

Comparative Analysis of Student Satisfaction with Conventional and Digital Denture Fabrication Protocols: Addressing Educational Barriers through Curriculum Enhancement

Leela S. Breitman, DMD¹, Paul Kuta, DDS², Wendy A. Clark, DDS MS³, David A. Felton, DDS MS³, Soni Prasad, BDS MS MBA⁴

¹ Resident, Department of Prosthodontics, UNC-CH; ² Resident, Department of Prosthodontics, University of Tennessee; ³ Faculty, Department of Prosthodontics, UNC-CH; ⁴ Graduate Prosthodontics Program Director, UNC-CH

Introduction

With the increasing adoption of digital workflows in removable prosthodontics, dental educators are working to incorporate and expand digital learning into prosthodontic predoctoral curricula.¹ Broadly speaking, curricula on digital denture fabrication are less developed than are those for conventional denture fabrication.^{2,3} This is due, in part, to the fact that digital denture protocols are relatively new compared to those for the fabrication of complete dentures through conventional protocols. This study aimed to assess student satisfaction with existing complete denture curricula to understand how to bridge educational gaps between conventional and digital denture fabrication protocols for future curriculum development.

Methods

An IRB-exempt (UNC IRB 20-2218) study was conducted at the UNC Adam’s School of Dentistry. The study was conducted among second year predoctoral dental students as part of their didactic and preclinical course on Complete Dentures (DENT212). Following lecture presentations from subject matter experts on conventional and digital complete denture fabrication workflows, students participated in practical exercises on digital tooth arrangement (Dentca™ Academy) and conventional tooth arrangement (Ivoclar™ Academy).

After completing the DENT212 course, a survey was distributed to second year students (n=85) via Qualtrics™, evaluating students’ satisfaction with the conventional and digital denture exercises and curricula on tooth arrangement. The null hypothesis posited no difference in students’ satisfaction between the two modalities.

