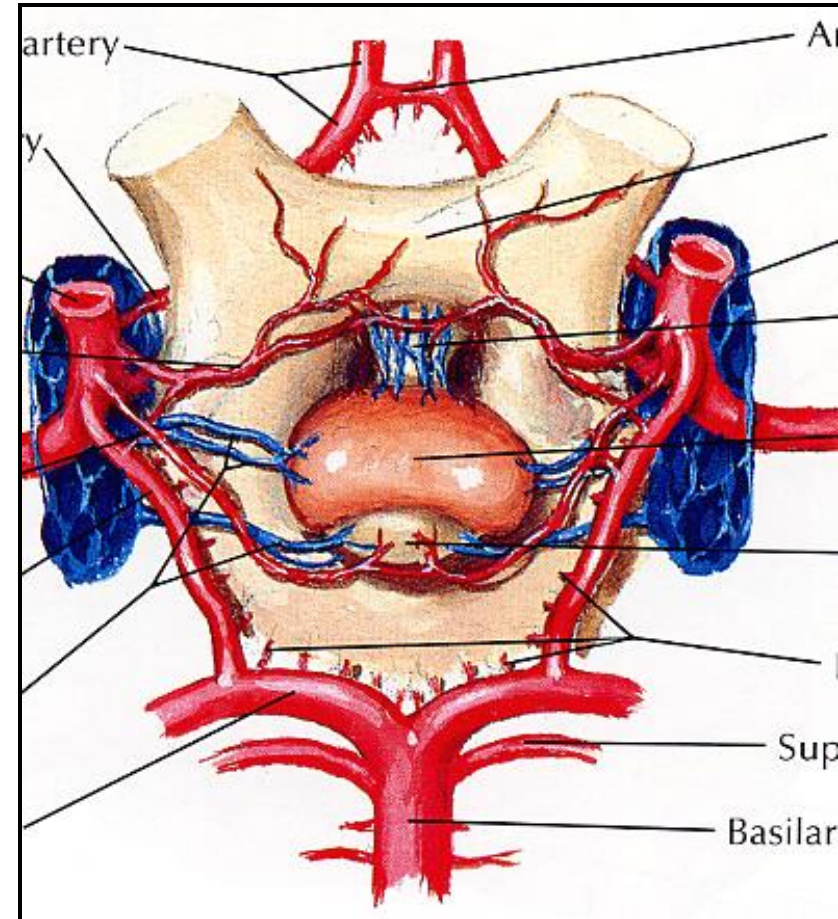
Sinusitis Surgery is Dangerous...



◆ “Any surgery in [the ethmoid sinuses] should be simple, but it has proven one of the easiest ways to kill a patient”

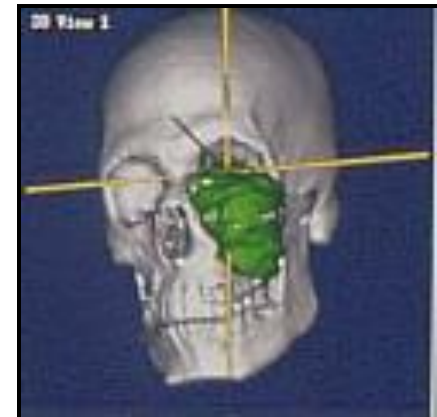
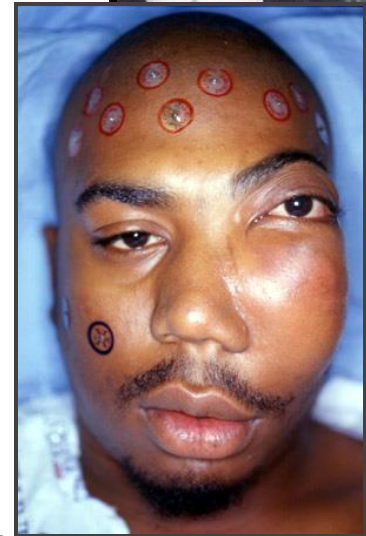
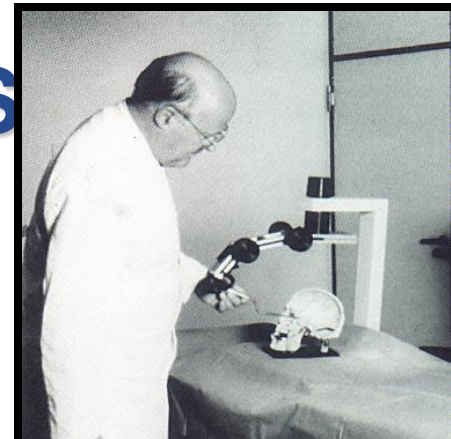
☞ Mosher, H. Trans Am Acad Ophth Oto, 1929

