10-Dec-2015

Draft outline for approach to development of novel endoscopic ear surgery instruments

1. Needs assessment
   1. Qualitative
      1. Surgeon’s opinion
      2. Survey other endoscopic surgeons
   2. Systematic assessment
      1. Time / flow analysis in OR
         * + what are rate limiting steps in tympanoplasty?
           + how does instrument selection contribute to this?
2. Review of current instruments
   1. Features that are good for endoscopic surgery
   2. Limitations of current instruments
3. Design & preparation of novel instruments
   1. Multi-purpose hand tools
      1. Suction
      2. Electrocautery
      3. Cutting
      4. Dissection
      5. Graft manipulation
   2. Other
      1. Improved foot control of suction
      2. Better 532nm filter glasses for laser
      3. ? mirrors to use with endoscope
      4. Angulation of KTP laser fibre
      5. ?!
4. Testing of novel instruments
   1. Models
      1. Virtual temporal bone construct from CT scan
      2. 3D prints of different patients
      3. cadaveric temporal bone lab
   2. Clinical
      1. SickKids
      2. ? TGH
      3. ? Vancouver, US, worldwide
5. Translation to surgical practice
   1. ? patent for IP
   2. industrial partnership

14-Jun-2016

course that talks about the proposal

survey -> development -> validation

validation will be the main research piece of the masters

validation: - modeling using patient CT scans – is this critical for testing? Or can we use an existing model?

* Modeling would be more of a research part
* How to set up the experiment, how to compare to existing instruments, who are participants, etc.
* Cadaver testing – surgical skills lab
* Clinical testing (?) – phd
* Simulate surgery process
* Find inspiration from Papers that test new tools to develop the protocol – sample size, dependent variables, controls, data analysis, etc.
* Start out with testing the existing instruments with endoscope
  + Paper – Bennett about visualization of middle ear using endoscope
* Computer simulation good for development

Phd would include more levels of validation testing - clinical, cadaver, simulation, etc.

Survey publication ->

Scope:

Goals:

Scientific Question:

Interests:

Next Steps:

* choosing committee – experts from which fields? Mechanical engineering, materials, industrial?, clinical?
* Written confirmation from Dr. James and Sickkids? About the funding.

Collaboration with MIE for developing the tool robustly?? – will give me more resources – machine shop and 3D printer

Internship interests:

* Spiggle and Tyes (?) – makes suction & dissection instruments, company from Germany – they might be able to support an internship
* Grace Medical – suction and dissection instruments

Courses – instrument design, ergonomics