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Fundamentals of Facial Scanning Technology in Dentistry

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Abstract

The pandemic's lessons enforced the idea of a virtual dental patient, advising us to cut down on dental visits and gather more information during visits so that we could work remotely to develop the best diagnosis and treatment options for the patient and to improve communication between various specialists, labs, and patients themselves. To obtain a virtual dental patient with dynamic occlusion during aesthetic and functional treatment, you need the following digital data from an intraoral scanner, a facial scanner, a jaw motion analyzer, and computed tomography with the help of a software that combines them and constructs virtual dental patient.

Keywords

Facial Scanning; Technology; Hand-held Scanner; AI Facial Scanner; TMJ X-Ray

Introduction

The pandemic's lessons enforced the idea of a virtual dental patient, advising us to cut down on dental visits and gather more information during visits so that we could work remotely to develop the best diagnosis and treatment options for the patient and to improve communication between various specialists, labs, and patients themselves. To obtain a virtual dental patient with dynamic occlusion during aesthetic and functional treatment, you need the following digital data from an intraoral scanner, a facial scanner, a jaw motion analyzer, and computed tomography with the help of a software that combines them and constructs virtual dental patient.

While intraoral scanners are the gold standard in dental care these days for digital dental impressions and static bite registration, facial scanners are still a relatively new device. In this article, we'll go over the different kinds of facial scanners, the basics of face scanning in general, and the advantages face scanning can bring to your everyday practice. Dental facial scanners are becoming more and more common in dentistry, and for good reason! They are essentially extraoral scanners that take precise 3D pictures of a patient's facial structures. This has a lot of benefits over photos, as you can probably imagine. These devices create high-resolution, three-dimensional models (which can be aligned with your intraoral scan and CBCT) using imaging technology that uses structured light or laser scanning to create a comprehensive view of the patient's smile and surrounding facial features. For the most part, the scanning procedure is quick, painless, and extremely precise. In-depth diagnosis and treatment planning; improved communication with labs and technicians, particularly in cosmetic cases; and patient education are just a few of the uses for which dental professionals can put the digital scan files to use.

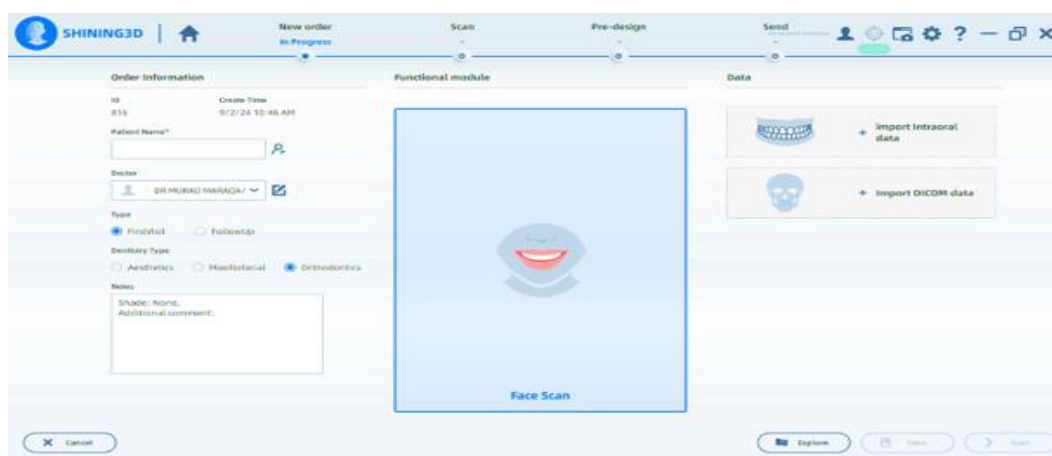
At present, there are two varieties of dental face scanners available in the market. Both desktop and portable face scanners are available. Although phone face scanners fall under the category of "handheld" scanners, the majority of face scanners are specialized products designed for this use. Bellus3D was an iPhone app that popularized the concept of dental face scanning before all of these products that we have today. Regrettably, the app was removed in 2022. Desktop face scanners are made to be used on a desk or counter in your lab or office, as the name suggests. These scanners are usually bulkier in nature, roughly the size of a small desktop computer or printer, and they are difficult to transport between spaces or rooms. Actually, you should set aside a space in your office specifically for taking face scans. Patients sit (or stand) in front of the face scanner while a scan is being taken, as these are meant to be stationary devices. Desktop scanners are known for their remarkable accuracy. Operator error and scanning problems are less likely because there isn't really any "scanning" involved and the operations are typically performed with just one click. Positioning a patient requires some learning, but other than that, anyone can do it. The major disadvantages of a desktop face scanners are cost, size and the lack of portability

