2023 AAFP Poster Program

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2023 Annual Meeting and Pre-Meeting Workshop
February 23-25, 2023
Chicago Marriott Magnificent Mile

Posters

Please ignore this part as the poster evaluations are done in-person.

Applications & Submissions

Poster Application Form 2023

Please provide a score for all questions for each poster on a scale of 1 to 5. A score of 5 is the highest and a score of 1 is the lowest. If you did not attend a particular presentation, please choose "Did not view" instead. If you happen to have previously provided a review of a poster, you may find some of the form questions will be already filled in for you.

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Schedule | Posters | Speakers | Presentations | Sponsors

Poster Group A

Please do not click the individual posters below as it will require log-in.

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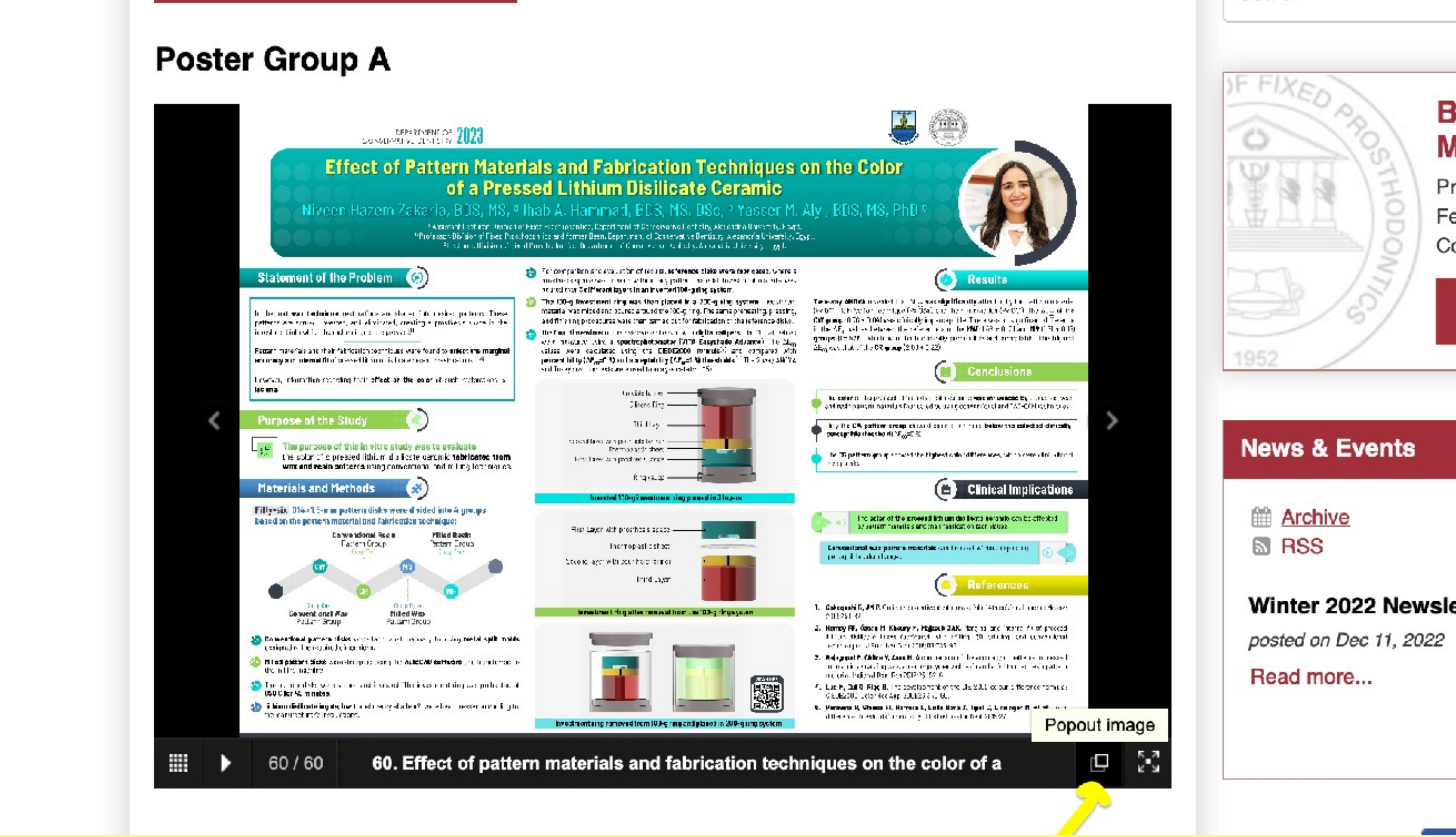
- 1. Error analysis of stages involved in CBCT-guided implant placement with surgical guides when different printing technologies are used *(Brandon Yeager DMD MS, Gulce Cakmak DDS PhD, Fengyun Zheng DDS, PhD, FACP, William Michael Johnston PhD, Burak Yilmaz DDS PhD)*
- 2. Accuracy of 3D-printed complete arch implant analog models *(Andréa Gagnon-Audet, DMD, MSD; Manuel Bratos, DDS, MSD, CDT; Unnur Flemming Jensen DDS, MSD; John*