Figures

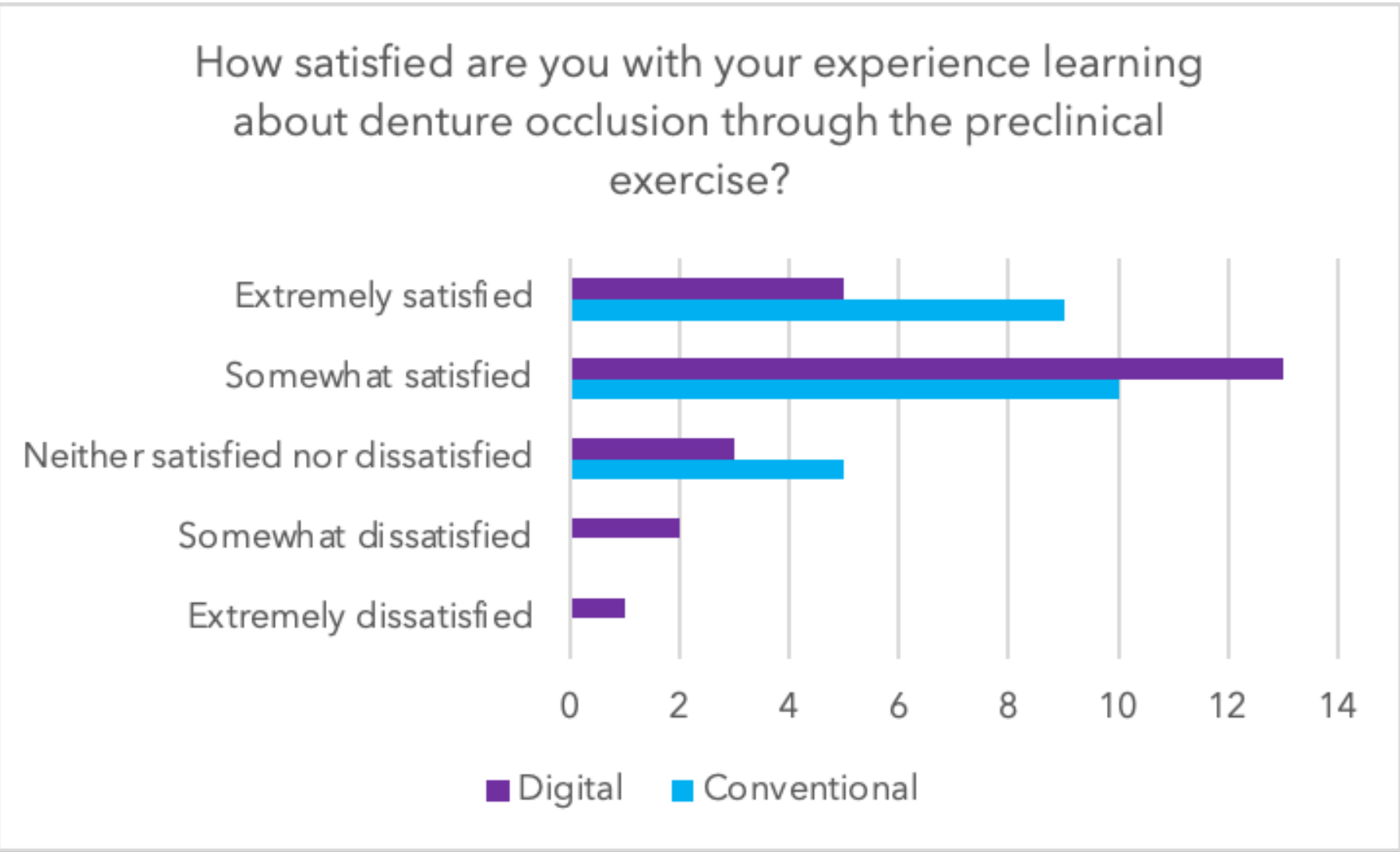


Figure 1: Responses from the second-year students who were asked about their satisfaction level with the digital and conventional denture occlusion exercises.

