Needs Analysis and Time Flow Study to Assess Endoscopic Ear Surgery

**Introduction:**

* Minimally invasive ear surgical techniques have been developed using endoscopes to access the middle ear through the ear canal without an external incision (1), (2)
* This is a new and challenging surgical technique, requiring one handed surgery (one hand holds the endoscope steady) and current instruments are not optimized for the technique therefore there is a low adoption among ear surgeons
* Traditional surgeries can be performed via this technique which allows better visualization within the hidden recesses in the middle ear

**Research Question:** Why is transcanal endoscopic ear surgery (TEES) not widely adopted by otologists and what technological advances would encourage more frequent and broader use of TEES.

**Hypothesis:** We hypothesize that a needs analysis study will provide an answer to this question and help develop criteria against which new endoscopic ear surgery tools can be developed.

**Research Objectives:** In order to increase the use of TEES we need to understand: a) the reason for surgeons not adopting TEES by conducting a questionnaire for surgeons and b) limitations of existing tools by conducting time flow analysis.

**Study Rationale/Literature Review:**

*Time Flow Analysis*

* Have been used for many purposes in surgery to test feasibility and efficiency of a specialized method
* Eg. MRI-guided angioplasty workflow and operating room setup dedicated for minimally invasive laparoscopic surgery (3)-(4)

*Survey*

* Used to gain information regarding a specific topic by consulting a wide variety of experts in the field
* Has been used to assess the challenges of endoscopic neurosurgery in Britain and the current status of endoscopic ear surgery in Canada (5)-(6) and is therefore applicable to assess the needs for endoscopic ear surgery

**Specific Aims and Methods:**

*Time Flow Analysis:*

* Aim: to measure the efficiency of current endoscopic ear surgery and provide areas where instrumentation redesign is required. Method: measure the duration of predetermined steps during endoscopic ear surgery as well as the number of changes between instruments

*Survey:*

* Aim: understand the reason why ear surgeons are not using endoscopic ear surgery and what would increase its use. Method: Following a two-round Delphi method: 1) preliminary survey developed by talking to local ear surgeons 2) first round of survey sent out to members of otology societies globally (provides a wide range of surgical experience & environments) 3) qualitative results are analyzed, using a statistical approach, to categorize answers and generate more specific questions 4) send out these new questions for round two of the survey 5) analyze and present results

**Expected Outcomes and Significance:**

From discussions with project investigator (an endoscopic ear surgeon) and his colleagues:

* Disadvantages: one handed surgery is difficult, bleeding control with one hand and limited space
* Advantages: better visualization within hidden recesses in middle ear, low patient morbidity, minimally invasive surgery advantages
* Understanding the needs for TEES in order to design instruments better suited for the surgery aims to encourage surgeons to adopt endoscopic ear surgery
* This study can also be applicable to other types of minimally invasive surgery performed through natural orifices in the body; can provide a means of developing better instruments for these other types of minimally invasive surgery

**References:**

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