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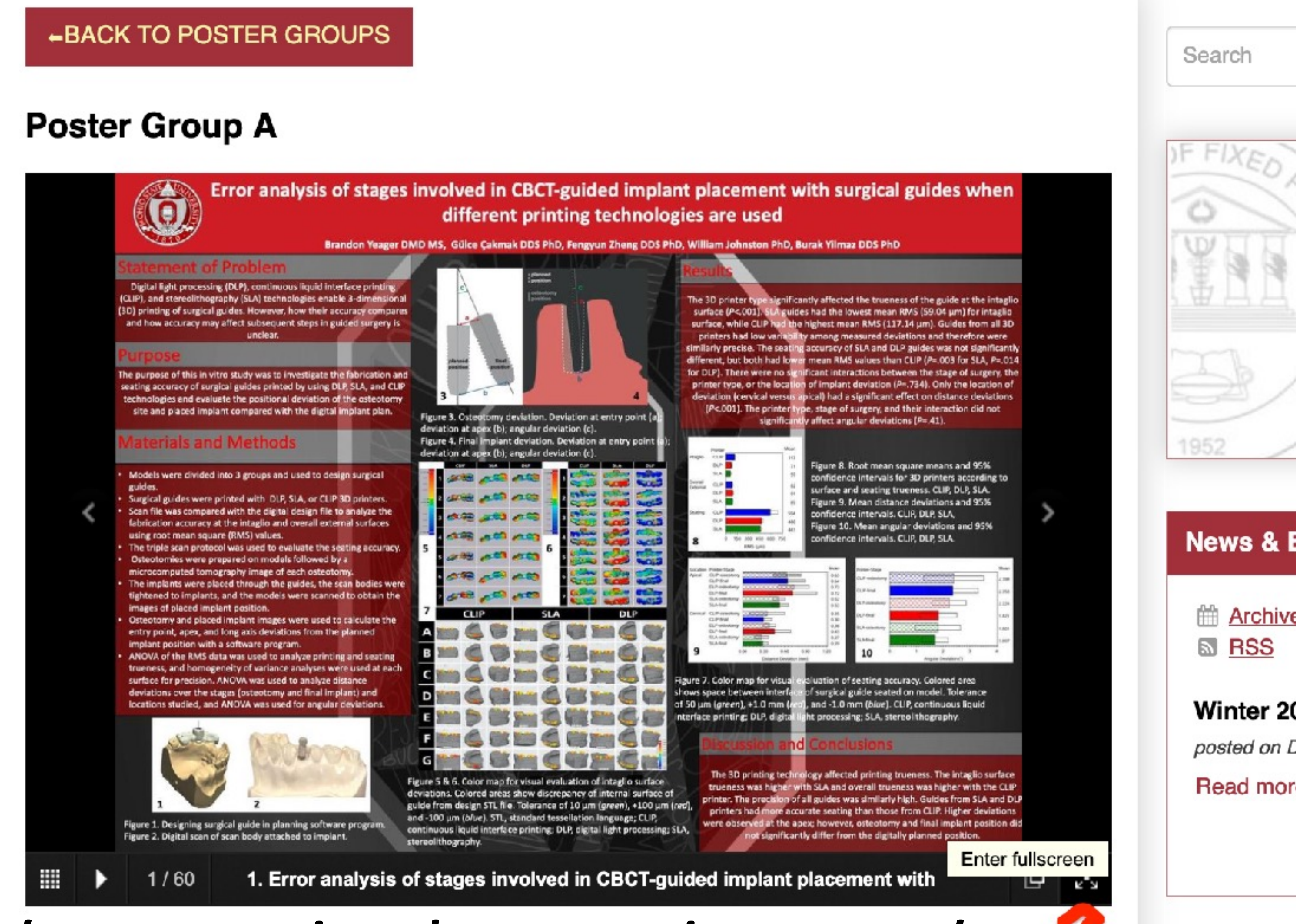