Hand-held scanners are utilized to create a face scan by manually advancing the device around the patient's face while the capture is in progress. In the same way that intraoral scanning works, the scanning approach "builds up" the scanned image by moving around the patient's face while adhering to a scan strategy. A portable option that brings technology to the chairside is provided by handheld dental facial scanners. Though usually lightweight and comfortable to hold, these devices are wired. Handheld scanners are unquestionably the best option if you wish to use your face scanner at various sites and locations due to their lightweight and compact design. It is simple to carry them. The cost of handheld

face scanners is significantly less than that of desktop face scanners. Although extremely sophisticated, some handheld facial scanners may not be able to match the ultra-high resolution of their desktop counterparts, though this difference is steadily closing. Scanning a face with a handheld scanner takes longer than scanning a face with a desktop face scanner, which only requires one click. Though they are still taking 15–40 seconds, depending on the device, they are becoming faster. The operator has the potential to introduce scanning issues, like Intra oral scanning. As such, having a solid scanning strategy in place and receiving some instruction on how to operate the device are essential. The final category is phone dental face scanners. In particular, apps for iPhone. In essence, this kind of face scanning is a handheld device, but instead of using a proprietary device, your Apple iPhone is the scanner these days. Users have been able to safely unlock their phones with Face ID by utilizing the True Depth camera and biometric technology since the iPhone X was released in 2017. The Bellus iPhone app made this popular, and now new players—most notably the Qlone app—are entering the market.

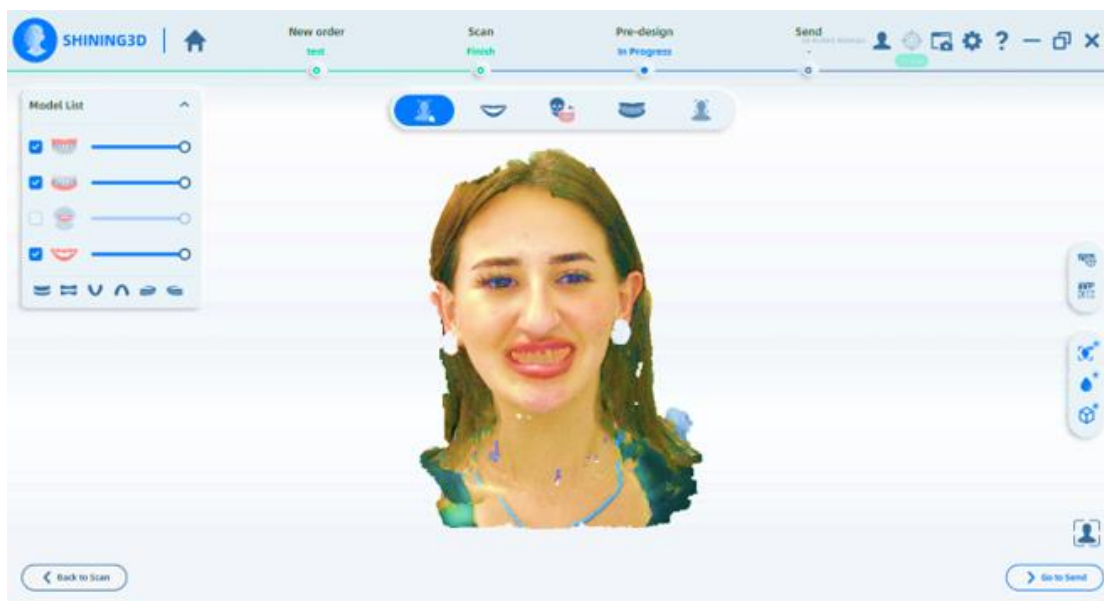
The benefits of using a phone facial scanner include: convenience—by utilizing the widespread use of smartphones, dental scanning is now possible at any time and from any location. And so many people already own an iPhone. Depending on the application, the price range for these apps is only \$20 to \$100 USD. The learning curve for phone dental scanners is comparatively lower than that of other handheld devices, as most people are accustomed to using smartphones. Although remarkable for their size, phone scanners usually capture less detail than more specialized dental scanners. Relying on phone specs: Once more, the scan's quality can be greatly influenced by the camera and processing capacity of your smartphone, which differ greatly amongst models. Therefore, a face scan taken with an Android phone—like a Samsung or Huawei phone—might look different from one taken with an Apple iPhone. If you use a phone in a clinical setting instead of a specially designed dental scanner in front of your patients, some may question your level of professionalism. Phone scanners require more time to complete tasks than desktop scanners, much like portable scanners. The face scanners on iPhones actually take longer than those on other portable scanners. Around 60 to 90 seconds are spent on each scan.

Apart from the technical details, as soon as the clinic has the facial scanner installed, data collection must begin.

