Past, present and future of Endoscopic Ear Surgery

Overcoming Human Hand limitations

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• No disclosures
Human Hand precision & limitations

- Micro-dimensions
- Vital structures crowded
- 0.2 mm margin of error at the footplate
- Baseline human hand tremor frequency
• Early 4 mm and 2.7 mm sinus endoscopes
• No specialized hand instruments
• Low quality video towers and poor visualization
• Better 3 mm rigid scopes
• Hi Def Video systems
• Dedicated EES hand instrumentations
• Still one hand operations

• Much better exposure and visualization
Future EES

- Becoming the mainstay of ME surgery
- Smart endoscopes: variable optics w/ auto-bending rods, 3D
- Endoscope scrub system
- Bendable micro drill systems

Overcoming human hand *tremor frequency*:

**Robotics endoscope and instrumentations:**

2-person, 4-handed dissections as needed
Chorda tympani nerve

*Dehiscent chorda canal* during flap elevation
Curetting injury
Adherent cholesteatoma
Heat injury from light source
Dehydration from prolonged dry dissection
Resection “sacrifice”
Future of TEES

• Develop two and 4-handed dissection

• Smart Auto bendable 3D Endoscopes

• ROBOTICS with micro probes and dissectors

• Inner ear Endoscopy: robotics through RW & OW