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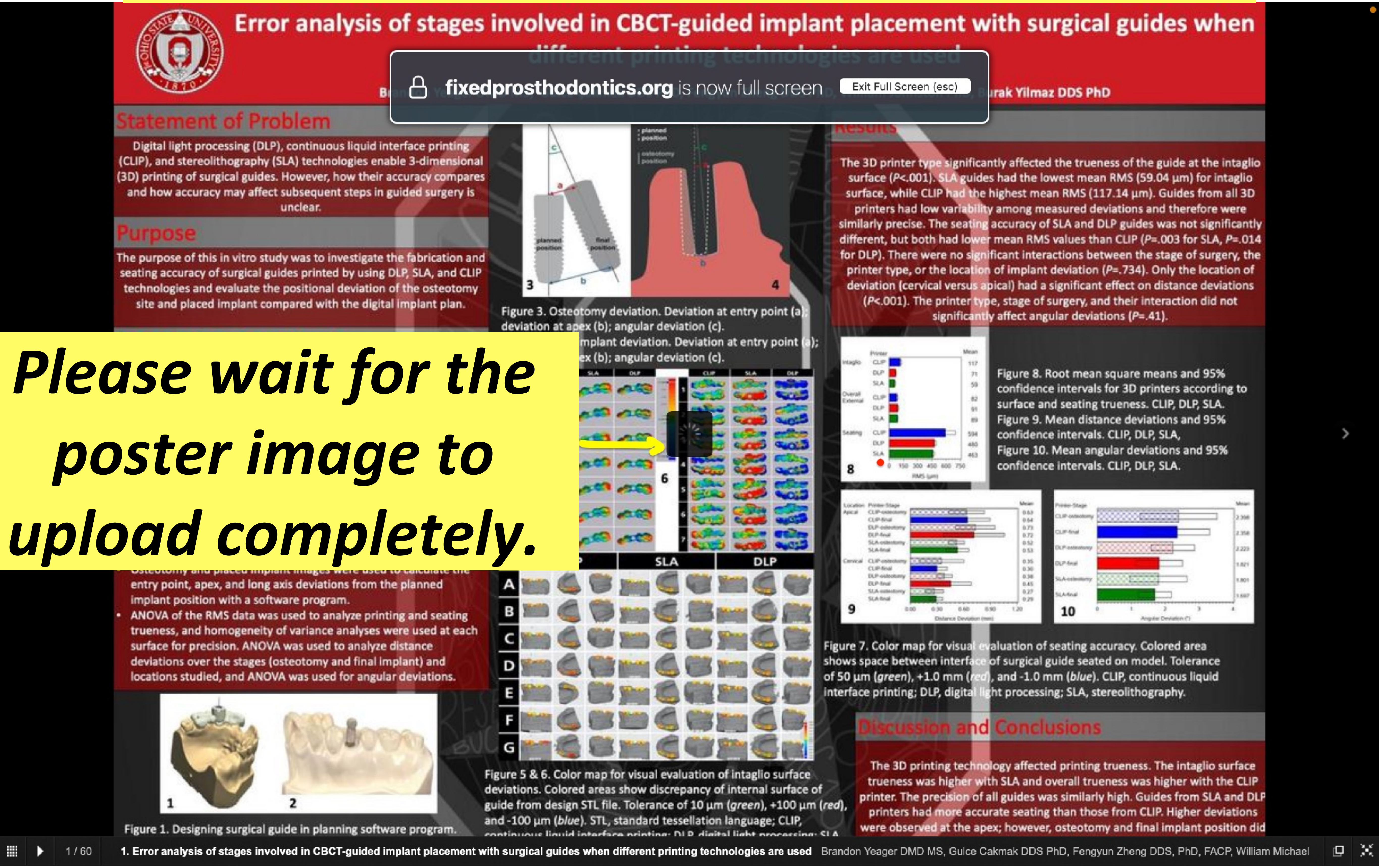

