Received: 12 August 2020 | Accepted: 31 August 2020

DOI: 10.1002/jdd.12416

ADEA THE VOICE OF DENTAL EDUCATION WILEY

Increasing clinic utilization with digital dentures in the pre-doctoral clinics

Wendy Auclair Clark DDS, MS[1] | **Ingeborg J. De Kok DDS, MS**[1] | **Michael D. Wolcott PharmD, PhD**[2]

[1] Division of Comprehensive Oral Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

[2] Division of Oral and Craniofacial Health Sciences, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

Correspondence
Dr. Wendy Auclair Clark, DDS, MS, 341 Brauer Hall, UNC School of Dentistry CB#7450, Chapel Hill, NC 27599-7450, USA.
Email: waclark@unc.edu

1 | PROBLEM

Maximizing clinical experiences is critical for dental students; this has become a problem with coronavirus disease 2019 (COVID-19) pandemic-related clinic closures. In addition to diminished clinic time, the number of dental students often exceeds the number of available chairs at different institutions. There is an interest in maximizing chair utilization while enhancing clinical education. Conventional complete denture workflows require five to six clinical appointments, in addition to post-operative appointments. An institutional chart review found it was not uncommon for our dental students to routinely require eight or more appointments.[1] Diminished ability to schedule patients due to increased infection control practices brought about an opportunity to explore different workflows to improve efficiency.

2 | SOLUTION

Digitally fabricated dentures were introduced as part of the predoctoral clinical curriculum to allow for more clinical experiences, enhance student comprehension, and increase patient satisfaction. A pilot program (n = 10 students) tested multiple workflows to evaluate value and efficacy in the prosthodontic curriculum. From this pilot, a clinical protocol was established and introduced to fourth-year dental students (Table 1), which eliminates one clinical visit by using the Wagner try-in (Figure 1) to combine maxillomandibular relations and clinical try-in.

TABLE 1 Selected clinical workflow

Visit 1	• Preliminary impressions • Custom tray fabrication
Visit 2	• Border molded definitive impressions • Wagner measurements • Tooth Selection
Visit 3	• Wagner try-in (anterior esthetics/phonetics) • Vertical dimension of occlusion • Centric relation record
Between visits	• Review digital preview with faculty
Visit 4	• Insertion: monolithic milled prosthesis
Visit 5+	• Post-operative care

A chart review also showed a decrease number of post-operative visits and remakes.[1] There is an opportunity to reduce the number of visits further with the introduction of prefabricated trays to make final impressions on the first day of treatment.

A monolithic milled complete denture prosthesis was selected as the restorative material due to its favorable clinical properties[2] and the ability to reline, rebase, and repair with conventional techniques and materials. Initial student, faculty, and patient feedback was gathered during our trial program, as well as a laboratory cost analysis.

Rising third-year dental students received digital denture training through remote learning, including virtual tooth arrangement at https://academy.dentcadesign.com (Dentca Academy, Dentca) (Figure 2) and reading digital

FIGURE 1 Wagner try in, combining maxillomandibular relations and clinical try in appointment. This allows the complete denture protocol to be shortened by one clinical appointment

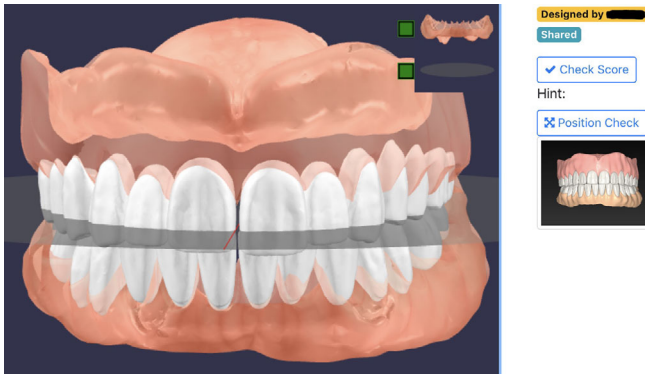

FIGURE 2 An example of a student's virtual setup, using Dentca Academy Web-based software

previews (Avadent Digital Education, Avadent). Large and small virtual sessions were used to calibrate clinical faculty on the digital workflow. As clinic re-entry begins, all students can now choose a digital workflow for their complete denture patients.

3 | RESULTS

The introduction of digital fabricated complete dentures has shown a reduction of clinical visits, increased student comprehension and patient satisfaction.[3,4] Without dedicated in-house removable laboratory technicians, the cost for digital dentures is comparable to conventionally processed dentures. However, there was a reduction in the number of patient appointments, which translates into overall cost reduction in a dental school setting.[5]

Another benefit is the opportunity to decrease risk of fomite transmission. The digital preview allows for virtual interaction and social distancing among faculty, students, and dental technicians. If there is access to digital scanners, then impressions and try-in prostheses can be scanned, and the laboratory work is never physically transported anywhere.

Perhaps the most important consideration is student learning. Faculty and students had mostly positive feedback, consistent with previous studies.[3,4] Digital design allows visualization of many aspects of complete denture fabrication that can benefit clinicians and educators. Many students have improved visualization and comprehension with 3D modeling, which has been corroborated in our student interviews.

CONFLICT OF INTEREST

The authors do not have any financial interest in the companies whose materials are included in this article.

ORCID

Wendy Auclair Clark DDS, MS https://orcid.org/0000-0002-2383-3537
Michael D. Wolcott PharmD, PhD https://orcid.org/0000-0003-3254-3643

REFERENCES

1. Clark WA, Brazile B, Matthews D, Solares J, De Kok I. A comparison of conventionally fabricated versus digitally fabricated denture outcomes in a University Dental Clinic. *J Prosthet Dent*. 2020. In press.
2. Srinivasan M, Gjengedal H, Cattani-Lorente M, et al. Cad/cam milled complete removable dental prostheses: an in vitro evaluation of biocompatibility, mechanical properties, and surface roughness. *Dent Mater J*. 2018;37:526-5333.
3. Saponaro PC, Yilmaz B, Johnston W, Heshmati RH, McGlumphy EA. Evaluation of patient experience and satisfaction with cad-cam-fabricated complete dentures: a retrospective survey study. *J Prosthet Dent*. 2016;116:524-528.
4. Kattadiyil MT, Jekki R, Goodacre CJ, Baba NZ. Comparison of treatment outcomes in digital and conventional complete removable dental prosthesis fabrications in a predoctoral setting. *J Prosthet Dent*. 2015;114:818-825.
5. Srinivasan M, Schimmel M, Naharro M, O'Neill C, McKenna G, Muller F. Cad/cam milled removable complete dentures: time and cost estimation study. *J Dent*. 2019;80:75-79.

How to cite this article: Clark WA, De Kok IJ, Wolcott MD. Increasing clinic utilization with digital dentures in the pre-doctoral clinics. *J Dent Educ*. 2020;1-2. https://doi.org/10.1002/jdd.12416