



Effectiveness of Virtual Treatment Planning During COVID-19: Remote vs. Traditional Instruction

Khera D, Lian L, Chinn C

Department of Pediatric Dentistry, New York University Dentistry | New York, NY

Background

During the emergence of COVID-19 and subsequent lockdown in 2020 – 2021, the field of dentistry in terms of both clinical practice and diagnosis as well as dental education was greatly impacted. Educators were forced to rapidly pivot material to online resulting in a movement towards virtual teaching and learning, presenting a unique teaching and learning opportunity for the pediatric department at NYU Dentistry. While much research has discussed the benefits and difficulties with online learning in dental education, there is little research evaluating the effectiveness of virtual learning on tooth specific diagnosis and treatment planning.

The purpose of this study is to evaluate the effectiveness of virtual pediatric diagnosis and treatment planning exercises amongst dental students in their pediatric clinical course during remote versus traditional instruction.

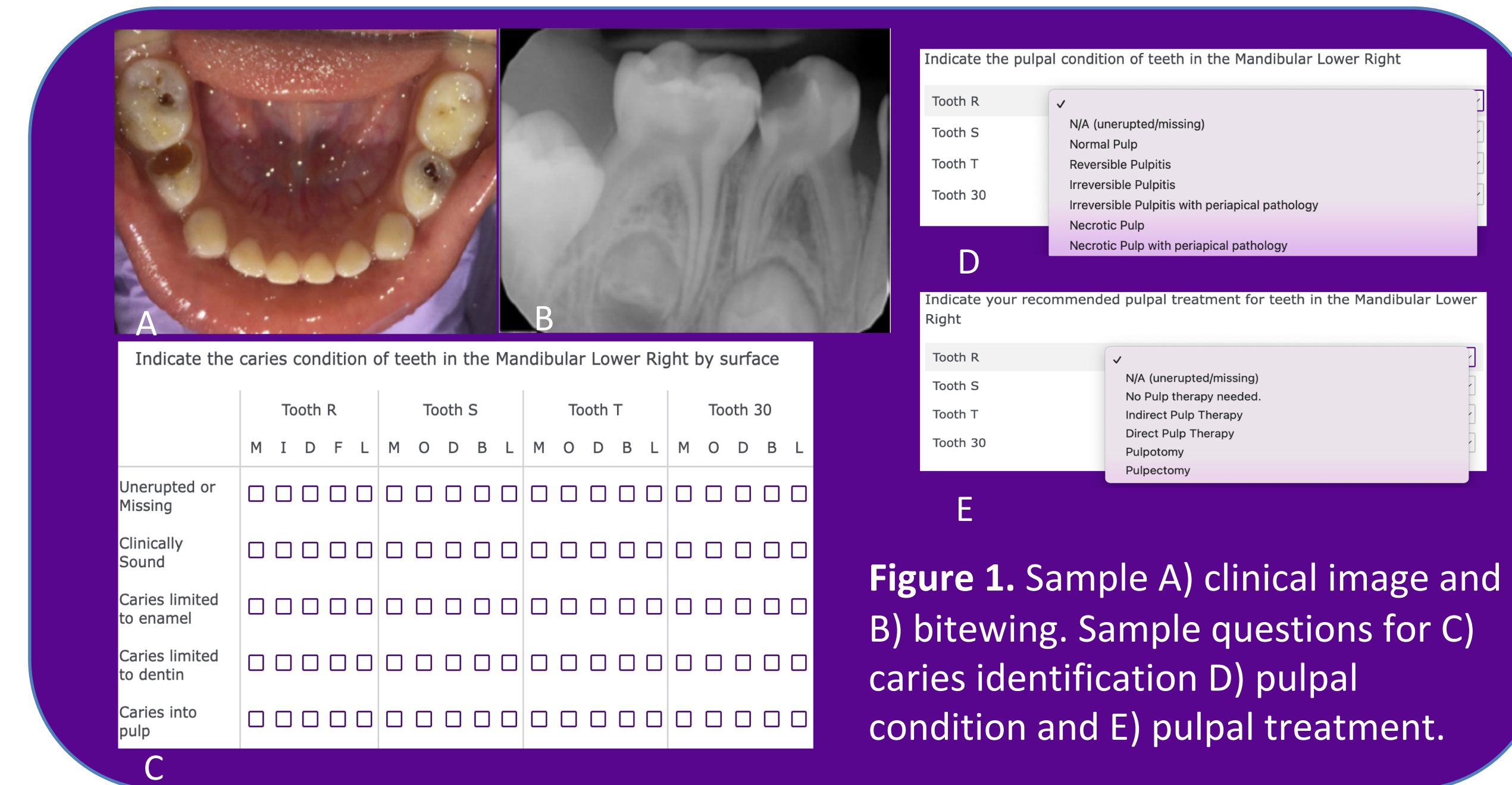


Figure 1. Sample A) clinical image and B) bitewing. Sample questions for C) caries identification D) pulpal condition and E) pulpal treatment.

Methods

Table 1. Data by domain category and point allocation for an overall score

Domain Category	Point Value
Occlusion -R & L Molar Occlusion -Malocclusion	0-3
Radiographs -Maxillary & Mandibular Occlusal -Bitewings	0-5
Caries Depth by Surface (X3)	0-9
Pulpal Diagnosis and Treatment (X3)	0-6
Caries Identification and Restorative Treatment (3 test teeth: Class II, SSC, Extraction)	0-9
Space Maintenance	0-1
Total Domain Score	0-33

- Retrospective study collected data from third and fourth year dental students who completed four diagnosis and treatment planning surveys from March 2020 - March 2021 (IRB-FY2022-6608)
- Data was broken down into domain categories and was given point allocation for an overall score (See Table 1)
- Caries and pulpal diagnosis, as well as restorative treatment were selected for three test teeth
- Independent T- tests were performed to analyze students' performance on various levels – total subjects performance comparison:
 - over time (case 1 vs. case 4)
 - by school year (D4 vs. D3)
 - by teaching style (traditional vs. remote)

Results