Anatomy of the Sella Region: “High Priced Real Estate”



Historical Aspects of IGS

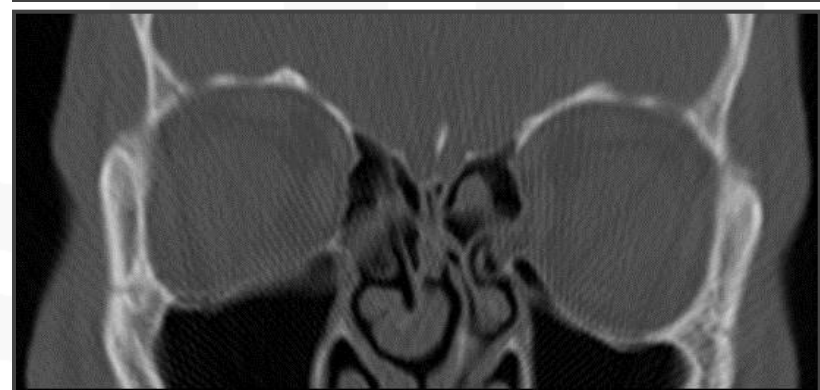
- Concepts go back to the 50s
 - Used in neurosurgery for 20y
 - ◆ Mechanical
 - ◆ Head fixed in Mayfield frame
- ◆ They've come a long way
 - ◆ Rapid, Simple Registration
 - ◆ Calibration and use of surgical instruments and suctions
- ◆ Limitations Persist
 - ◆ *Emphasis on probes or suctions*
 - ◆ *Line of sight with IR; metallic interference with EM*
 - ◆ *Not Real Time*





Limitations of IGS

- IGS does not make ESS “safe”
 - ☞ **Does not** replace the need for being a good surgeon
 - ☞ Has the capability of allowing a good endoscopist to be a little safer, go a little farther
 - ☞ **Does not** have the capability to allow a poor endoscopist to be safer, go a little farther
 - ☞ **Does not** replace the need for good quality preop CT imaging



