Theme: Remote Development of Clinical Competences

Title: WE Transform Dental Education: Level of Evidence for Surgical Simulation

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Institution: Tufts University School of Dental Medicine

Date: 9th November 2020
Outline of today’s presentation

Transition to Remote Education

Virtual Periodontology Rotations

Touch Surgery Introduction

Level of Evidence

Supporting Theories

Significance

There are two approaches to gain access to the sinus by osteotomy. These are the lateral approach, and the inferior cortical approach.
The COVID-19 epidemic forced a rapid transition to remote education. DMD students were exposed to periodontal surgery in the past during:

- Periodontal rotations (Y3, Y4)
- Predoctoral surgery program (Y4, selected cases)
- Lectures in Periodontology II (DMDY3)

COVID-19 shutdown caused several changes in the curriculum:

- Rotations were replaced by virtual rotations
- All procedures, including surgeries were temporarily halted
- Lectures were (and still are) administered remotely
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Virtual Periodontal Rotation

**Traditional periodontal rotation**

DMD3 and DMD4 students spend sessions in the postgraduate periodontal clinic observing and assisting surgical periodontal procedures, including:

- Open flap debridement
- Osseous surgery
- Gingival grafting
- Implant placement
- Bone grafting, including sinus lift

**Problem:**
- Dental clinic closure at TUSDM due to COVID-19 epidemic
- DMD student rotations in the postgraduate periodontal clinic are cancelled

**Action:**
- Remote case presentation by periodontal faculty and resident
- Group discussion facilitated by virtual reality, poll questions, online chat
- Online posting study materials relevant to the case
- Recording of sessions so that every rotation group can view all sessions

**Outcomes:**
- Valuable experience for all stakeholders
- Polling showed improvement in students’ knowledge

**Gyurko R, Neste C, Dragan IF. Transitioning clinical rotations to a virtual experience: Problem, solution and results. J Dent Educ. 2020;1-3.**
# LOGIC MODEL

<table>
<thead>
<tr>
<th>AIM/ASSUMPTIONS</th>
<th>RESOURCES</th>
<th>ACTIVITIES</th>
<th>OUTCOME/IMPACT</th>
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<td>1. Teaching Surgical Skills in a Virtual Format considering COVID.</td>
<td>1. Educational Technology (Zoom). 2. Content delivery – Case Presentation. 3. Training Faculty – faculty training was required before they deliver the content virtually. 4. Touch Surgery application was used as a portable simulator.</td>
<td>1. Synchronous sessions where live lecture is delivered. 2. Asynchronous sessions where students can download the app and play around themselves. 3. Knowledge retention of the students is tested with the help of a pre and post-assessment test. 4. Feedback from the students is available regarding this.</td>
<td>1. Valuable experience for all. 2. Student’s knowledge showed improvement.</td>
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Surgical Simulation: Touch Surgery App

Touch Surgery Interactive Surgical Simulation App

Learn, test, and prepare on more than 200 simulations.

Touch Surgery is an academically-validated interactive surgical simulator that provides a realistic and detailed guide to every step of a procedure. So you can learn, test, and rehearse for surgery – anytime, anywhere.

VISIT SITE ➤ touchesurgery.com/simulations
• 200+ surgical simulations across 17 specialties, including dentistry and oral surgery
• Used in surgical resident training and assessment
• Cognitive Task Simulation and Rehearsal Tool
• First developed in 2010 by Digital Surgery LTD, a London, New York City, Sydney and Auckland-based health technology company

touchsurgery.com/simulations
• Touch surgery has gained widespread acceptance in surgical specialty training as an interactive simulation and rehearsal tool.
• It is used to reduce incidence of surgical complications.
Worldwide use of Touch Surgery app

Active Users
2.00M+

Learns & Tests
15.31M+

Surgeons
344,932

Medical Students
581,992

Medics
581,992

Patients
43,868

United States
1,015,481
50.75%

Canada
48,931
(2.40%)

United Kingdom
120,397
(6.35%)

Brazil
125,958
(6.00%)

India
27,523
(1.37%)

China
30,692
(1.49%)

Russian Federation
26,055
(1.47%)

All data is for active users only (users who have done a 'learn' or a test).
Dentistry Specialty Users by Location

- United States: 64,958
- United Kingdom: 8,740
- Canada: 3,197
- Mexico: 1,742
- Russia: 3,020
- Spain: 1,818
- India: 1,672
- Thailand: 1,472
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There are two approaches to gain access to the sinus by osteotomy. These are the lateral approach, and the inferior orbital approach.
Knowledge retention & cognitive skills

Impact on Patient Care

Level of evidence

Outcomes Reported

- Validation (n=10)
- Impact on Patient Care (n=8)
- Knowledge retention & cognitive skills (n=1)

Acknowledgement: Amanda Nevius
Validating Touch Surgery™: A cognitive task simulation and rehearsal app for intramedullary femoral nailing
Kapil Sugand1, Mala Mawkin, Chinmay Gupte
MIS Lab, Imperial College London, Level 7 East, Chelsea and Westminster Hospital, Fulham, London, W6 8RF, UK

Validation of the mobile serious game application Touch Surgery™ for cognitive training and assessment of laparoscopic cholecystectomy
Karl-Friedrich Kowalski2, Jonathan D. Hendrie1, Mona W. Schmidt3

Validation of a Novel Cognitive Simulator for Orbital Floor Reconstruction
Renata Kielemoyski DDS, MD, R. Brianna Hill BA1, Daniel Buchtinder DMD, MD1

Validation of a Cognitive Task Simulation and Rehearsal Tool for Open Carpal Tunnel Release
John A. M. Parn, Anna Luan, Gordon K. Lee
Division of Plastic and Reconstructive Surgery, Stanford Hospital and Clinics, CA, USA
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There are two approaches to gain access to the sinus by osteotomy. These are the lateral approach, and the inferior alveolar approach.
What is the pedagogical principle that supports the learning with simulators of our students?

Theories

Cognitive Task Analysis

Constructivism
Cognitive task analysis (CTA)

CTA is the underlying methodology used in the Touch Surgery app.

Surgical procedures on Touch Surgery are created with leading surgical experts in the field, using a CTA approach. This creates a map of an operation. The medical visualization team layers this onto a VR patient.

Cognitive Task Analysis helps you unpack the thought processes of experts, so you can teach them to others.

CTA breaks a procedure into its cognitive steps, with particular focus on decision-making.

Without positive reinforcement, research shows that after 30 days only 10 per cent of the learning acquired in a passive state is retained, because learners don’t apply what they’ve learned.

Linking new knowledge to prior knowledge is explained in the theoretical framework of constructivism, which attributes learning to the interaction between new knowledge and already existing schemas (knowledge structure) in long-term memory for the construction of new schemas in a process known as elaboration.

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Significance: Use of this in dental education?

Recent studies have shown that simulation training improves performance during real cases with fewer errors.

Mobile simulators offer an useful adjunct to enhance undergraduate clinical skills education.

Mobile Simulators compared to current gold-standard revision resources, have significant advantages in terms of cost-effectiveness and practice flexibility.

Perceptions towards surgical simulation by residents is predominantly positive with most residents appreciating that simulation-based training is essential and should be mandatory in current residency programmes.
Surgical Simulation: Live Demonstration
WE Transform Dental Education: Level of Evidence for Surgical Simulation