“Mitigating the Dental July Effect”

UT Health School of Dentistry
Meet the Team

Participants
Joseph P. Connor DDS MA Associate Professor
Mark Littlestar DDS Assistant Dean for Clinics
Barbara MacNeill Assistant Director
Advanced Education in General Dentistry Program

Facilitator
Edna Cruz. M.Sc., RN, CPHQ, CPPS

Sponsor
Gary F. Guest, DDS, Associate Dean & Associate Dean for Patient Care
The July Effect Defined

• The term “July Effect” refers to a “perceived increase in the risk of medical errors and surgical complications that occur when... medical school graduates begin residencies.

• Dental schools experience the same perceived effect in the first months of clinical experience despite concerted efforts to mitigate this phenomenon.
Aim Statement

To increase the level of confidence in treatment planning decisions from 4.6 to 6.0% by December 2017.

What are we trying to Accomplish? . . . understanding the problem
WikiClinic areas of impact

- Stovepipe courses
- Lack of experience
- Hundreds of discreet tasks
- Separation of didactic and clinical courses

- Medical complications
- Financial resources
- Dental complexity

Students

- Lack of calibration
- Unfamiliar with Resources
- Loss of Diagnosis department
- Faculty Shortage
- Difficulty in locating reference materials
- Requires one-on-one training on a case-by-case basis
- Risk / benefit analysis for each procedure with dozens of yes/no decisions

Patients

Process

Faculty

Treatment Plan
Pre- Survey distributed to Third Year Dental Students

- 20 questions concerning student level of confidence in performing specific tasks that they will perform in the first months of clinic

- 10 point Likert scale where 1 was “I am not confident at all” and 10 was “I am very confident”

- 110 responses (100% participation)

- Focused on lowest mean student scores

- Formulate and record a multi-discipline dental treatment plan received a score of 4.63 out of 10
### Pre-Survey Results recorded July 5, 2018

<table>
<thead>
<tr>
<th>Task</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>Variance</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulate and record a multi-discipline dental treatment plan</td>
<td>1</td>
<td>10</td>
<td>4.63</td>
<td>2.29</td>
<td>5.25</td>
<td>110</td>
</tr>
<tr>
<td>Locate materials, devices, and forms</td>
<td>1</td>
<td>10</td>
<td>5.12</td>
<td>2.47</td>
<td>6.09</td>
<td>110</td>
</tr>
<tr>
<td>Perform removable prosthodontic procedures</td>
<td>1</td>
<td>10</td>
<td>5.19</td>
<td>2.07</td>
<td>4.3</td>
<td>109</td>
</tr>
<tr>
<td>Overall, I feel well prepared to begin patient care</td>
<td>1</td>
<td>10</td>
<td>5.37</td>
<td>2.11</td>
<td>4.45</td>
<td>110</td>
</tr>
<tr>
<td>Make entries in the dental record using AxiUm</td>
<td>1</td>
<td>10</td>
<td>5.43</td>
<td>2.34</td>
<td>5.48</td>
<td>110</td>
</tr>
<tr>
<td>Detect and assess dental caries lesions</td>
<td>1</td>
<td>10</td>
<td>5.45</td>
<td>2.21</td>
<td>4.88</td>
<td>110</td>
</tr>
<tr>
<td>Recognize and remove caries</td>
<td>1</td>
<td>10</td>
<td>5.71</td>
<td>2.26</td>
<td>5.12</td>
<td>110</td>
</tr>
<tr>
<td>Perform scaling and root planing to remove subgingival calculus</td>
<td>1</td>
<td>10</td>
<td>5.78</td>
<td>2.48</td>
<td>6.13</td>
<td>110</td>
</tr>
<tr>
<td>Treatment plan for single crown restorations</td>
<td>1</td>
<td>10</td>
<td>5.84</td>
<td>2.26</td>
<td>5.1</td>
<td>109</td>
</tr>
<tr>
<td>Select and handle the appropriate restorative material</td>
<td>1</td>
<td>10</td>
<td>5.87</td>
<td>2.26</td>
<td>5.11</td>
<td>110</td>
</tr>
<tr>
<td>Present treatment options to my patient</td>
<td>1</td>
<td>10</td>
<td>5.89</td>
<td>2.52</td>
<td>6.37</td>
<td>109</td>
</tr>
<tr>
<td>Formulate a periodontal diagnosis</td>
<td>1</td>
<td>10</td>
<td>5.94</td>
<td>2.24</td>
<td>5.01</td>
<td>110</td>
</tr>
<tr>
<td>Adjust the occlusion and cement the crown</td>
<td>1</td>
<td>10</td>
<td>5.97</td>
<td>2.44</td>
<td>5.94</td>
<td>110</td>
</tr>
<tr>
<td>Perform dental restorative procedures</td>
<td>1</td>
<td>10</td>
<td>6.05</td>
<td>2.29</td>
<td>5.24</td>
<td>110</td>
</tr>
<tr>
<td>Make an endodontic diagnosis</td>
<td>1</td>
<td>10</td>
<td>6.19</td>
<td>2.29</td>
<td>5.23</td>
<td>110</td>
</tr>
<tr>
<td>Make an impression and provisionalize</td>
<td>1</td>
<td>10</td>
<td>6.26</td>
<td>2.32</td>
<td>5.39</td>
<td>110</td>
</tr>
<tr>
<td>Place, finish, and polish the restoration including occlusal adjustment</td>
<td>1</td>
<td>10</td>
<td>6.27</td>
<td>2.3</td>
<td>5.27</td>
<td>110</td>
</tr>
<tr>
<td>Prepare a tooth for restoration with a crown</td>
<td>1</td>
<td>10</td>
<td>6.63</td>
<td>2.22</td>
<td>4.92</td>
<td>110</td>
</tr>
<tr>
<td>Isolate the surgical site</td>
<td>1</td>
<td>10</td>
<td>6.81</td>
<td>2.29</td>
<td>5.23</td>
<td>110</td>
</tr>
<tr>
<td>Perform a Dental Examination</td>
<td>1</td>
<td>10</td>
<td>6.98</td>
<td>2.12</td>
<td>4.51</td>
<td>110</td>
</tr>
</tbody>
</table>

