

# 600.645 HW1: Mastoid Surgical Procedure Evaluation

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09/17/2016

## 1. Procedural Analysis

### A. Evaluation Criterion

For each step of the procedure, the following traits are analyzed and assigned a score from 1-5. A lower score indicates a problem area. A aggregate sum highlights specific problematic steps.

- **Cost**
  - *Definition:* Immediate material costs relative to the entire procedure.
  - *Assessment:* After a mean procedural cost is established, the contribution of the step to the overall cost is used to determine its score. A 5 indicates a low cost step.
  - *Importance:* Material costs impact all stakeholders, reducing the financial burden on the payer (e.g. insurance), hospital, and patient.
- **Resources**
  - *Definition:* Non-material costs, such as increased personnel support or reusable equipment requirements.
  - *Assessment:* Total resource usage is defined to be the number of personnel and the suite of surgical equipment required in the OR during the procedure. A lower score indicates that the step utilizes a higher proportion of those resources relative to other steps.
  - *Importance:* With overall reduced resource usage, costs are indirectly reduced having the same impacts as Cost. Additionally, the reduction in resources benefits the hospital in terms of resource allocation and procedural capacity.
- **Safety**
  - *Definition:* Complication rate related to the procedural step.
  - *Assessment:* A higher contribution of the step to the overall complication rate, combined with the severity of the complication, translates to a lower score. Risk to the surgeon, such as radiation, is also included.

- *Importance:* The primary impact of improving the safety of a step is an improved patient outcome. Surgeon related safety issues are especially important as they are compounded over many procedures.
- **Effectiveness**
  - *Definition:* How effectively does the step achieve the desired output?
  - *Assessment:* A low score translates to direct objective completion. A high score indicates the step does not fully meet the goals, for example anatomy may prevent direct access.
  - *Importance:* Improving the effectiveness of a procedural step benefits the surgeon as there is reduced risk of failure. The reduced risk translates into better outcomes for the patient and reduced overall costs.
- **Accuracy**
  - *Definition:* Can the step be executed to a close tolerance to the target?
  - *Assessment:* A lower score indicates a lower tolerance to necessary tolerance ratio. A step might require a higher necessary tolerance due to reduced physical size or an increased risk.
  - *Importance:* The more accurate execution of a step can improve patient outcome and reduce long term complications. Improved accuracy will also reduce the difficulty of the procedure to the surgeon.
- **Time**
  - *Definition:* How long does the step take to execute relative to the overall procedure?
  - *Assessment:* A low score translates to a high time to complete relative to the overall procedure time.
  - *Importance:* A long step increases the cost of the procedure, impacting the payer, hospital, and patient. Additionally, reducing the time is beneficial to the surgeon and hospital due to reduced resource usage.
- **Instructability**
  - *Definition:* How long does the step take for a new surgeon to learn?
  - *Assessment:* A low score indicates that the step is complicated to preform, and takes a long time to master. This is assessed from the steps complexity.
  - *Importance:* Reducing the skill level of a step improves the surgeons time to competency and ease. Additionally the risk of failure is reduced, improving patient outcomes.

## B. Evaluation

The procedure was broken down into the following steps.

1. Primary Incision

Criteria		Comments
<i>Cost</i>	5	
<i>Resources</i>	5	
<i>Safety</i>	5	
<i>Effectiveness</i>	5	
<i>Accuracy</i>	5	
<i>Time</i>	5	
<i>Instructability</i>	5	
<b>Total</b>	35	

2. b
3. c
4. d
5. e
6. f
7. g
8. h
9. i

## Citations

The assignment was discussed with my partner Doran Walsten.