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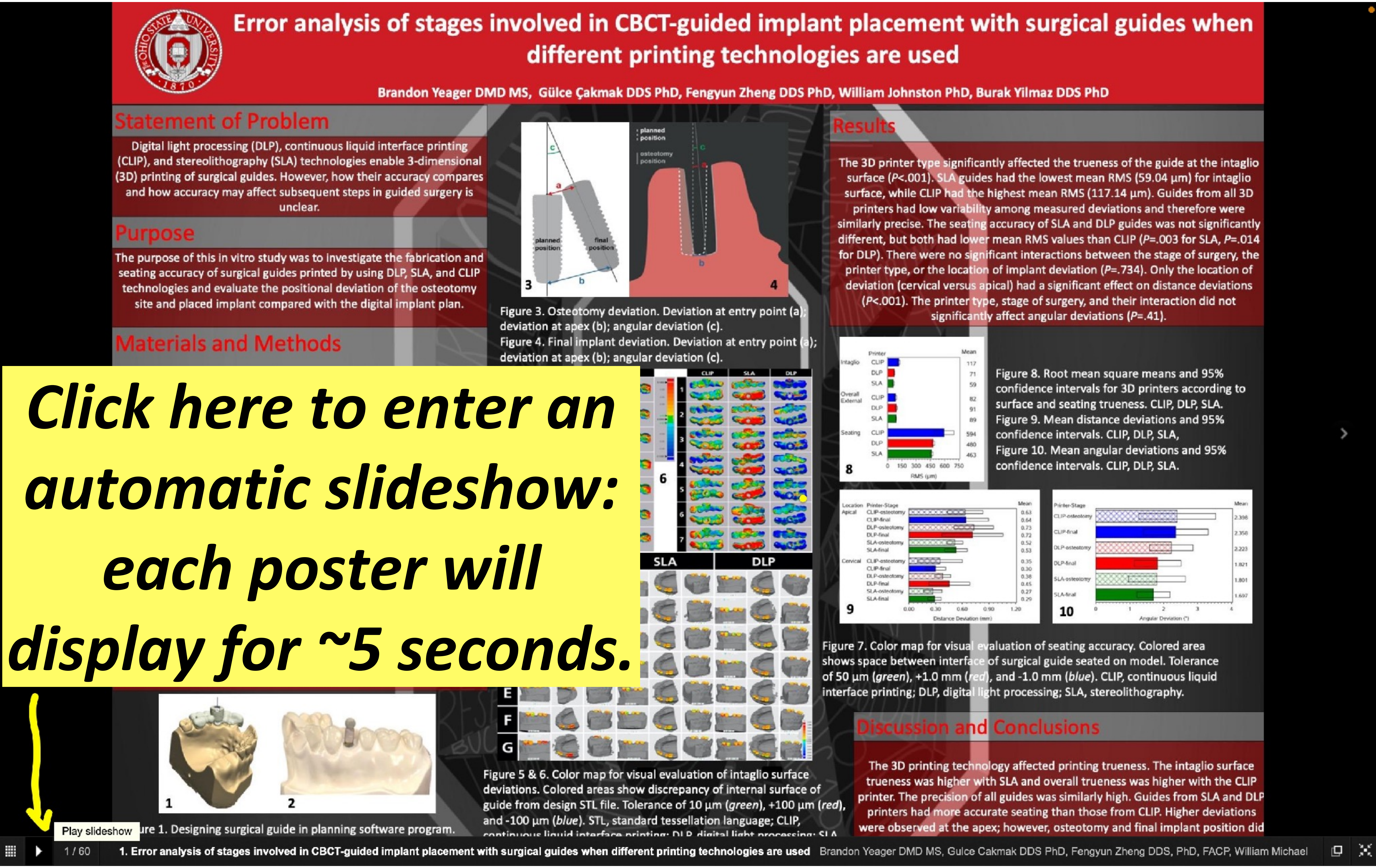
Error analysis of stages involved in CBCT-guided implant placement with surgical guides when different printing technologies are used
Brandon Yeager DMD MS, Gülce Çakmak DDS PhD, Fengyun Zheng DDS PhD, William Johnston PhD, Burak Yilmaz DDS PhD
Statement of Problem
Digital light processing (DLP), continuous liquid interface printing (CLIP), and stereolithography (SLA) technologies enable 3-dimensional (3D) printing of surgical guides. However, how their accuracy compares and how accuracy may affect subsequent steps in guided surgery is unclear.
Purpose
The purpose of this in vitro study was to investigate the fabrication and seating accuracy of surgical guides printed by using DLP, SLA, and CLIP technologies and evaluate the positional deviation of the osteotomy site and placed implant compared with the digital implant plan.
Materials and Methods
Figure 3. Osteotomy deviation. Deviation at entry point (a); deviation at apex (b); angular deviation (c).
Figure 4. Final implant deviation. Deviation at entry point (a); deviation at apex (b); angular deviation (c).
Results
The 3D printer type significantly affected the trueness of the guide at the intaglio surface (P<.001). SLA guides had the lowest mean RMS (59.04 µm) for intaglio surface, while CLIP had the highest mean RMS (117.14 µm). Guides from all 3D printers had low variability among measured deviations and therefore were similarly precise. The seating accuracy of SLA and DLP guides was not significantly different, but both had lower mean RMS values than CLIP (P=.003 for SLA, P=.014 for DLP). There were no significant interactions between the stage of surgery, the printer type, or the location of implant deviation (P=.734). Only the location of deviation (cervical versus apical) had a significant effect on distance deviations (P<.001). The printer type, stage of surgery, and their interaction did not significantly affect angular deviations (P=.41).