Average mean 5.87
Formulate and record a multi-discipline dental treatment plan.
# Action Plan

Aim Statement: To raise the level in confidence in treatment planning decisions for 4.6 to 6.0 percent by December of 2017.

<table>
<thead>
<tr>
<th>Action Strength</th>
<th>Action Driver</th>
<th>Action</th>
<th>Who?</th>
<th>Why?</th>
<th>Start Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Calibration of faculty</td>
<td>Approval of Dean and Chairs, presentation to the faculty on two occasions</td>
<td>Connor Littlestar MacNeill</td>
<td>Introduce WikiClinic, Calibrate Faculty, Grant access, encourage participation</td>
<td>May 2017</td>
</tr>
<tr>
<td>Strong</td>
<td>Introduction of concept (students)</td>
<td>Presentation to students at orientation</td>
<td>Connor</td>
<td>Grant access, outline content, explain use</td>
<td>11 July</td>
</tr>
<tr>
<td>Strong</td>
<td>Pre-survey</td>
<td>Conduct survey to determine the level of confidence in tasks performed in the first months of clinic</td>
<td>Connor Littlestar MacNeill</td>
<td>Establish confidence level before using WikiClinic</td>
<td>11 July</td>
</tr>
<tr>
<td>Strong</td>
<td>Introduction of concept (faculty)</td>
<td>One-on-one meetings with faculty leaders</td>
<td>Connor, Littlestar</td>
<td>Explain content and use by students and faculty</td>
<td>Continuous since May</td>
</tr>
<tr>
<td>Strong</td>
<td>Student participation</td>
<td>Formation of student committee to identify improvement of content</td>
<td>Connor MacNeill</td>
<td>Teaching honors program students will work with professors to refine content and improve search function</td>
<td>September, October</td>
</tr>
<tr>
<td>Strong</td>
<td>Faculty Participation</td>
<td>Faculty members selected as advisors for student input</td>
<td>Connor MacNeill</td>
<td>Assure accuracy of web content</td>
<td>October</td>
</tr>
<tr>
<td>Strong</td>
<td>Post survey</td>
<td>Post exposure survey assess the impact of the process improvements</td>
<td>Connor Littlestar MacNeill</td>
<td>Assess the level of improvement in student confidence</td>
<td>02 November</td>
</tr>
</tbody>
</table>
A Wiki is an open access web-based program that allows users to collaborate in creation and modification of content by use of a web browser.

The first wiki was created in 1994 by Ward Cunningham and given the name “Wiki Wiki Web” from the Hawaiian word for “quick” The technology developed over the following decades to be used by individuals, corporations, and schools.

The use of Wikis in medical education has been limited. 45 citations in PubMed.

A 2015 systematic review examined 25 Medical Wikis to determine their use and value in clinical practice of Medicine.

- Brulet A, Llorca G, Letrilliart L. Medical wikis dedicated to clinical practice: a systematic review. Med Internet Res. 2015 Feb 19;17

A PubMed search shows only 4 articles on “Wikis in Dental Education”
Welcome to the WikiClinic! You can search here for help with anything from clinic procedures, to protocols, or even Axium. Below are a few examples of the articles found on the wiki.

