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# Transforming smiles using an intraoral scanner and face scan application on smartphone



## KEYWORDS

Digital dentistry;  
Digital scan;  
Face scan;  
Smartphone;  
Veneer

Providing patients a functional and aesthetic dentition traditionally entails a labor-intensive process and numerous appointments are required to successfully complete these preliminary steps prior to delivering the final restorations. Advancements in dental technology have substantially simplified this arborous process by streamlining workflow thus reducing patient in-office time, and allowing patients the ability to view the result before committing to a treatment plan.<sup>1–3</sup> This case report described a digital workflow including use of an intraoral scanner, a 3-dimensional (3-D) face-scan application on smartphone, and a digital design software to achieve the patient's desired smile transformation.

A 30-year-old female presented to the clinic with a chief complaint of dissatisfaction with her current smile. Clinical examination revealed asymmetrical central incisors, peg-lateral incisors, and extrinsic staining. After multiple treatment options were discussed, she opted for six maxillary all-ceramic veneers. The preliminary steps included digital photographs and intraoral scans (Trios 3, 3 Shape, Copenhagen, Denmark) of the patient's current dentition (Fig. 1A and B).

To obtain the face scan, a 3-D face scanning application (Bellus3D Inc., Campbell, CA, USA) on a smartphone (iPhone 12, Apple Inc., Cupertino, CA, USA) was used. For face scanning procedure, the patient centered her face on the screen of the smartphone and then turned her head to

either side to capture the architecture of the face from multiple views. Two 3-D face scans were obtained to facilitate alignment with the intraoral scans, one with an exaggerated smile and one with a relaxed smile.

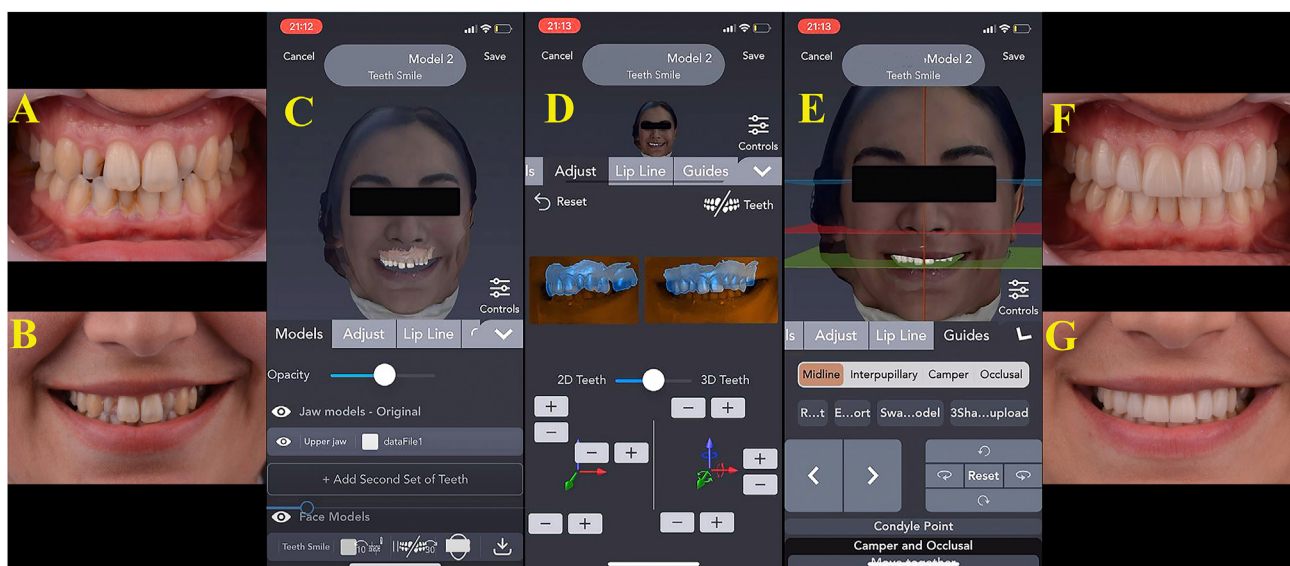
After the face scan process was completed, the intraoral scans of the maxilla and mandible were accurately overlapped by the Bellus3D software and created into layers. Now layered, a variety of features were now available for the clinician to explore. These features include the tabs: models, adjust, and guides tabs (Fig. 1C–E). The “models” tab offers the ability to alter in the opacity of the facial replica to better visualize its relationship to the dentition. The “adjust” tab allows for alterations to occur in a 2-D rendition of the layers for a more precise overlap of the facial and intraoral scans. Multiple planes (midline, interpupillary, occlusal, etc) of reference are also available. The final 3-D face scan was exported as a polygon (PLY) file.

A digital smile design software (3 Shape Dental System, 3Shape, Copenhagen, Denmark) was used to mockup the proposed restorations based on the intraoral dental scans and the 3-D facial scans. Once completed, the PLY files of the 3-D facial scan, maxillary, and mandibular intraoral scans were uploaded and synchronized. At this time, digital adjustments were made to the smile such as alignment of the occlusal plane and removal of unwanted soft tissue information.

With the digital segment of the workflow complete, the maxillary six anterior teeth were prepared. After a digital impression was made, the digital impression and proposed 3-D design were sent to the laboratory. Using the patient-approved digital wax up, a matrix was fabricated and then temporary veneers were fabricated and cemented. When the final restorations using lithium disilicate material were received from the laboratory, the temporary restorations were removed. After the surfaces of prepared teeth and definitive veneers were prepared (etching and bonding etc.), they were cemented permanently (Fig. 1F and G). It has been concluded that smartphone-based face scanning software can be used as an effective way to deliver desired

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**Figure 1** Digital workflow of the veneer restorations. (A and B) Intraoral view and smile line before treatment. (C, D, and E) Face scanning process allows visualization of the proposed smile design in multiple planes specific to the patient's anatomy. (F and G) Intraoral view and smile line after the definitive veneers were cemented.

outcomes to patients and help facilitate the treatment planning and fabrication processes.

### Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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