A Video-Based Coaching Intervention to Improve Surgical Skill in Fourth Year Medical Students

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Background

- For senior medical students pursuing careers in surgery, specific technical feedback is critical for developing foundational skills in preparation for residency.
- Opportunities to receive directed, technical feedback on surgical skills are time-limited to optimize patient care.
- Video-based coaching is commonplace in other professional fields like athletics for its effectiveness in optimizing technique.
- Video-based interventions to improve skills in surgery have gathered increased attention for their use in faculty quality improvement, as well as outcomes research.

HYPOTHESES:
1. Students who receive a coaching session regarding their technical skills will demonstrate greater improvement compared to students who did not receive the coaching intervention.
2. Students will find the coaching sessions informative and enjoyable.

Methods

- All fourth year medical students pursuing careers in surgical specialties were contacted via email for voluntary participation.
- All students were randomized to one of two groups:
  - Coached: Students viewed footage of their suturing task with a faculty member as part of a technical skills coaching session.
  - Controls: Students were given a break with no coaching intervention.
- Videos were evaluated by independent faculty members to compare baseline vs. follow up technical skills.
- Students evaluated their own suture technique following both baseline and follow up suture tasks.
- University of Michigan IRB approved (HUM0129685).

Results

- Student Perception of Coaching Session (n=16)

<table>
<thead>
<tr>
<th>Area</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Neither Agree or Disagree</th>
<th>Somewhat Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This was a beneficial experience for me</td>
<td>94%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>This experience improved my technical skills</td>
<td>75%</td>
<td>19%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- Student Self-evaluation of Suture Skills (n=16)

<table>
<thead>
<tr>
<th>Area</th>
<th>Coached</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Change (5-point scale)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bimanual dexterity</td>
<td></td>
<td></td>
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<tr>
<td>Efficiency</td>
<td></td>
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<td>Tissue handling</td>
<td></td>
<td></td>
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<tr>
<td>Consistency</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
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</tbody>
</table>

- Coached: 0.6 vs. -0.4
- Control: -0.2 vs. -0.6

Positive Comments
- "My view is more specific and concrete - much easier to reflect on strengths/areas of weakness."
- "I felt more confident in the aspects that I have been doing well, and it showed me more clearly the impact of my inefficiencies."
- "Saw and learned about minor changes to technique that can greatly improve efficiency and skills."
- "It showed me areas I could improve in small motions that I considered "basic" and easy enough not to notice."

Suggestions for Improvements
- "Doing a running subcuticular stitch, as these are harder and more commonly performed tasks for students."
- "Just including more and different technical skills. The more the better!"
- "I think that offering a similar trainer for subcutaneous closures as well as running closures would be really useful."
- "Consider having students watch a master video and then watch their video before meeting with the coach - could help continue to develop our self-reflective skills."

Conclusions

- Subjective, free response comments from students centered on the following themes:
  - Becoming more aware of non-productive hand movements
  - Benefits of viewing themselves from the camera placed across the table from them- simulating an attending's view
  - The usefulness of the coaching advice moving forward

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  - Benefits of viewing themselves from the camera placed across the table from them- simulating an attending's view
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- This study demonstrated the feasibility of a video based coaching intervention in undergraduate medical education.
- Coaches and students are able to visualize an extensive field of view while simultaneously appreciating granular details such as appropriate needle loading or the exact placement of stitches in tissue.
- Student self evaluations demonstrate greater subjective self improvements in all graded domains for students who received the coaching intervention compared to controls.
- Based on faculty evaluations, mixed results were observed comparing improvements in coached students versus controls.
- The coaching experience was well received by students, with 100% of students recommending this training to their peers and repeated feedback desiring the expansion to include other technical skills.