Figure 8. Root mean square means and 95% confidence intervals for 3D printers according to surface and seating trueness. CLIP, DLP, SLA.
Figure 9. Mean distance deviations and 95% confidence intervals. CLIP, DLP, SLA,
Figure 10. Mean angular deviations and 95% confidence intervals. CLIP, DLP, SLA.
Figure 7. Color map for visual evaluation of seating accuracy. Colored area shows space between interface of surgical guide seated on model. Tolerance of 50 µm (green), +1.0 mm (red), and -1.0 mm (blue). CLIP, continuous liquid interface printing; DLP, digital light processing; SLA, stereolithography.
Discussion and Conclusions
The 3D printing technology affected printing trueness. The intaglio surface trueness was higher with SLA and overall trueness was higher with the CLIP printer. The precision of all guides was similarly high. Guides from SLA and DLP printers had more accurate seating than those from CLIP. Higher deviations were observed at the apex; however, osteotomy and final implant position did
Figure 5 & 6. Color map for visual evaluation of intaglio surface deviations. Colored areas show discrepancy of internal surface of guide from design STL file. Tolerance of 10 µm (green), +100 µm (red), and -100 µm (blue). STL, standard tessellation language; CLIP,
ure 1. Designing surgical guide in planning software program.
Click here to enter an automatic slideshow: each poster will display for ~5 seconds.
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1 / 60
1. Error analysis of stages involved in CBCT-guided implant placement with surgical guides when different printing technologies are used
Brandon Yeager DMD MS, Gulce Cakmak DDS PhD, Fengyun Zheng DDS, PhD, FACP, William Michael