Limitations of IGS



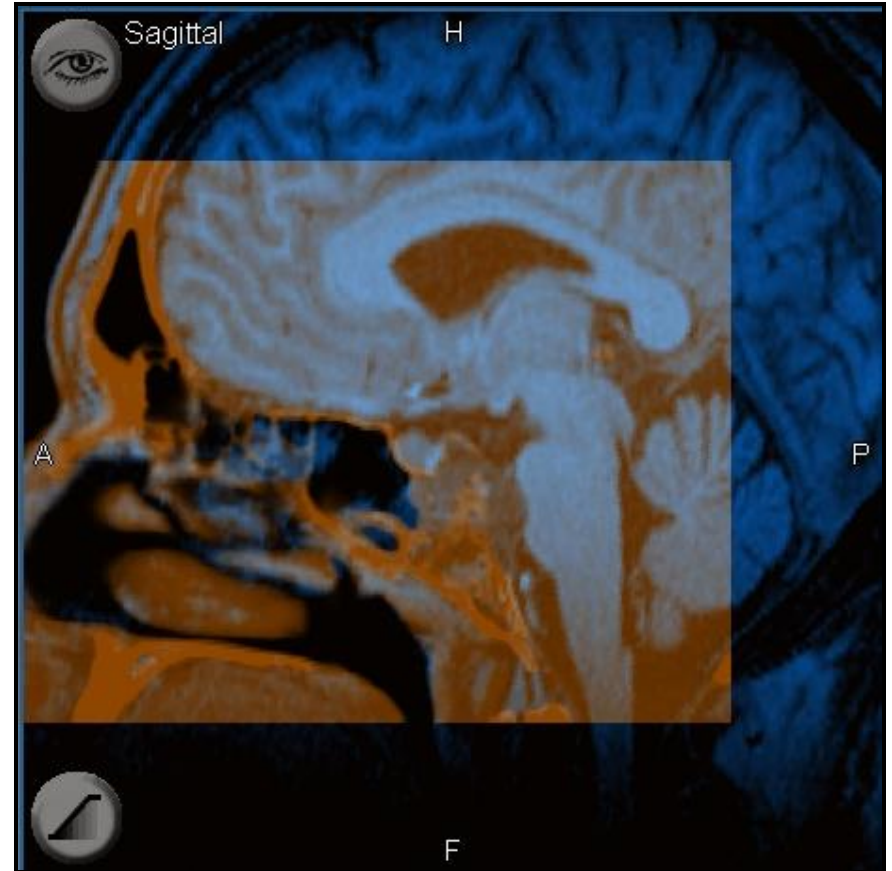
- IGS is not “real time”
 - ◆ Changes in anatomy are not being determined in real time by the system
 - ☞ Particularly important with soft tissue lesions
 - ☞ Improved with integration with intraoperative CT and MRI

