

Advanced Implantation Schemes.

Professor Peter Brett

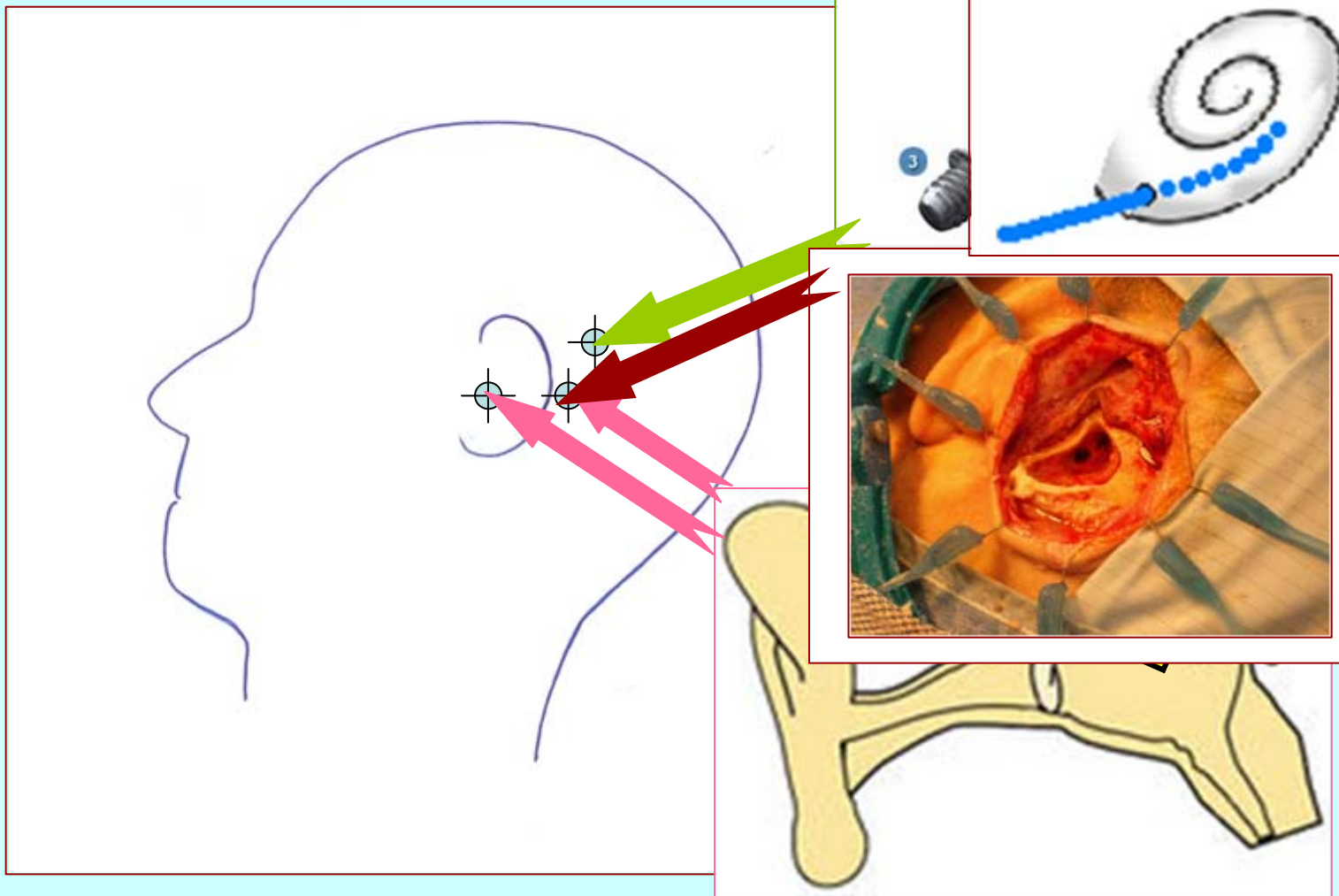
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Implant Types.