Error analysis of stages involved in CBCT-guided implant placement with surgical guides when different printing technologies are used

Brandon Yeager DMD MS, Gülce Çakmak DDS PhD, Fengyun Zhe

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Statement of Problem

Digital light processing (DLP), continuous liquid interface printing (CLIP), and stereolithography (SLA) technologies enable 3-dimensional (3D) printing of surgical guides. However, how their accuracy compares and how accuracy may affect subsequent steps in guided surgery is unclear.

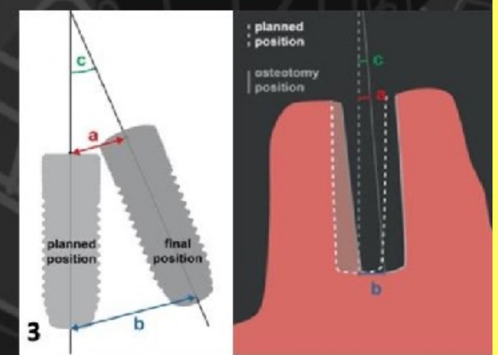
Purpose

The purpose of this in vitro study was to investigate the fabrication and seating accuracy of surgical guides printed by using DLP, SLA, and CLIP technologies and evaluate the positional deviation of the osteotomy site and placed implant compared with the digital implant plan.

Materials and Methods

- Models were divided into 3 groups and used to design surgical guides.
- Surgical guides were printed with DLP, SLA, or CLIP 3D printers.
- Scan file was compared with the digital design file to analyze the fabrication accuracy at the intaglio and overall external surfaces using root mean square (RMS) values.
- The triple scan protocol was used to evaluate the seating accuracy.
- Osteotomies were prepared on models followed by a microcomputed tomography image of each osteotomy.
- The implants were placed through the guides, the scan bodies were tightened to implants, and the models were scanned to obtain the images of placed implant position.
- Osteotomy and placed implant images were used to calculate the entry point, apex, and long axis deviations from the planned implant position with a software program.
- ANOVA of the RMS data was used to analyze printing and seating trueness, and homogeneity of variance analyses were used at each surface for precision. ANOVA was used to analyze distance deviations over the stages (osteotomy and final implant) and locations studied, and ANOVA was used for angular deviations.

Figure 1. Designing surgical guide in planning software program.



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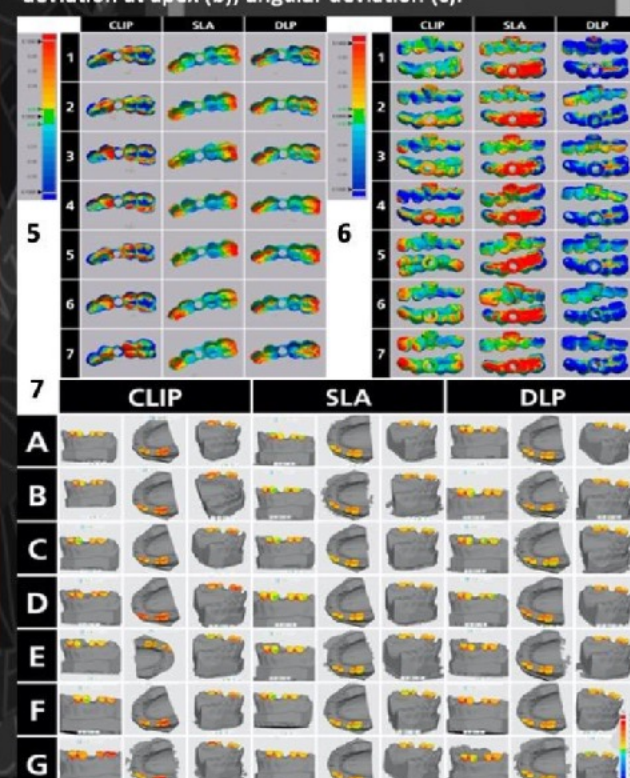