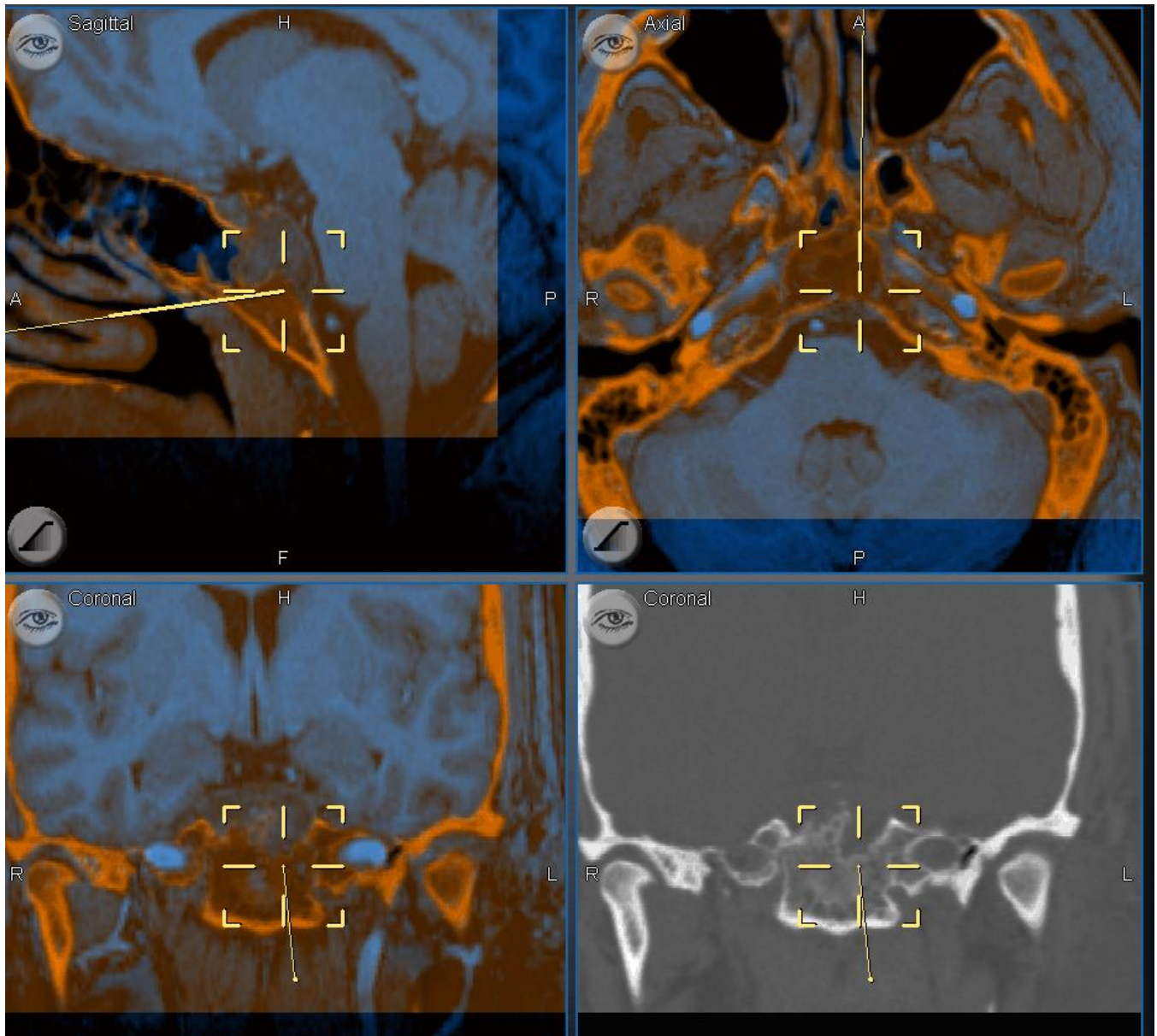
Advanced IG Techniques

Clival Chordoma

Image Fusion of MRI/CT/MRA

- 29 year old man with Htn and OSA presenting with intermittent diplopia





Advanced IG Techniques

Minimally Invasive Pituitary Surgery (

Go Heels!!

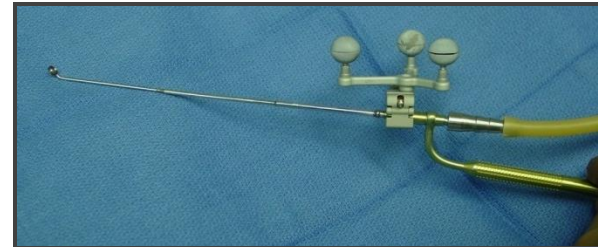
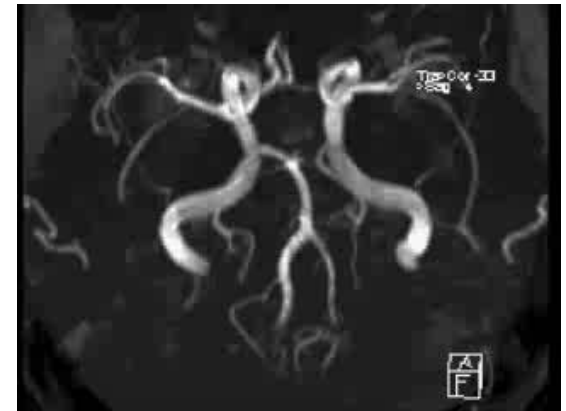
- 62 year old man found cheering on the University of North Carolina Tarheel football team in Kenan Stadium
 - ◆ ...at night
 - ◆alone