Contents

1 Protocols and procedures
2 Grading Criteria
3 Basic Information
4 Types of Cases
5 Rotations
6 Treatment Planning Information
7 Operative
8 Fixed
   8.1 Single-Unit Fixed Restoration
   8.2 CEREC Fixed Restoration
   8.3 Veneers: Patient Information
   8.4 Bonding Zirconia Restorations
   8.5
9 Use of the TRIOS3shape intraoral scanner
   9.1 Video Lists
10 Implant Information
11 Implant referral on AxiUm
12 Glossary of Prosthodontic terms
13 Removable
   13.1 Complete Dentures

UT Health Center for Oral Health and Research
# International Caries Detection and Assessment System

<table>
<thead>
<tr>
<th>American Dental Association Caries Classification System.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sound</strong></td>
</tr>
<tr>
<td>Clin.</td>
</tr>
<tr>
<td>Other Labels</td>
</tr>
<tr>
<td>Infected Dentin</td>
</tr>
<tr>
<td>Appearance of Occlusal Surfaces (Pit and Fissure)* &amp; †</td>
</tr>
<tr>
<td>Accessible Smooth Surfaces, Including Cervical and Root‡</td>
</tr>
<tr>
<td>Radiographic Presentation of the Approximal Surface*</td>
</tr>
</tbody>
</table>

* Photographs of extracted teeth illustrate examples of pit-and-fissure caries.
† The ICDAS notation system links the clinical visual appearance of occlusal caries lesions with the histologically determined degree of dentinal penetration using the evidence collated and published by the ICDAS Foundation over the last decade; ICDAS also has a menu of options, including 3 levels of caries lesion classification, radiographic scoring and an integrated, risk-based caries.
Assessment and Management of Initial Caries Lesions in Fissured Surfaces of Permanent Teeth

- Visual changes in enamel: ICDAS scores 1, 2
- Localized enamel breakdown with no visible dentin or underlying shadow; discontinuity of surface enamel; widening of fissure: ICDAS score 3
- Underlying dark shadow from dentin with or without localized breakdown to extensive cavitation: ICDAS 4, 5, 6

- Caries Risk?
  - Low
    - No Treatment
  - Moderate or High
    - Sealant Recommended

- Sealant or Minimally Invasive Restoration Recommended

- Minimally Invasive Restoration: Preventive Resin Restoration [PRR] or Preventive Amalgam Restoration [PAR]

- Appropriate Preventive Care Based on Caries Risk
  - Monitor
  - Caries Risk Re-Evaluation

International Caries Detection and Assessment System (ICDAS)

0 - Sound
1 - Opacity with air-drying (white or brown)
2 - Opacity without air-drying (white or brown)
3 - Surface Integrity loss
4 - Underlying grey shadow
5 - Distinct cavity
6 - Extensive cavity
Post- Survey conducted November 2, 2018

