The Use of Simulation in Teaching Office-Based Medical Emergencies to Dental Students

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Disclosures

None

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An Office-Based Emergencies Course for Third-Year Dental Students

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Abstract: Although uncommon, medical emergencies do occur in the dental office setting. This article describes the development and implementation of an office-based emergencies course for third-year dental students. The course reviews the basic management of selected medical emergencies. Background information is provided that further highlights the importance of proper training to manage medical emergencies in the dental office. Details regarding course development, implementation, logistics, and teaching points are highlighted. The article provides a starting point from which dental educators can modify and adapt this course and its objectives to fit their needs or resources. This is a timely topic that should benefit both dental students and dental educators.
Learning Objectives

1. Recognize the importance of providing emergency medical training for medical emergencies encountered in the dental office setting

2. Identify ways to incorporate simulation into an “Office Based Emergencies” course for dental students

3. Develop a strategy to implement an “Office Based Emergencies” course at your institution
Current Training

- Large disparity in training (mean 19 hours, range 3 – 60 hours)
- The majority of training occurs in the second and third year of dental school
- Role playing and simulation is utilized by less than two thirds of responding programs (62.8%)
How Dental Students Would React to a Real or Simulated Medical Emergency

Ability of Dental Students to Deliver Oxygen in a Medical Emergency


- 50% of the students were unable to successfully operate the oxygen regulators
- **Modifications that occurred as a result of the study**
  - Standardized all oxygen regulators
  - Relocation of some oxygen tanks
  - Oxygen masks attached to oxygen tanks
  - Development of online training modules
Medical Emergency Training

- Kornberg SOD – Summer lecture series for students entering 3rd year of training
- Need for additional training identified by SOD leadership in the spring of 2011
- Review of the medical literature:
  - No national standards exist for this training
  - Incidence, office preparedness, general recommendations for management
Simulation of medical emergencies in dental practice: development and evaluation of an undergraduate training programme

JP Newby, *† J Keast, * WR Adam *

*Rural Health Academic Centre, The University of Melbourne, Victoria.
†Goulburn Valley Health, Shepparton, Victoria.

Australian Dental Journal 2010; 55: 399–404

A dental undergraduate course for the management of medical emergencies in dental practice

M. C. Balmer

Liverpool University Dental Hospital, University of Liverpool, Liverpool, UK

Training Programs

University of Melbourne
- Training needs:
  - Incidents of medical events in dental practice
  - Pre-reading / BLS workshop / Simulation training in a hospital dental clinic

University of Liverpool
- Didactic component / Clinical skills practical training / Scenario practice in a clinical setting / Assessment (Pre / Post – MCQ / scenario test)
Citation

Citation
Training Programs

Cardiovascular simulation cases for dental students

- HFS based cases to expose first-year dental students to the physiological processes related to cardio-vascular emergencies

HFS for teaching medical emergencies

- Explain how to integrate HPS into dental and/or allied dental curricula
- Utilize template's provided to design appropriate dental human patient simulation scenario including de-briefing/grading key
Course Content
Course Content

- Didactic presentation – 2 hours
- Clinical skills stations – 3 hours
- 3rd year dental students
- Achievable objectives
  - General review / furthering of an understanding on how to care for a patient presenting to the dental office with selected medical emergencies
  - Formative feedback
  - Logistics prohibited adequate assessment of skills
## Course Content

### Didactic component

<table>
<thead>
<tr>
<th>Iatrogenic complications / emergencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergic reaction / anaphylaxis</td>
</tr>
<tr>
<td>Local anesthetic toxicity / adverse effects</td>
</tr>
<tr>
<td>Vasovagal syncope</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emergencies not related to an office based intervention or procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac emergencies</td>
</tr>
<tr>
<td>Diabetic complications</td>
</tr>
<tr>
<td>Neurologic emergencies</td>
</tr>
<tr>
<td>Pulmonary emergencies</td>
</tr>
</tbody>
</table>
Didactic Component