- **Bone Anchored Hearing Aid**
- **Middle ear implant (FMT)**
- **Cochlear Electrode**

Access



Implantation time and cost.

Bone Anchored Hearing Aid	45- 60 mins
£4,000 + surgery & Medical costs	

Middle ear Implantation	3hrs
£12,000	

Cochlear Implant	3hrs
£35,000	

Solutions for implantation need to achieve:

- **Greater precision with respect to tissues.**
- **Greater Consistency.**
- **Reduced implantation time.**
- **Feedback on integrity of tissues.**
- **Feedback on physical state of implant/ tissues during insertion and when implanted.**
- **Reduced trauma.**

Cochlear Electrode Implantation.

•Hand-held drills

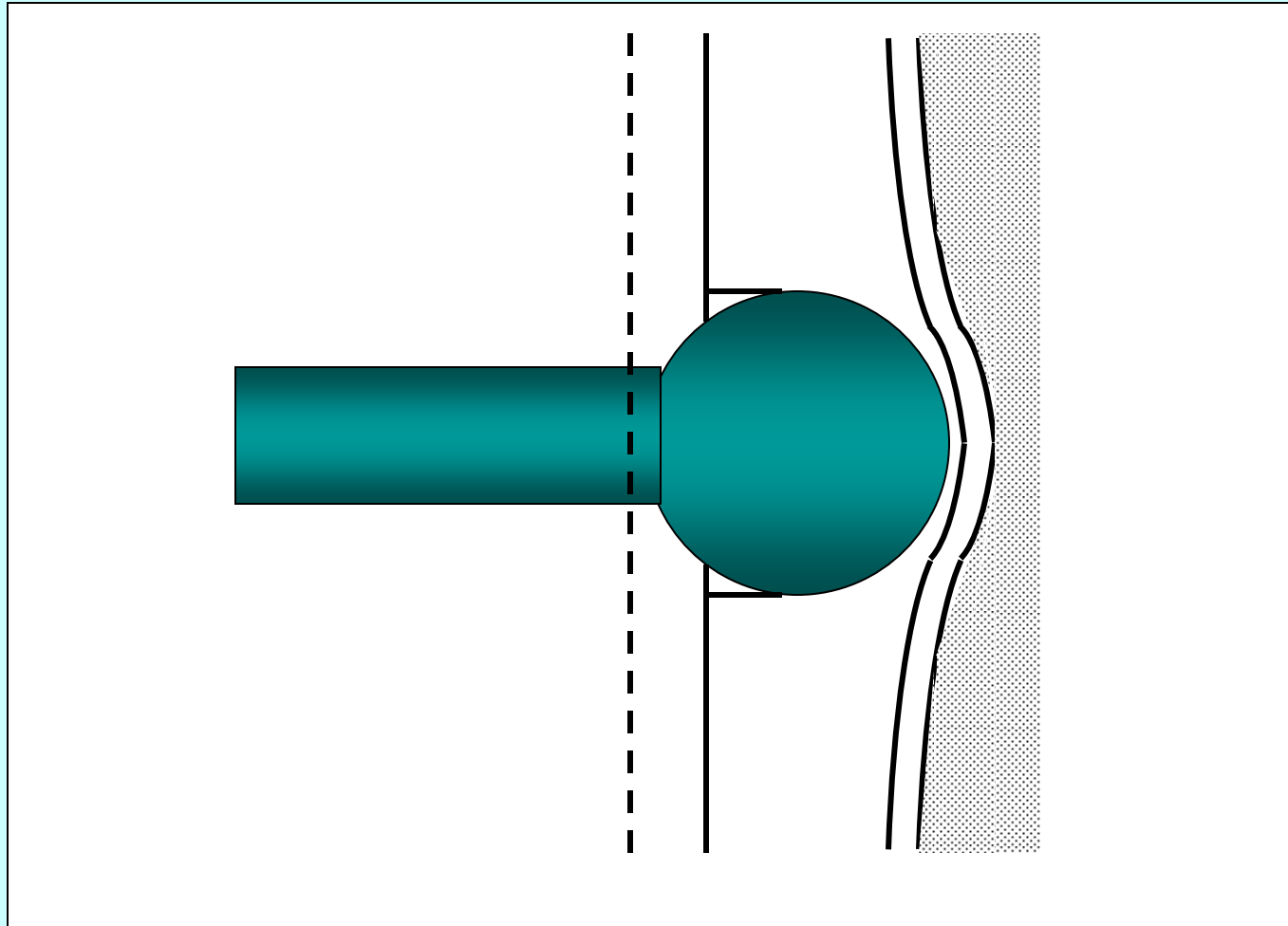


•Cochlear
Electrode



Micro-drilling a Cochleostomy

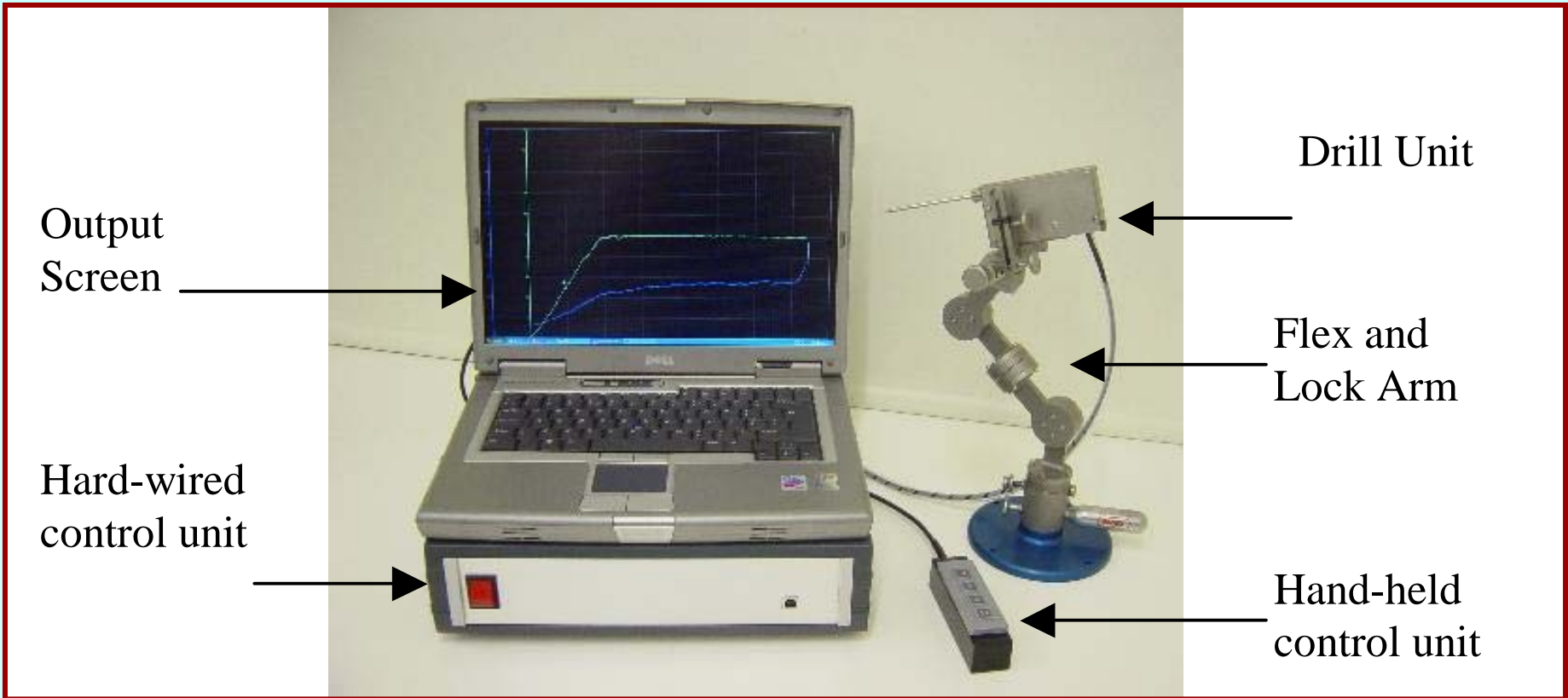
Tissue Response



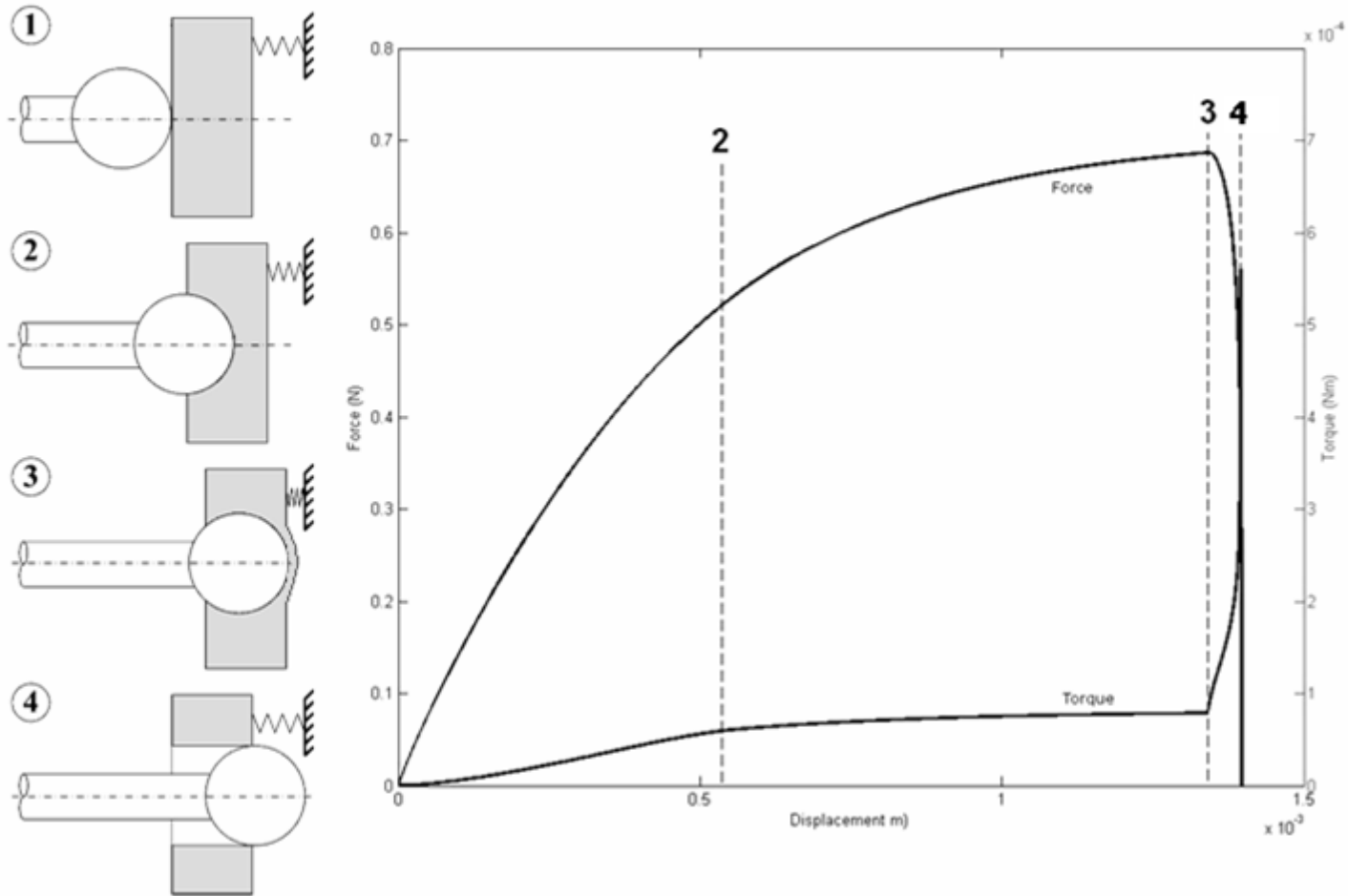
Smart Micro-drill