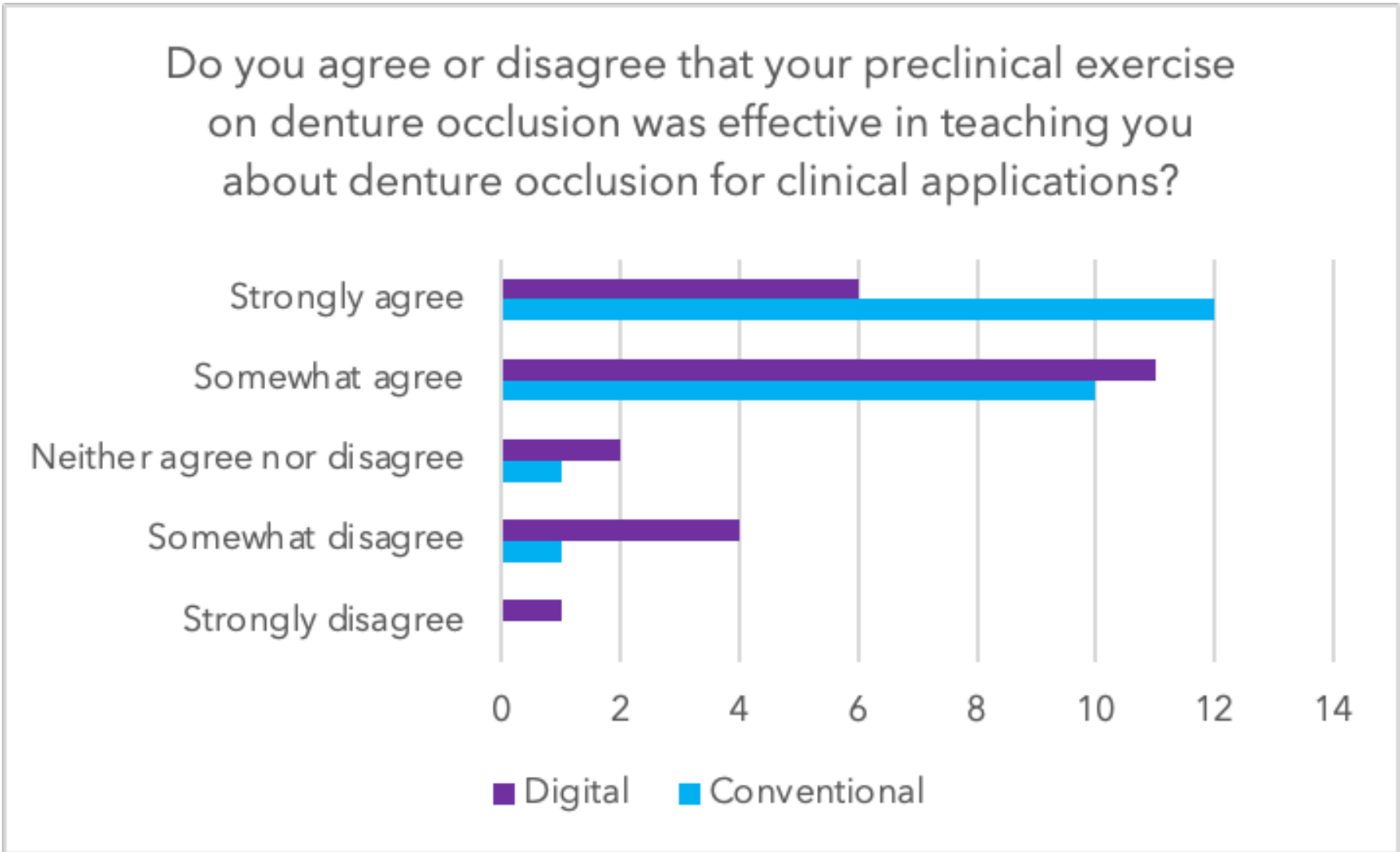


Figure 2: Responses from the second-year students who were asked whether the digital and conventional denture occlusion exercises were effective learning experiences.

Results

The response rate to the survey was 52% (n=44/85). Of the respondents, 24 completed the survey in its entirety and were included in this analysis (28%; n=24/85).

For the conventional denture curriculum, 79.17% of respondents reported satisfaction (41.67% "somewhat satisfied," 37.50% "extremely satisfied"). For the digital denture curriculum, 75% were satisfied (54.17% "somewhat satisfied," 20.83% "extremely satisfied"). While 12.5% were dissatisfied with the digital curriculum, none were dissatisfied with the conventional curriculum. However, this difference in satisfaction between the curricula was not statistically significant ($\chi^2(4) = 4.292$, $p = 0.370$) (Figure 1).

Regarding teaching denture occlusion, a statistically significant difference was found ($\chi^2(4) = 47.47$, $p < 0.001$), with 91.67% of respondents considering the conventional curriculum effective compared to 70.83% for the digital curriculum (Figure 2).

Representative quotes were selected from the survey responses. Overall, students had fewer requests for improvement of the conventional denture exercises and curriculum compared to for the digital denture exercises and curriculum. Students emphasized the importance of learning the conventional denture curriculum as a means of informing the digital workflow. They also expressed interest in improving the structure and breadth of hands-on digital denture exercises (Table 1).

Modality	Question	Representative Quotes
Digital	Ways in which the exercise was effective for your learning and preparedness for clinic.	“I think it was effective in teaching about tooth positioning and how to set teeth, but not really how occlusion works and the whole process was a bit confusing to understand especially the software part.” “I felt getting the opportunity to learn the overarching workflow for digital dentures helped me understand how I would approach a digital denture case in clinic.” “It was very effective and easier to do. Digital dentistry is the next big thing and I’m glad I got the chance to learn this way.”
	Ways in which the exercise could have been improved.	“More practice with the tooth arrangement software, or other tools to simulate what we would do with a patient.” “I would like more time with the digital platforms and maybe even a digital practical to heighten its significance.” “I think would have been advantageous for us to get more familiar with some hands on production of a digital denture.”
Conventional	Ways in which the exercise was effective for your learning and preparedness for clinic.	“I thought the tooth arrangement lab was really helpful. I was able to manually manipulate things exactly the way I envisioned it in my head so that was helpful.” “The conventional exercises were more fully practiced and graded, giving me more confidence in using this method as opposed to the digital.” “Conventional helped us to understand the mechanics and reasoning for how dentures work.”
	Ways in which the exercise could have been improved.	“I feel comfortable with this process heading into clinic. We essentially walked through the entire process of a conventional denture in the sim lab and we have a full booklet guide to take with us to clinic when we need assistance.” “None! I loved it.” “I feel like the conventional exercises are up to par.”

Table 1: Free response answers from the second-year students who were asked about their perceptions of the effectiveness of the digital and conventional denture occlusion exercises and the ways in which these curricula might be improved.

Conclusion

Among the 28% included in the analysis, satisfaction rates were similar for the conventional and digital denture curricula, but a significant difference was observed in the effectiveness of teaching denture occlusion, with 91.67% finding the conventional curriculum effective versus 70.83% for the digital curriculum. In the free-response section of the survey, students conveyed that they perceived the conventional curriculum as more comprehensive and expressed interest in enhancing the digital curriculum. Within its limitations, this study highlights discrepancies in predoctoral student satisfaction between existing conventional and digital denture curricula. In response to, and given the growing importance of digital workflows in removable prosthodontics, our team is developing video modules and associated hands-on exercises to enhance digital denture education. The development of these modules holds potential for improving student learning. Future studies could explore attitudes of dental students to these modules throughout their education.