- 2,925 surveys completed by 374 third year dental students (D3) and 379 fourth year dental students (D4) were reviewed. Partially completed or redundant surveys were excluded
- 848 surveys were included, representative of 120 D3s and 92 D4s students who had completed all four case-based surveys during the time period of March 2020 to March 2021
- 60 D3 and 46 D4 students experienced remote learning while the remaining students experienced traditional learning.

Table 2. Average Change in Student Score by Domain (n=212)

Domains	Average Score Change (Case 4 vs. Case 1)	Percent Change	P value
Occlusion	*1.099	76.64%	<.001
Radiographs	*0.189	6.26%	0.022
Caries Depth By Surface	*-2.915	-46.93%	<.001
Pulpal Diagnosis & Treatment	*-0.217	-5.59%	0.014
Caries Identification & Restorative Treatment	*0.363	6.60%	0.015
Space Maintenance	*0.118	41.70%	0.01
Total Domain Score	0.043	0.22%	0.907

Table 3. Average Change in Student Score by Class Year (D4 vs.D3, n=212)

Domain	Average Score Change (Across all Cases)	Percent Change	P value
Occlusion	*0.158	8.27%	0.033
Radiographs	*0.184	5.53%	0.005
Caries Depth By Surface	*0.252	4.83%	0.045
Pulpal Diagnosis & Treatment	-0.032	-0.80%	0.652
Caries Identification & Restorative Treatment	*0.242	4.34%	0.028
Space Maintenance	0.056	19.20%	0.071
Total Domain Score	*0.971	4.83%	<.001

Table 4. Average Change in Student Score by Teaching Style (Traditional vs. Remote, n=212)

Domain	Average Score Change	Percent Change	P value
Occlusion	*0.448	21.90%	<.001
Radiographs	-0.071	-2.22%	0.279
Caries Depth By Surface	0.135	2.63%	0.28
Pulpal Diagnosis & Treatment	*0.215	5.21%	0.002
Caries Identification & Restorative Treatment	*0.323	5.78%	0.003
Space Maintenance	0.057	19.79%	0.06
Total Domain Score	*1.106	5.50%	<.001

* Significant, p>0.05

Conclusion

- Students improved over the case-based exercises in occlusion, radiographs, caries identification & restorative treatment, space maintenance, and total domain score
- No significant improvement for caries depth by surface and pulpal diagnosis and treatment
- Remote learning is a viable method for discussing and accurately diagnosing and treatment planning pediatric dental patients
- Greater integration of technology in dental education and teledentistry are becoming more relevant, making virtual diagnosis and treatment planning exercises more important to keep educational curricula current