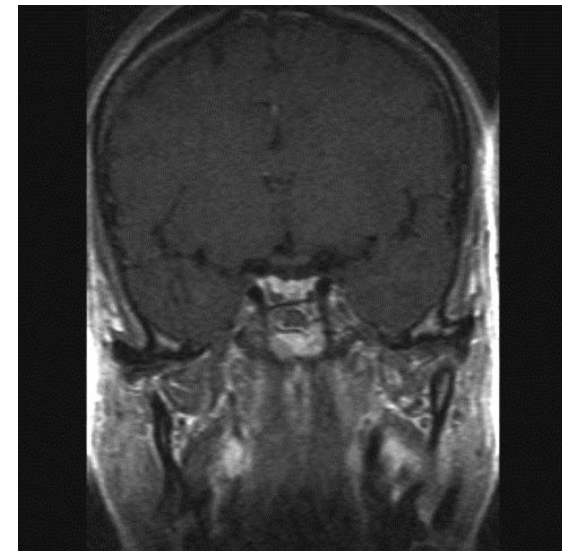
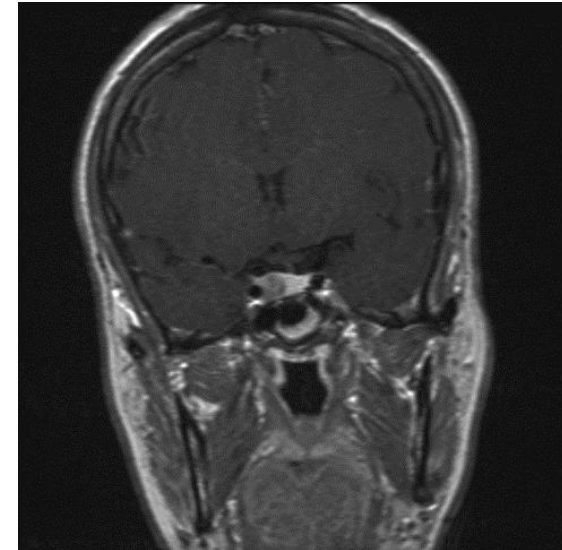
Minimally Invasive Pituitary Surgery (MIPS)

- Exposing Sella
 - ◆ Particularly important in revision surgery
- Also Aids in tumor removal

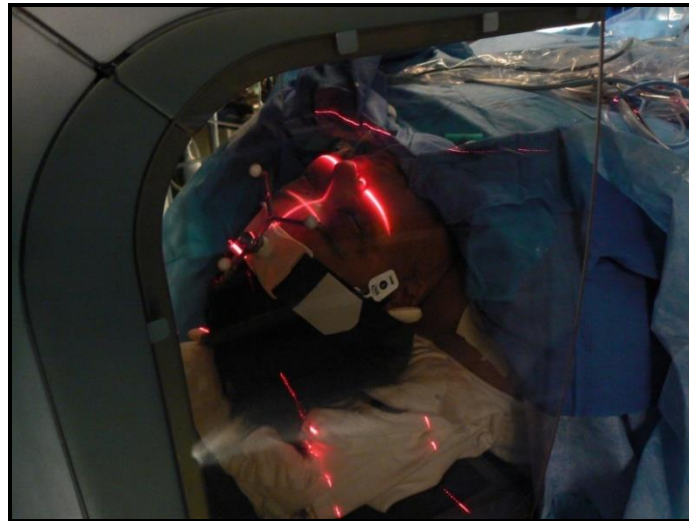


Minimally Invasive Pituitary Surgery (MIPS)

