Virtual Interactive surgical skills classroom (VIRTUAL) - A Randomised Controlled Trial

Arjun Nathan1, Monty Fricker2, Nancy Hanna3, Aqua Asif4, Sonam Patel1, Maria Georgi1, Kien Hang1, Amil Sinha3, Will Mullins3, Jessie Shea3, Benjamin Lamb5, Ashwin Sridhar1, John Kelly1, Justin Collins1

1.University College London, London, United Kingdom
2.Newcastle University, Newcastle, United Kingdom
3.University of Cambridge, Cambridge, United Kingdom
4.University of Leicester, Leicester, United Kingdom
5.Cambridge University Hospitals, Cambridge, United Kingdom
Importance of the Study

Surgical skill courses are typically face-to-face

Non-interactive distanced training (independent practice supplemented with pre-recorded training material)

Virtual classroom training
Virtual Classroom Teaching

• Increase teaching accessibility
• Facilitate large scale teaching
• International collaboration
The Virtual Classroom
Different screens students can click through

Main window which students can use to maximise their view of any of the screens

Camera view of the instructor

‘Chat’ section where attendees can write messages. Any polls you create also appear here.

This is where students can see themselves and each other
Primary Objective

• To measure the effect of virtual basic surgical skills classroom training on medical students’ ability to place three interrupted sutures with hand tied knots.
Secondary objectives

1. To compare the efficacy of virtual basic surgical skills classroom training to both face-to-face and non-interactive training.
2. To measure the effect of different training methods on students’ subjective confidence in suturing and enthusiasm for surgery.
3. To assess the accessibility of virtual basic surgical skills classroom training.
4. To assess the feasibility of virtual basic surgical skills classroom training.
5. To validate a novel granular scoring system for suturing skill assessment.
Inclusion Criteria

- London-based
- Medical student
- Required date availability
- Access to a computer and smartphone with an integrated camera
Method – Participant Selection

72

UCL
Imperial College London
King's College London
QMUL
St. George's

Year 1/2
Year 3/4
Year 5/6
Method – Pre-Intervention

ENTHUSIASM FOR SURGERY
SUTURING ABILITY
PREVIOUS TRAINING
HAND DOMINANCE
Method - Allocation and Randomisation

- Non-Interactive Video
- Assessment Task Attempt 1
  - A: Independent Practice
  - B: Virtual Classroom
  - C: Face-to-Face
- Assessment Task Attempt 2
<table>
<thead>
<tr>
<th>Group</th>
<th>Method</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>Independent practice, No feedback, Monitored over video call</td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>Virtual classroom, Live expert feedback and guidance, 1:12 instructor to student ratio</td>
<td></td>
</tr>
<tr>
<td>Group C</td>
<td>Face-to-face, 1:6 instructor to student ratio, Live expert feedback and guidance</td>
<td></td>
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</tbody>
</table>
Method - Video Assessment

- 2 experts will blindly mark videos
- OSAT and novel granular scoring system

<table>
<thead>
<tr>
<th>Table 3: Itemised technical performance in OSAT components: before and after course (number of participants performing correctly, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Before course</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Safe removal of suture from packet</td>
</tr>
<tr>
<td>Safe mounting on needle holder</td>
</tr>
<tr>
<td>Appropriate mounting and orientation of needle in jaws</td>
</tr>
<tr>
<td>Counter traction on tissue by forceps</td>
</tr>
<tr>
<td>Appropriate suture bite size</td>
</tr>
<tr>
<td>Appropriate trajectory of needle through tissues</td>
</tr>
<tr>
<td>Appropriate formation of each throw of knot</td>
</tr>
<tr>
<td>Appropriate crossing of hands with each throw</td>
</tr>
<tr>
<td>Appropriate number of throws for suture material used</td>
</tr>
<tr>
<td>Correct suture tension: not pulled too tight</td>
</tr>
<tr>
<td>Correct suture tension: not left too loose</td>
</tr>
<tr>
<td>Correct cut/length of suture</td>
</tr>
<tr>
<td>Correct distance between sutures</td>
</tr>
<tr>
<td>Avoided handling needle</td>
</tr>
<tr>
<td>Safe put-down/disposal of needle</td>
</tr>
<tr>
<td>Correct stitch removal technique</td>
</tr>
<tr>
<td>Completed task with suture length provided</td>
</tr>
</tbody>
</table>

* These percentages calculated from a denominator of 16 (one rating missing on these items)
Methodology

Participant recruitment → Pre-Intervention questionnaire

Inclusion and exclusion → Assessment Task Attempt 1

Intervention: Group A, B or C → Assessment Task Attempt 2
Data Analysis

Primary objective

• Mean difference between participants’ performance pre- and post-intervention according to the OSATS

H0

• No statistically significant improvement in OSAT scores

H1

• Statistically significant improvement will be observed
Study Implications

- Largest RCT investigating virtual basic surgical skills classroom training
- Evaluation of the suitability of virtual BSS classroom training
- COVID-19
- May lead to further research into virtual classroom training for complex surgical skills.
Conclusion

The effect of virtual basic surgical skills classroom training on students’ confidence is not established.

Virtual Interactive surgical skills classroom – A Randomized Controlled Trial

Primary objective - effect of virtual basic surgical skills classroom on medical students’ surgical skills.
Thank you for listening!
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A Randomised Controlled Trial

Introduction

- Barriers to face-to-face basic surgical skills (BSS) training include: high costs, inaccessibility and location.
- Whereas non-interactive distant training (independent practice supplemented with pre-recorded training material) provide no tutor interaction or feedback.
- Virtual classrooms enable the combination of computer-based learning with interactive expert instruction and feedback. They may optimise resources and increase accessibility, facilitating larger-scale training whilst producing a similar educational benefit.
- We aim to evaluate the efficacy of virtual BSS classroom training compared to both non-interactive video and face-to-face teaching.

Method

- 72 medical students will be randomly assigned to three equal intervention groups based on year group and surgical skill confidence.
- Interventions will be implemented following an instructional video. Group A will practice independently, Group B will receive face-to-face training, and Group C will receive virtual classroom training.
- The assessed task will be to place three interrupted sutures with hand tied knots.
- The primary objective is to measure the effect of virtual basic surgical skills classroom training on medical students’ ability to place three interrupted sutures with hand tied knots.
- Pre- and post-intervention Objective Structured Assessment of Technical Skills (OSATS) will be blind marked independently by two experts.
- Changes in subjective suturing confidence, granular performance score, time to task completion and enthusiasm for surgery will be measured.

Results

- Significant improvement in OSATS within groups will be indicative of intervention quality.
- Improvements in subjective suturing confidence, granular performance score and time to task completion will provide further evidence of effectiveness.
- Differences in improvements measured between groups will determine the interventions’ relative performance.

Conclusion

- To our knowledge, this will be the largest randomised control trial investigating virtual BSS classroom training.
- It will serve as a comprehensive appraisal of the suitability of virtual BSS classroom training as a practical and cost-effective alternative to face-to-face training.
- The validation of training modalities that permit social distancing is of particular importance during the COVID-19 pandemic and in the future.
- The findings of this study will assist the development and implementation of further resource-efficient virtual BSS training programs.