- The same 20 questions were asked
- 105 total responses
- Designed to gauge specific improvements to confidence level as affected by use of WikiClinic
- Number of times WikiClinic was accessed
- Measure improvement in confidence in formulation of complex treatment plans
- Impact on reduction of clinical errors, increased use of time and productivity
<table>
<thead>
<tr>
<th>Task</th>
<th>Pre-Survey Results</th>
<th>Post-Survey Results</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locate materials, devices, and forms</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.12, Std Deviation: 2.47, Variance: 6.09, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.26, Std Deviation: 1.69, Variance: 2.85, Count: 104</td>
<td>30%</td>
</tr>
<tr>
<td>Overall, I feel well prepared to begin patient care</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.37, Std Deviation: 2.11, Variance: 4.45, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.39, Std Deviation: 1.44, Variance: 2.08, Count: 104</td>
<td>23%</td>
</tr>
<tr>
<td>Make entries in the dental record using AxiUm</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.43, Std Deviation: 2.34, Variance: 5.48, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 8.32, Std Deviation: 1.48, Variance: 2.2, Count: 105</td>
<td>35%</td>
</tr>
<tr>
<td>Recognize and remove caries</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.71, Std Deviation: 2.26, Variance: 5.12, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.5, Std Deviation: 1.61, Variance: 2.59, Count: 105</td>
<td>24%</td>
</tr>
<tr>
<td>Perform scaling and root planing to remove subgingival calculus</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.78, Std Deviation: 2.48, Variance: 6.13, Count: 110</td>
<td>Minimum: 2, Maximum: 10, Mean: 7.72, Std Deviation: 1.72, Variance: 2.95, Count: 104</td>
<td>25%</td>
</tr>
<tr>
<td>Treatment plan for single crown restorations</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.84, Std Deviation: 2.26, Variance: 5.1, Count: 109</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.81, Std Deviation: 1.77, Variance: 3.14, Count: 104</td>
<td>26%</td>
</tr>
<tr>
<td>Select and handle the appropriate restorative material</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.87, Std Deviation: 2.26, Variance: 5.11, Count: 110</td>
<td>Minimum: 4, Maximum: 10, Mean: 7.78, Std Deviation: 1.45, Variance: 2.09, Count: 105</td>
<td>25%</td>
</tr>
<tr>
<td>Formulate a periodontal diagnosis</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.94, Std Deviation: 2.24, Variance: 5.01, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.74, Std Deviation: 1.58, Variance: 2.48, Count: 104</td>
<td>21%</td>
</tr>
<tr>
<td>Adjust the occlusion and cement the crown</td>
<td>Minimum: 1, Maximum: 10, Mean: 5.97, Std Deviation: 2.44, Variance: 5.94, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 7.49, Std Deviation: 1.93, Variance: 3.71, Count: 97</td>
<td>19%</td>
</tr>
<tr>
<td>Make an impression and provisionalize</td>
<td>Minimum: 1, Maximum: 10, Mean: 6.26, Std Deviation: 2.32, Variance: 5.39, Count: 110</td>
<td>Minimum: 2, Maximum: 10, Mean: 7.57, Std Deviation: 1.77, Variance: 3.13, Count: 100</td>
<td>19%</td>
</tr>
<tr>
<td>Place, finish, and polish the restoration including occlusal adjustment</td>
<td>Minimum: 1, Maximum: 10, Mean: 6.27, Std Deviation: 2.3, Variance: 5.27, Count: 110</td>
<td>Minimum: 3, Maximum: 10, Mean: 8.14, Std Deviation: 1.55, Variance: 2.41, Count: 104</td>
<td>23%</td>
</tr>
<tr>
<td>Prepare a tooth for restoration with a crown</td>
<td>Minimum: 1, Maximum: 10, Mean: 6.63, Std Deviation: 2.22, Variance: 4.92, Count: 110</td>
<td>Minimum: 2, Maximum: 10, Mean: 7.48, Std Deviation: 1.78, Variance: 3.17, Count: 100</td>
<td>11%</td>
</tr>
<tr>
<td>Isolate the surgical site</td>
<td>Minimum: 1, Maximum: 10, Mean: 6.81, Std Deviation: 2.29, Variance: 5.23, Count: 110</td>
<td>Minimum: 4, Maximum: 10, Mean: 7.88, Std Deviation: 1.44, Variance: 2.06, Count: 103</td>
<td>13%</td>
</tr>
<tr>
<td>Perform a Dental Examination</td>
<td>Minimum: 1, Maximum: 10, Mean: 6.98, Std Deviation: 2.12, Variance: 4.51, Count: 110</td>
<td>Minimum: 4, Maximum: 10, Mean: 8.45, Std Deviation: 1.36, Variance: 1.85, Count: 105</td>
<td>18%</td>
</tr>
</tbody>
</table>
Q3 -- Formulate and record a multi-discipline dental treatment plan

Histogram by Response Category

Pre and Post Comparison
Post- Survey results

• Average mean for all tasks 7.65
• Average gain in self assessment of student confidence was 27.8 percent for all 20 tasks
• Highest gain was 37 percent for “formulate and record a multi-discipline treatment plan”
• Unpaired Student T test results
  • 0.0078
  • Statistically significant 95% confidence interval
  • The null hypothesis was rejected
Return on Investment

• Frequency of student access in the first months of clinic
• Impact on:
  • Reduction of errors
  • Increase in productivity
  • More efficient use of time in the clinic
Return on Investment

105 RESPONSES

- Never: 7%
- More than 5 times per week: 3%
- Between 2 and 5 times per week: 44%
- Once a week or less: 46%

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid errors</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>Increase productivity</td>
<td>89</td>
<td>4</td>
</tr>
<tr>
<td>Save time</td>
<td>76</td>
<td>7</td>
</tr>
</tbody>
</table>
POST-SURVEY RESPONSES

- More Productive
- Avoid Errors
- Save time

More Productive: 46
Avoid Errors: 44
Save time: 37

Strongly disagree: 0
Disagree: 1
Somewhat disagree: 2
Neither agree nor disagree: 13
Somewhat agree: 23
Agree: 46
Strongly agree: 14
Maintaining the Gains Post Survey and Next Steps

- Increase faculty participation
- Publish our results in the Journal of Dental Education
- Encourage student input in creation of content as a part of the Teaching Honors Program
- Develop technical infrastructure within the school
- Improve the WikiClinic search function
- Analyze trends in use of content
- Monitor the relationship between reduction in errors and improvement in use of time and productivity
Thank You