- Curetting microadenoma under image guidance
- Fusion with 3d imaging



Moving into the Future: Intraoperative Imaging and Integration



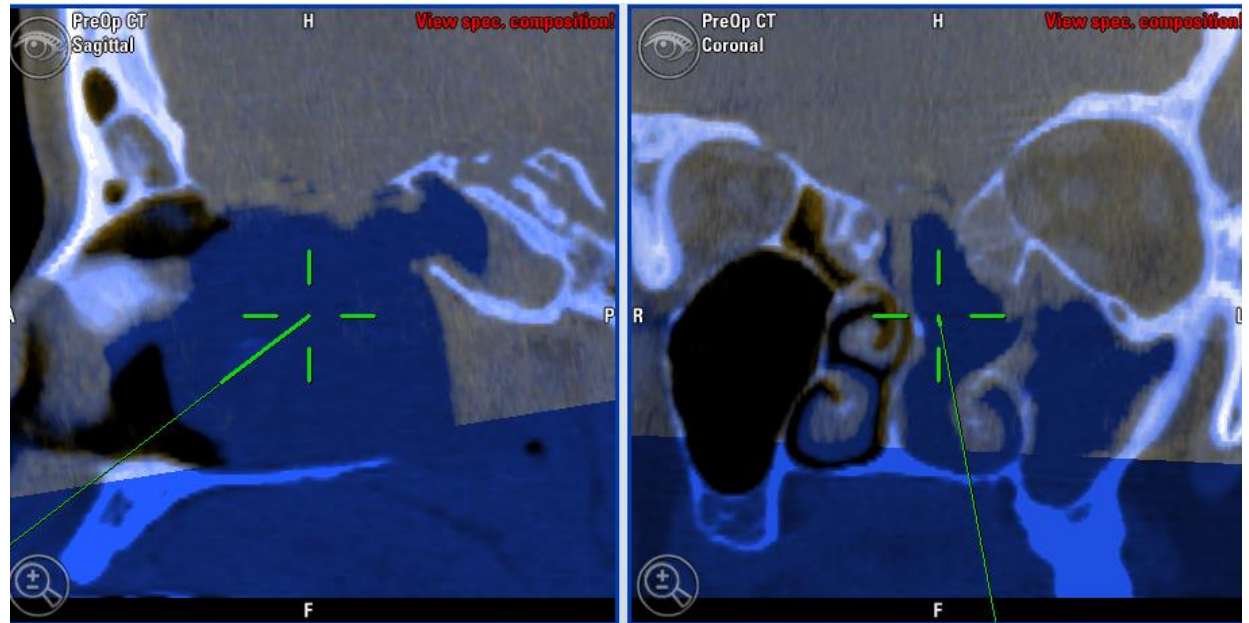
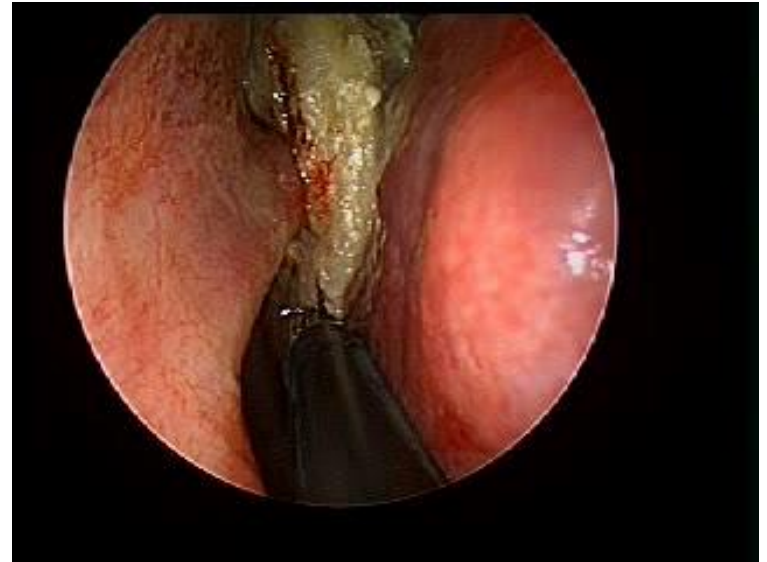
- The Greatest Limitation of IGS is that it is not **Real Time**..
- IGS integration with intraoperative imaging
 - ◆ MR
 - ◆ CT
- ***Almost*** “Real Time” ...



Intraoperative CT Imaging

- *Changing what we do*
- *Confirming what we have done*

Large
Meningoencephalocele



Conclusions

- Imaging technology continues to advance
–aiding the rhinologist in endoscopic skull base surgery
 - ◆ Pushing the boundaries and advancing endoscopic techniques
- But
 - ◆ It is not mandatory for every surgery
 - ◆ It is not a substitute for intimate knowledge of the anatomy



***“A Fool with an Instrument is
Still a Fool”***

-Heinz Stammberger, 2005

***“A Fool with an Instrument is an
Even More Dangerous Fool”***

-Mike Sillers, 2005