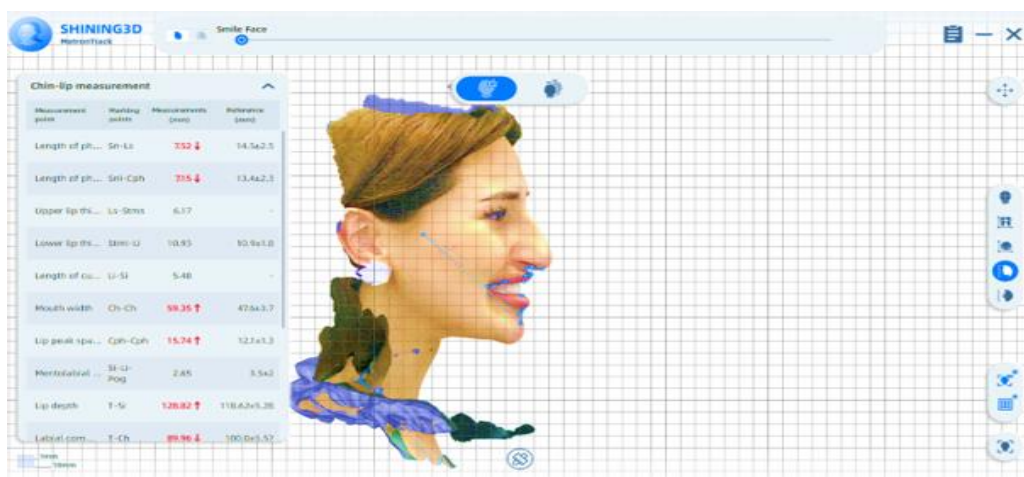


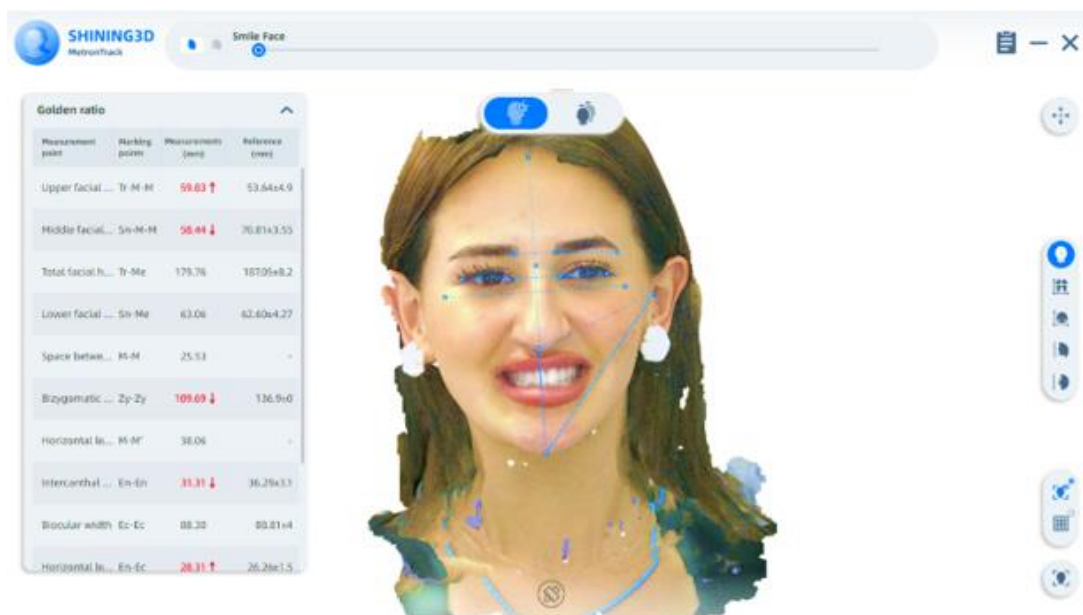
After the patient's information has been entered, you must begin the face scan process. As previously mentioned, this process could take up to a minute, depending on the hardware specifications of the

scanner and the practitioner's skills. Once the scanning is complete, all that's left to do is align the intraoral scan and CBCT, with the patient's face.

