Simulation-Training for Central Venous Catheter Placement
2008-10-05
Subject Powerpoint
<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reading and viewing experiment orientation material</td>
<td>10 min</td>
</tr>
<tr>
<td>2</td>
<td>Conduct first block of 5 trials</td>
<td>15 min</td>
</tr>
<tr>
<td>3</td>
<td>Conduct survey on simulator experience</td>
<td>5 min</td>
</tr>
<tr>
<td>4</td>
<td>Conduct second block of 5 trials</td>
<td>15 min</td>
</tr>
<tr>
<td>5</td>
<td>Review your scores</td>
<td>10 min</td>
</tr>
<tr>
<td>6</td>
<td>Conduct survey on scoring system</td>
<td>5 min</td>
</tr>
</tbody>
</table>

**Total:** 60 min

Today you will only be doing portions 1-4
Performance Objective

Given:
1. US Unit
2. Phantom with Discrete Target

(Note: Discrete Target = Tip of Target Needle)

Objective:
- Demonstrate ability to guide needle to within 5mm of discrete target.
- Earn a high score
Each trial...

- **Before** the trial, the **proctor will place the target**.
- **Before** the trial starts, **you will not be holding onto the US probe or needle**.
  
  [The needle and probe will be resting on the procedure table]
- Each trial **starts** when the proctor **says “go.”**
- On “go,” you will use the ultrasound unit to find the target (**planning**).
  
  [Planning Time starts when the US probe touches the phantom]  
  **You do NOT need to rush when picking up the US probe / needle**
- Then, you will advance your needle to the target (**execution**).
  
  [Execution Time starts when needle touches phantom]
- When you are **finished, say “done.”**
Maximize your Score

Planning
Finding the target, plan where to insert needle on phantom surface.

Execution
Guide needle along planned path to target.

Scored Elements
2) Execution Quality
3) Execution Efficiency
4) Execution Difficulty
5) Execution Multiplier

How to Maximize your score will be shown in green.

How to Minimize your score will be shown in red.
1) Planning Score

To maximize your Planning Score, **minimize the time** between:

- a) placing the US probe on the tissue
- b) placing your needle tip on the tissue phantom

(Note: The time between ‘a’ and ‘b’ is your Planning Time)

**Maximal Score:** Short Planning Time

**Minimal Score:** Long Planning Time
2) Execution Quality

To maximize your score, arrive at your end point with a **minimal extraneous movements**.
3) Execution Efficiency

To maximize your Execution Efficiency, minimize the time between:

a) placing your needle tip on the tissue phantom
b) saying “done” at the end of your trial

(Note: The time between ‘a’ and ‘b’ is your Execution Time)

Maximal Score: Short Execution Time
Minimal Score: Long Execution Time
4) Execution Difficulty

Difficulty is influenced by 2 variables:

1) The distance between the needle tip and target at the **START** (*larger* is more difficult)

2) The distance between the needle tip and target at the **END** (*smaller* is more difficult)

To maximize your Difficulty:

a) **MAXimize** the start point-end point distance

b) **MINimize** the end point-target distance
4a) Execution Difficulty: MAXimize Start Point-End Point Distance

(Note: The End Point is **NOT** the target; it is where your needle tip ends.)
4b) Execution Difficulty:
MINimize End Point-Target Distance
5) Score Multiplier

To maximize your score, you must finish with an **end point – target distance less than 5mm.**

<table>
<thead>
<tr>
<th>End Point – Target Distance (mm)</th>
<th>Score Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>End point to target distance &lt; 5mm</td>
<td>1.0</td>
</tr>
<tr>
<td>End point to target distance &lt; 10 mm</td>
<td>0.5</td>
</tr>
<tr>
<td>End point to target distance &gt; 10mm</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Summary: Maximize your Score

1) Planning Score: **Minimize Planning Time**

2) Execution Quality: **Minimize extraneous path movements**

3) Execution Efficiency: **Minimize Execution Time**

4) Execution Difficulty: **MAXimize Start Point-End Point Distance**
   **MINimize End Point-Target Distance**

5) Execution Score Multiplier: **End Point < 5mm from Target**
Questions?

Before beginning your first trial, did you have any questions?