

Trueness comparison of digital model obtaining methods for single restoration

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Aim or purpose
To compare the trueness of digital model obtained from 3 different indirect scanners (3DGI, Invision scanning, and working model scanning) for all ceramic single restoration.

Material and method
Teeth 20 were prepared for all ceramic restoration on dental model. The tooth was prepared with shape 32 as reference file. The right left files of each group were obtained from scanning the model with 3 DGI (Faro Design 30 UTL 3000), 3DShape 9000-4 (ITL, Phall 700 900), Invision with 3-Dart and scanned with 3Shape TT-SPC. Free working model was fabricated and scanned with 3Shape 83 (CA). The test file was compared to reference file with Geometric Control 4. The 3 comparing points were measured on each surface (occlusal, mesial, distal, buccal and lingual). The 30 comparing points were measured on finishing line. The mean deviation, 50% of 3 parameters (surface, finishing line, and occlusal) was analyzed with one-way ANOVA.

Result
All 3DS groups (3D, 3F, and 3E) had lower deviation than 3F and CA group, while 3F showed the highest deviation in all parameters. Between 3DS groups, 3E group showed the lowest surface deviation followed by 3D and 3F group. The 3D and 3F group showed lower finishing line deviation than 3E group. The overall deviation, 3D and 3F group had lower deviation than 3E group.

Table 1 Mean in % of each group with comparison between areas

Parameter	Mean deviation (%)		
	Surface	Edge	Occlusal
3D Faro Design 30	0.48 (0.00*)	0.50 (0.00*)	0.48 (0.00*)
3Shape 83 (CA)	0.52 (0.00*)	0.51 (0.00*)	0.50 (0.00*)
3Shape TT-SPC	0.53 (0.00*)	0.52 (0.00*)	0.51 (0.00*)
Invision 3-Dart	0.54 (0.00*)	0.53 (0.00*)	0.52 (0.00*)
Working model 3D	0.55 (0.00*)	0.54 (0.00*)	0.53 (0.00*)

*Statistically significant difference
**Not considered as statistical difference

Conclusion
For all ceramic single restoration, digital scanner with 3D was recommended due to the low deviation compared to other methods using in this study. If the 3D does not exist, scanning working model is recommended over scanning Invision. However, the deviation of all groups were in clinical acceptable value.



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Thermoplastic polymer blend as novel material for denture base

Aim or purpose

Materials and methods

Results

Conclusion

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manifests as x-ray translucence impossible to distinguish from unsuccessful endodontic treatment.

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P055

A novel model incorporating 3D printing for endodontic training

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Aim or Purpose: A 3D printed model includes a tooth body, pulp cavity, and root canal system is useful in simulating clinical condition. The 3D printing method and Cone-Beam Computed Tomography (CBCT) image to create a tooth model that can be applied to various different dental training manikin.

Materials and Methods: We used 3D printing to fabricate teeth obtained from CBCT image. Being installed into the model, a conductive wire was placed at the apex of the root tip where filled with solution. On the other side, a connective probe wire extended to the cheek of the human head model and was then connected with the lip hook of the electronic apex locator to form a circuit. When the probe of the electronic apex locator approaches the apex, an audible sound is produced. A bee-bee warning sound was emitted as the probe passes through the apical foramen. Therefore, the devices can simulate the actual conditions during clinical root canal treatment.

Results: This device can be applied in preclinical dental student root canal therapy training, objective structured clinical examination (OSCE), endodontic specialist training and standardized training procedures. This may also integrate with dental simulation systems and develop a new training programs in dental simulation system to help our biomedical industry develop distinctive products and enhance international competitiveness.

Conclusions: This model can be conveniently attached onto the dental training manikin at preclinical dental laboratory training in dental schools.

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Theme: Digital Dentistry

Poster Session 18, Screen 1, September 25, 2023, 10:45 - 11:45

P057

Trueness comparison of digital model obtaining methods for single restoration

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Aim or Purpose: To compared the trueness of digital model obtained from 3 different intraoral scanners (IOS), impression scanning, and working model scanning for all-ceramic single restoration.

Materials and Methods: Tooth 46 was prepared for all-ceramic restoration on dental model. The tooth was scanned with 3shape E3 as reference file. The eight test files of each group were obtained from scanning the model with 3 IOS (iTero Element 5D (IT), 3Shape TRIOS 4 (TF), Medit i700 (MD)), impression was taken and scanned with 3shape E3 (IM), then working model was fabricated and scanned with 3shape E3 (CA). The test file was compared to reference file with Geomagic Control X. The 9 comparing points were measured on each surface (occlusal, mesial, distal, buccal, and lingual). The 32 comparing points were measured on finishing line. The mean deviation (μm) of 3 parameters (surface, finishing line, and overall) was analyzed with one-way ANOVA.

Results: All IOS groups (IT, TF, and MD) had lower deviation than IM and CA group, while IM showed the highest deviation on all parameters. Between IOS groups, IT group showed the lowest surface deviation followed by MD and TF group. The MD and TF group showed lower finishing line deviation than IT group. For overall deviation, MD and IT group had lower deviation than TF group.

Conclusions: For all-ceramic single restoration, digital impression with IOS was recommended due to the less deviation. If the IOS does not exist, scanning working model is recommended over scanning impression. However, the deviation of all groups was in clinical acceptance value.

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P058

Comparison of Different CAD Software on User Experience and Satisfaction

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Aim or Purpose: This study aims to compare the effect of open-source, professional, and artificial intelligence-assisted dental CAD software performance on user experience and satisfaction among dental practitioners and dental students with different levels of expertise in single crown design.

Materials and Methods: The study employed a quantitative research approach involving a survey and interviews with dental practitioners who have different levels of expertise in single crown design. Participants (N =100) were divided into novice (undergraduate dental students, n= 40), and professional (dental technicians, and prosthodontic residents, n = 60) groups. The survey consisted of two parts – Participant Information and Software Procedure regarding the user experience and satisfaction of each of the three types of software, including open-source, professional, and artificial intelligence-assisted (AI) automated dental CAD software.