Operative Skills Progression in Plastic Surgery Residents

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Disclosures

• Carisa Cooney, Scott Lifchez, & Damon Cooney
  – Co-inventors of MileMarker® & the Operative Entrustability Assessment.
  – Co-advisors and equity holders for the parent company, EduMD, LLC.

• Carisa Cooney, MPH
  – Vice President of EduMD, LLC.
Background

- Training programs -> efficient training
  - Resident 80-hour work-week
  - Ever-increasing medical knowledge\(^1\)
  - Cost of GME\(^2\)
    - To programs, hospitals, CMS ($)
    - To trainees ($, 
  - Generating competent practitioners
Background

• Training programs -> efficient training
  – Resident 80-hour work-week
  – Ever-increasing medical knowledge\(^1\)
  – Cost of GME\(^2\)
    • To programs, hospitals, CMS ($)
    • To trainees ($,)
  – Generating competent practitioners

• Understanding pace of resident skill advancement in the operating room -> more efficient training
Background

- Conscious Competence Learning Model

![Chart showing the Conscious Competence Learning Model]

- **Unconscious Incompetence**: You are unaware of the skill and your lack of proficiency.
- **Unconscious Competence**: Performing the skill becomes automatic.
- **Conscious Incompetence**: You are aware of the skill but not yet proficient.
- **Conscious Competence**: You are able to use the skill, but only with effort.
Specific Aim

• To determine how long it takes residents to achieve step-wise advances in operative skills for common plastic surgery cases.
Methods

- Used Operative Entrustability Assessment (OEA)
- Validated tool\textsuperscript{3,4} for quick assessment of operative competence
- One score given per CPT code
- Ratings based on 5-point scale
  - 1 = "observed case"
  - 5 = "can take junior resident through case"
  - Operative competence ≥ 4 ("resident can perform entire surgery")
Methods

- Abstracted OEA data from MileMarker®
- Included data from 2 training programs
  - Baylor Scott & White
  - Johns Hopkins/Univ. of Maryland
- Identified most common cases for which OEAs are completed
  - Stratified OEAs
    - CPT code, resident, score transition level
  - Assessed # of cases for which OEAs are completed before OEA score increase.
  - Used descriptive statistics (e.g., avg., range)
Results

• Study period: 5.5 years
• Of ~12,000 OEAs in MileMarker®,
• 682 OEAs selected for inclusion
  – 19357, Breast Reconstruction (n=400)
  – 29848, Endoscopic Carpal Tunnel Release (n=282)
• 54 unique residents
## Results

- OEA cases logged by residents between skill levels

### Breast Reconstruction (CPT 19357) (n=400)

<table>
<thead>
<tr>
<th>OEA Level Change</th>
<th>Level 1-2</th>
<th>Level 2-3</th>
<th>Level 3-4</th>
<th>Level 4-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Residents</td>
<td>8</td>
<td>26</td>
<td>36</td>
<td>33</td>
</tr>
<tr>
<td>Number of OEAs</td>
<td>16</td>
<td>90</td>
<td>169</td>
<td>107</td>
</tr>
<tr>
<td>Mean (±SD)</td>
<td>2 (1.3)</td>
<td>3.5 (2.8)</td>
<td>5.2 (4.7)</td>
<td>3.2 (2.6)</td>
</tr>
<tr>
<td>Range</td>
<td>1-4</td>
<td>1-12</td>
<td>1-18</td>
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### Endoscopic Carpal Tunnel (CPT 29848) (n=282)

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<tbody>
<tr>
<td>Number of Residents</td>
<td>4</td>
<td>26</td>
<td>43</td>
<td>29</td>
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<td>Number of OEAs</td>
<td>4</td>
<td>60</td>
<td>138</td>
<td>98</td>
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<td>Mean (±SD)</td>
<td>1 (0)</td>
<td>2.3 (1.5)</td>
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<tr>
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<td>N/A</td>
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Results

- OEA cases logged by residents between skill levels

| Breast Reconstruction (CPT 19357) (n=400) |
|---|---|---|---|---|
| OEA Level Change | Level 1-2 | Level 2-3 | Level 3-4 | Level 4-5 |
| Number of Residents | 8 | 26 | 36 | 33 |
| Number of OEAs | 16 | 90 | 169 | 107 |
| Mean (±SD) | 2 (1.3) | 3.5 (2.8) | 5.2 (4.7) | 3.2 (2.6) |
| Range | 1-4 | 1-12 | 1-18 | 1-12 |

| Endoscopic Carpal Tunnel (CPT 29848) (n=282) |
|---|---|---|---|---|
| OEA Level Change | Level 1-2 | Level 2-3 | Level 3-4 | Level 4-5 |
| Number of Residents | 4 | 26 | 43 | 29 |
| Number of OEAs | 4 | 60 | 138 | 98 |
| Mean (±SD) | 1 (0) | 2.3 (1.5) | 3.2 (2.5) | 3.4 (2.4) |
| Range | N/A | 1-6 | 1-11 | 1-9 |
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Conclusions

- Highest # of assessments occurred:
  - CPT 19357:
    - Skill level 3 ("needs verbal guidance") -> level 4 ("operates independently")
      - Mean=5.2 cases
      - Range: 1-18
  - CPT 29848:
    - Skill level 4 ("operates independently") -> level 5 ("can take junior resident through case")
      - Mean=3.4 cases
      - Range: 1-9
Conclusions

• Conscious Competence Learning Model

- Unconscious Incompetence: You are unaware of the skill and your lack of proficiency.
- Unconscious Competence: Performing the skill becomes automatic.
- Conscious Incompetence: You are aware of the skill but not yet proficient.
- Conscious Competence: You are able to use the skill, but only with effort.
Conclusions

- Conscious Competence Learning Model

Unconscious Incompetence
DIRECT

Conscious Incompetence
You are aware of the skill but not yet proficient

Conscious Competence
You are able to use the skill, but only with effort

Unconscious Competence
Performing the skill becomes automatic
Conclusions

- Conscious Competence Learning Model

Unconscious Incompetence
DIRECT

Conscious Incompetence
GUIDE

UNCONSCIOUS COMPETENCE
Performing the skill becomes automatic

CONSCIOUS COMPETENCE
You are able to use the skill, but only with effort
Conclusions

- Conscious Competence Learning Model

Unconscious Incompetence
DIRECT

Conscious Incompetence
GUIDE

Conscious Competence
SUPPORT
Conclusions

- Conscious Competence Learning Model
Conclusions

• Conscious Competence Learning Model

Unconscious Competence
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Unconscious Competence
DELEGATE

Conscious Competence
GUIDE

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CPT 19357
Conclusions

- Conscious Competence Learning Model

- Unconscious Incompetence
  - DIRECT

- Conscious Incompetence
  - GUIDE

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  - DELEGATE

- Conscious Competence
  - SUPPORT

CPT 19357

CPT 29848
References


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  - Maryland Innovation Initiative (MII) – TEDCO
  - Johns Hopkins Technology Transfer
  - Multiple Venture Capital Firms and Private Investors

- **Faculty and Residents,**
  Department of Plastic and Reconstructive Surgery, Johns Hopkins University SOM