Additional topics covered:
- Background / Introduction
- Dental school guidelines / location / content emergency equipment
- General principles of emergency care
- Elevated blood pressure
- Medical emergency equipment
<table>
<thead>
<tr>
<th>Station 1</th>
<th>Station 2</th>
<th>Station 3</th>
<th>Station 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vital Signs - Anaphylaxis</strong>&lt;br&gt;• Anaphylaxis&lt;br&gt;• Blood pressure&lt;br&gt;• Lung Sounds</td>
<td><strong>Pulmonary</strong>&lt;br&gt;• O2 Admin.&lt;br&gt;• Airway Adjuncts&lt;br&gt;• BVM ventilation&lt;br&gt;• Airway obstruction</td>
<td><strong>Neurologic</strong>&lt;br&gt;• Seizure&lt;br&gt;• Syncope&lt;br&gt;• Hypoglycemia</td>
<td><strong>Cardiac</strong>&lt;br&gt;• BCLS&lt;br&gt;• Chest pain / MI&lt;br&gt;• Use of an AED</td>
</tr>
</tbody>
</table>
Station 1 – Vital Signs/Anaphylaxis
Station 2 – Pulmonary
Lessons Learned

- Support from dental school leadership
- Early planning necessary
- Instructor availability always a challenge
  - Transitioned to all attending instructors

**Modifications made for 2nd course (2012)**

- Cardiac /respiratory stations reorganized
- Addition of anaphylaxis to VS station
- Assessment – still a challenge
Logistics

- Curriculum
- Class Size
- Facility Availability
- Simulation Equipment
- Faculty Availability
- Fees (Facility, Faculty, SP Costs)

Dental OBE Course
Clinical Skill Stations

- Class of 136 divided into 4 equal groups
  - 26 – 28 students per block
- Instructor: student ratio approximately 1:6
- Groups randomly assigned to AM or PM session
  - 9a – 12p or 1p – 4p
- Clinical skill stations completed over 3 days
<table>
<thead>
<tr>
<th>Time</th>
<th>All Groups – Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 9:10</td>
<td>Station 1</td>
</tr>
<tr>
<td>9:15 – 9:50</td>
<td>A</td>
</tr>
<tr>
<td>9:55 – 10:30</td>
<td>D</td>
</tr>
<tr>
<td>10:35 – 11:10</td>
<td>C</td>
</tr>
<tr>
<td>11:15 – 11:50</td>
<td>B</td>
</tr>
<tr>
<td>11:55 – 12:10</td>
<td>All Groups – Wrap Up</td>
</tr>
</tbody>
</table>
Resources / Equipment

- **Station 1 – Vital Signs**
  - Blood pressure cuffs
  - Dry erase board / markers
  - Lap top computer
  - SimMan®
  - Stethoscopes
  - Student Auscultation Mannequin™
  - Epi-pen trainers

- **Station 2 – Pulmonary**
  - Bag valve masks
  - Laerdal Airway Management Trainer®
  - Magill forceps
  - Nasal cannulas
  - Nasopharyngeal / oral airways
  - Non-rebreather face masks
  - SimMan®

- **Station 3 – Neurologic**
  - Audio visual system to watch live scenario
  - Blood pressure cuff
  - Debriefing room
  - Dental chair
  - Standardized patient
  - Stethoscope

- **Station 4 – Cardiac**
  - Automated external defibrillator trainer
  - Bag valve mask
  - SimMan®

- **Conference room**
  - Lap top computer / projector
Assessment / Evaluation

- Pre- & post-course
- Rate your comfort with performing selected skills or caring for selected patients
- 5 item Likert Scale
82% response rate (104/127)

Achieved the learning objectives:
- 74.8% Strongly Agree
- 25.2% Agree

Stations were educational and valuable:
- 86.5% Strongly Agree
- 13.5% Agree
Survey Results

Comfort level in skill performance – Strongly Agree

<table>
<thead>
<tr>
<th>Skill</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td>32.7</td>
<td>70.6</td>
</tr>
<tr>
<td>Palpating a Pulse</td>
<td>45.2</td>
<td>76.9</td>
</tr>
<tr>
<td>Lung Sounds</td>
<td>3.8</td>
<td>33.3</td>
</tr>
<tr>
<td>Supplemental Oxygen</td>
<td>10.6</td>
<td>61.5</td>
</tr>
<tr>
<td>Bag Valve Mask</td>
<td>5.8</td>
<td>69.2</td>
</tr>
<tr>
<td>CPR</td>
<td>11.5</td>
<td>68.3</td>
</tr>
</tbody>
</table>
Survey Results

Comfort in caring for patient with chief complaint
Strongly Agree

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP or SOB</td>
<td>1.9</td>
<td>26.9</td>
</tr>
<tr>
<td>AMS</td>
<td>1</td>
<td>22.1</td>
</tr>
<tr>
<td>FB Aspiration</td>
<td>1</td>
<td>26</td>
</tr>
</tbody>
</table>
Next Step

In Development

- Office medical emergency training for TUH/Episcopal campus Pediatric Dental Residency
- Planned – Fall 2014
Thank you!

Contact Information

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