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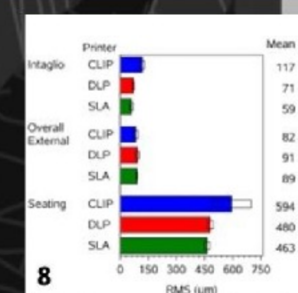
(*P*<.001). The printer type, stage of surgery, and their interaction did not significantly affect angular deviations (*P*=.41).



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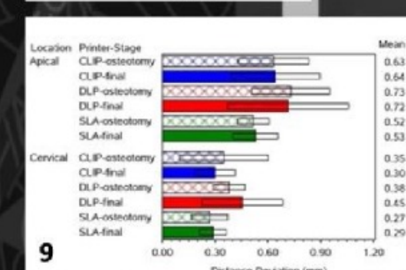

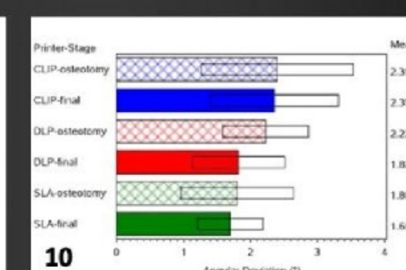

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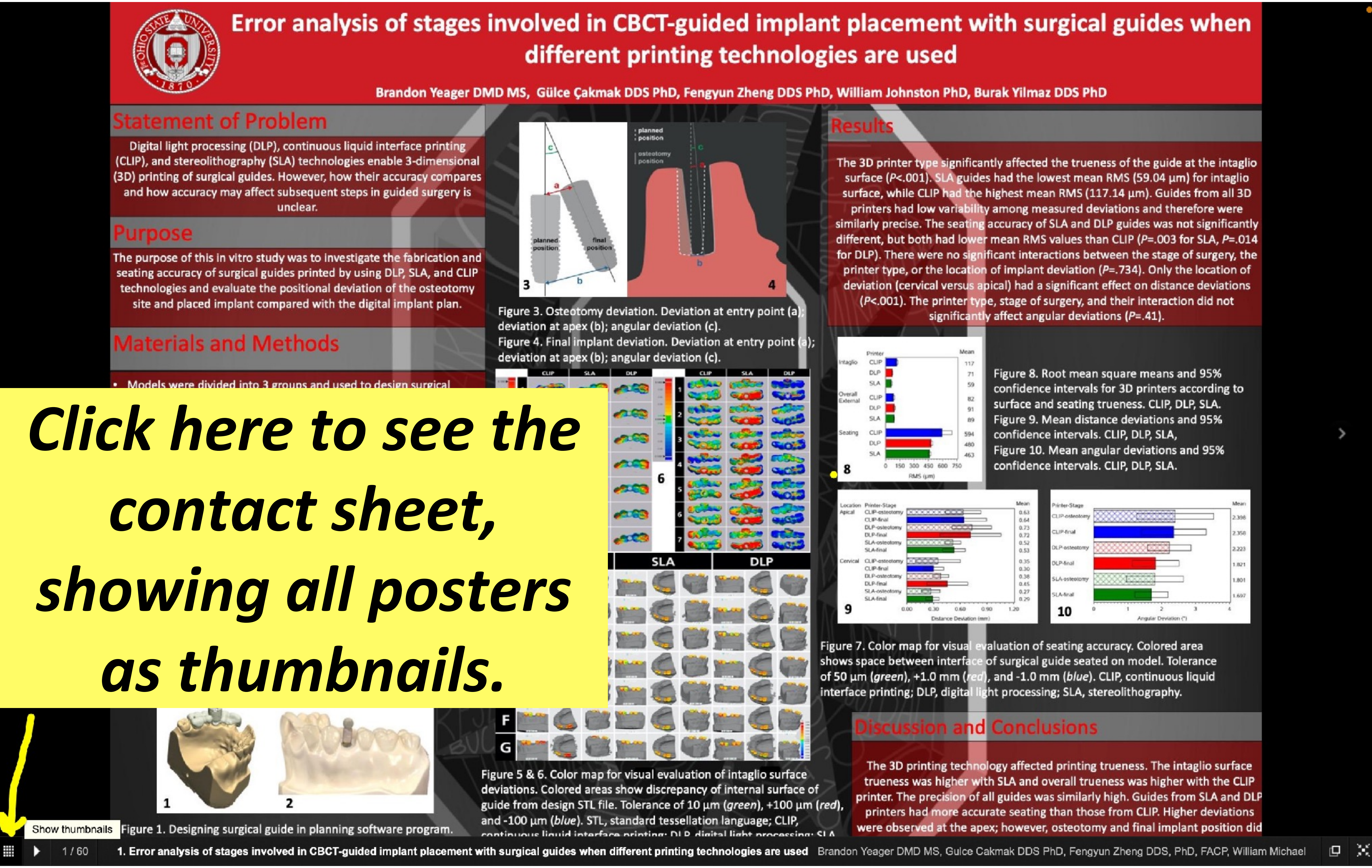

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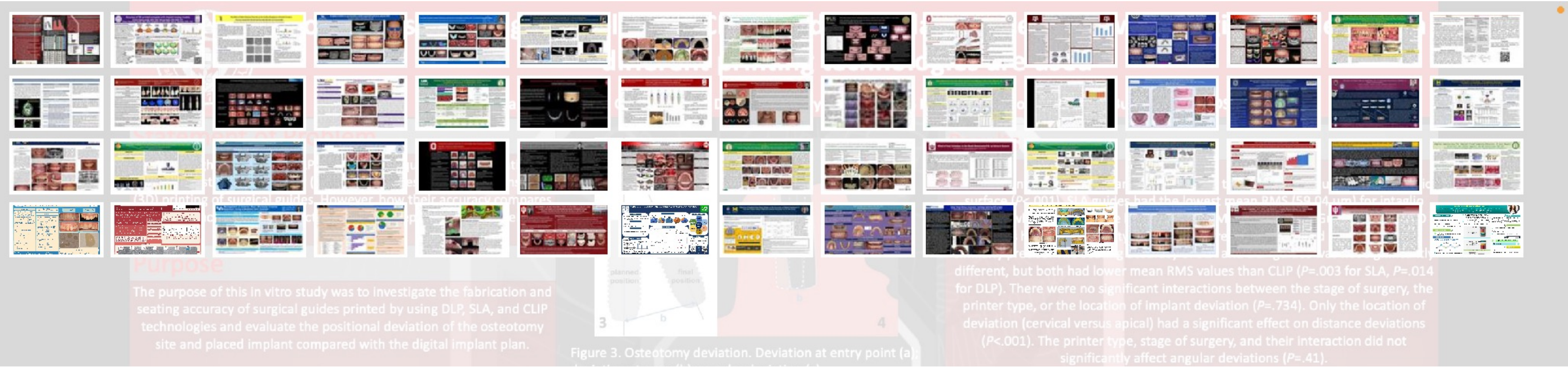

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