Micro-drilling System



Breakthrough Detection



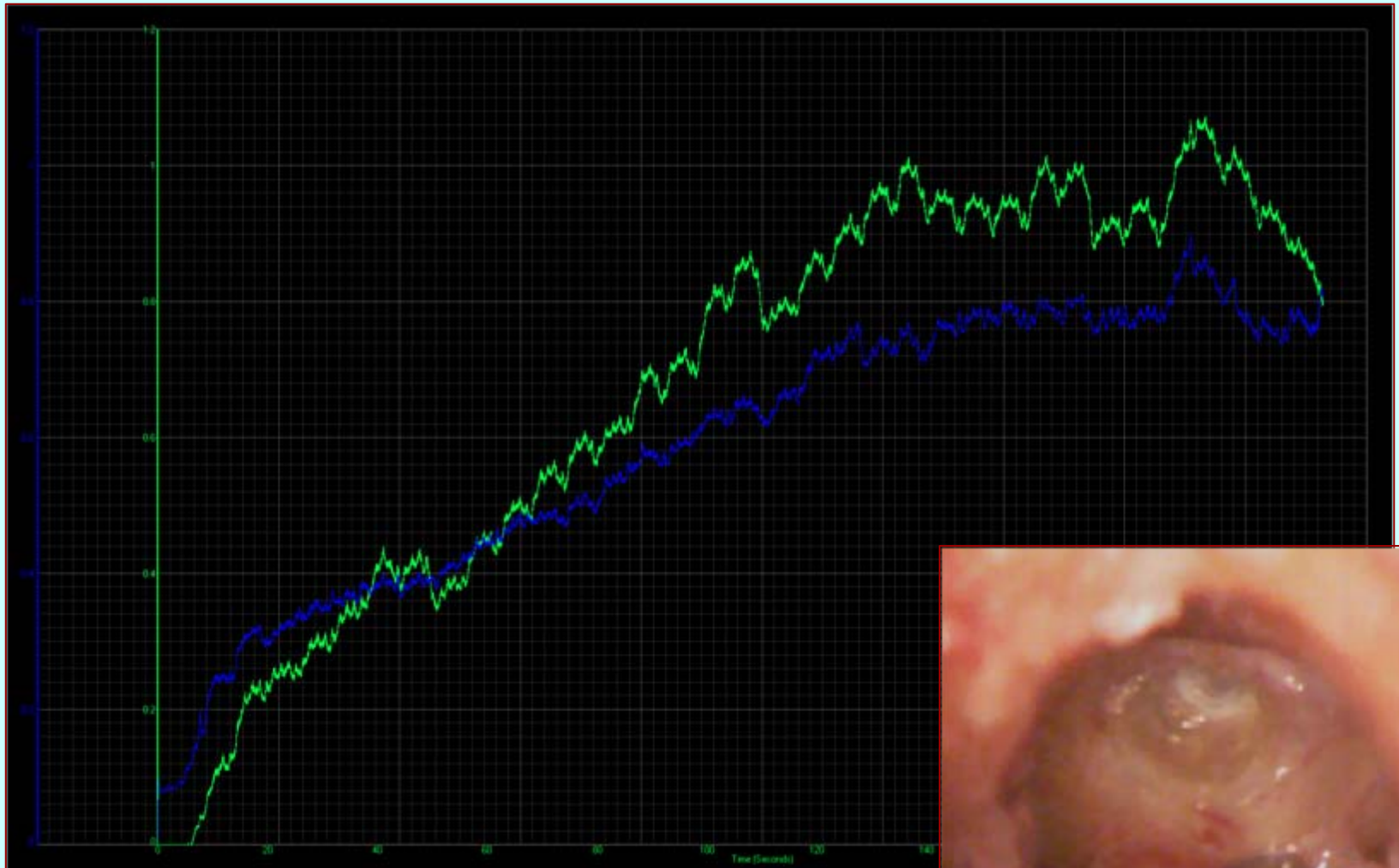
Drilling a porcine cochleostomy

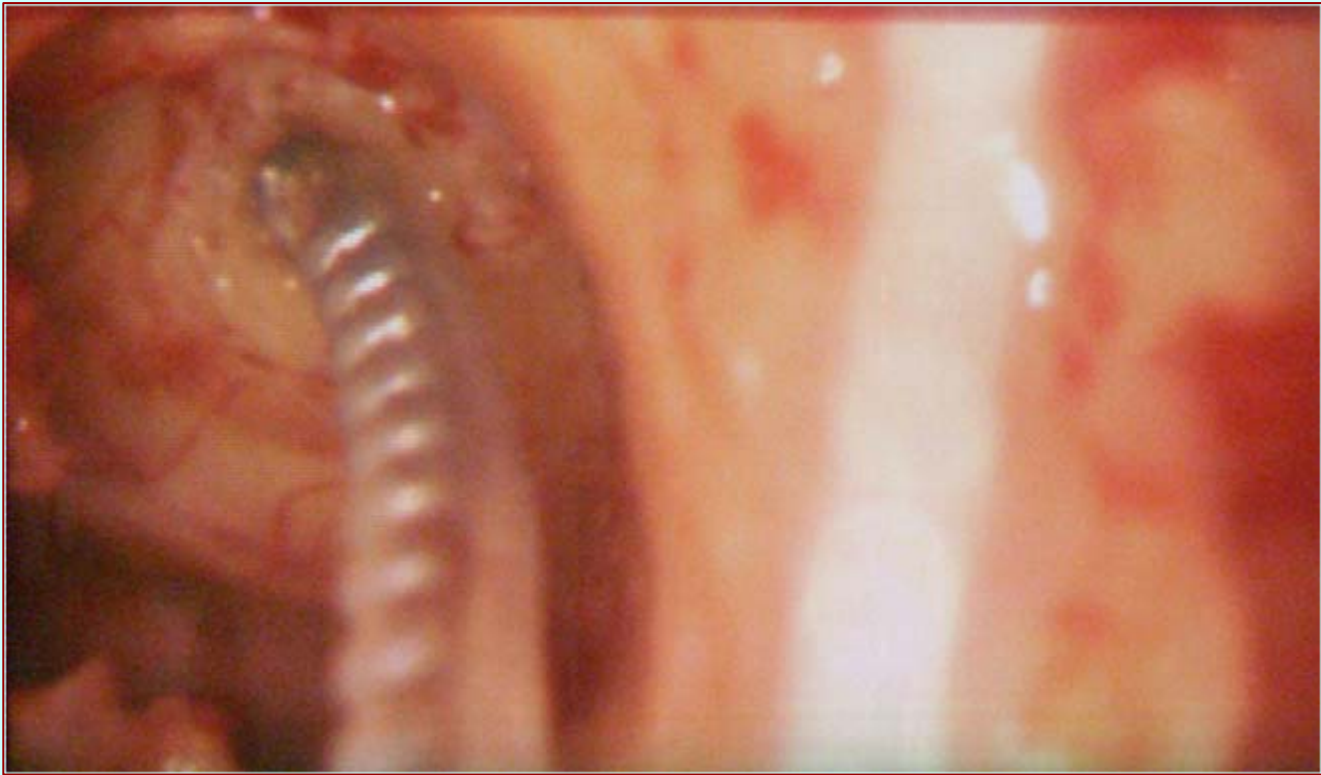






Clinical Drilling Force Transients





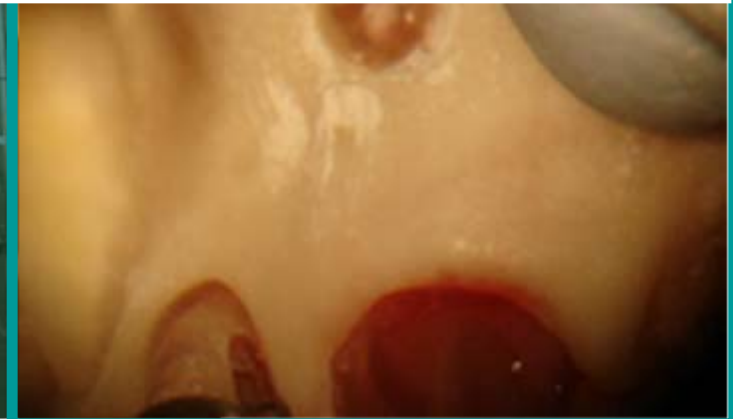
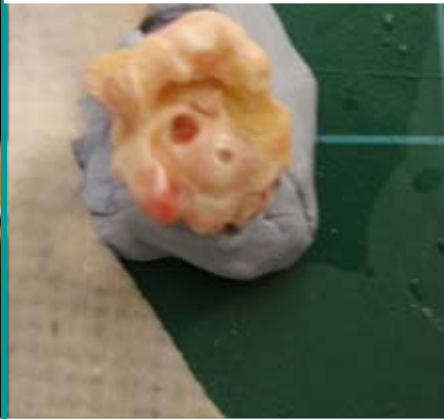
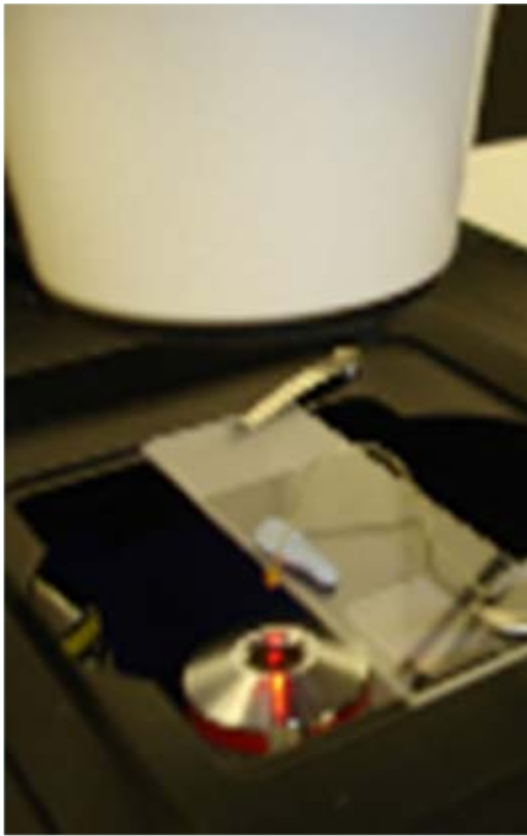
FUTURE



**Smart
flexible
implant**

FUTURE

Investigating Cochlear Pressure Transients during Insertion



Conclusion

- **Engineering has a role to improve implantation tools.**
- **Precise control of tissue-toolpoint interaction will enable precise placement.**
- **Greater Consistency, reduced operating time.**
- **Smart micro-drill has demonstrated benefits.**
- **Lower complication rate is expected.**

From surgical robotics to smart micro-tools in surgery.

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