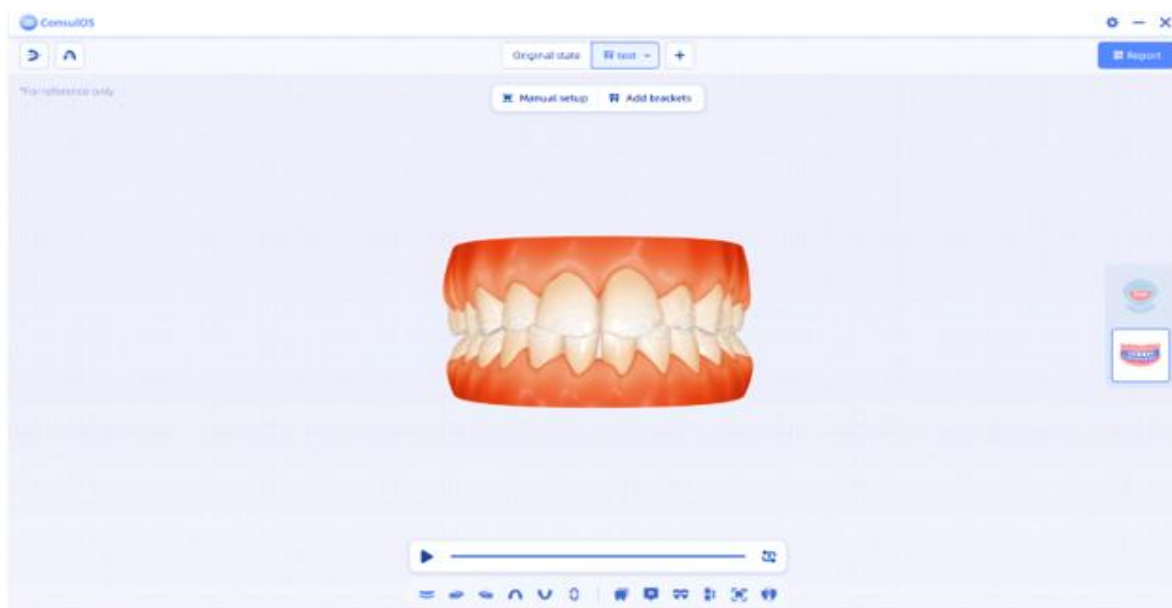


One advantage of the facial scanner is that it can help you obtain facial analysis without the need for multiple x-ray views, as demonstrated in the pictures. The facial scanner can also take accurate measurements of the patient's face, which can help you design a suitable treatment plan that takes the patient's appearance into consideration.

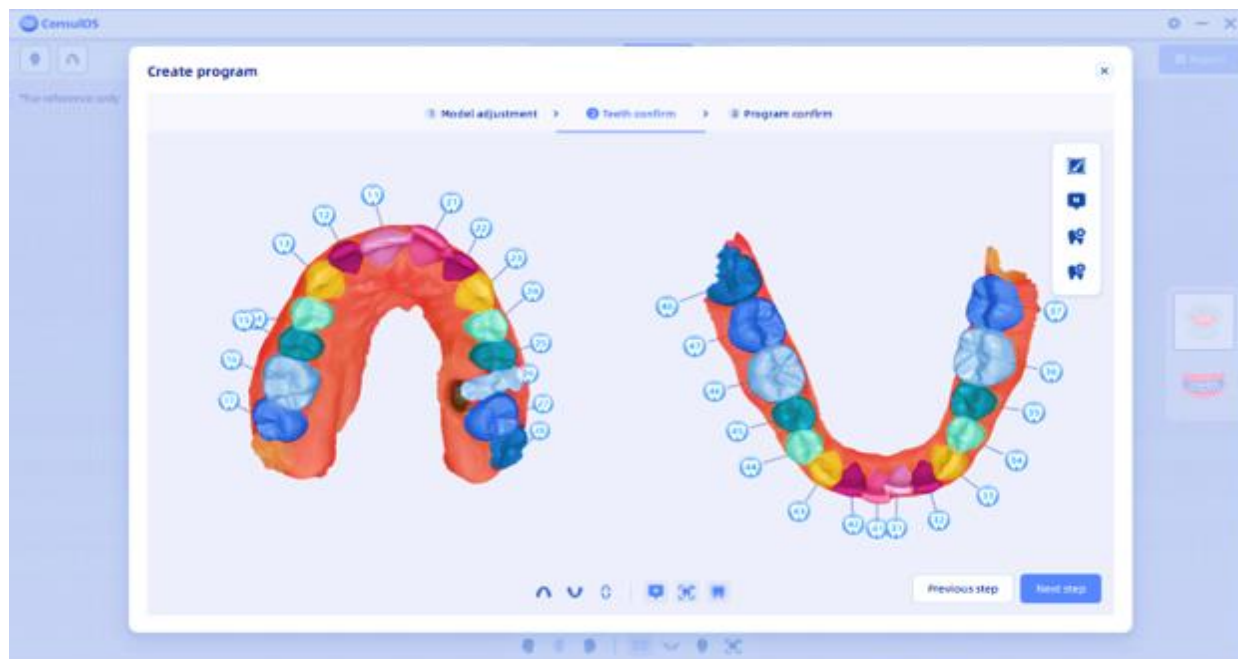




Using AI the facial scanner can help you plan the upcoming treatment whether smile designing or bracket placement.



In addition to helping the aesthetic dentist choose the best design for the smile while consulting with the technician about what is more appropriate for the face and profile, this clearly helps the patient see the results of the treatment before starting it. It also helps the orthodontist position the brackets more precisely, which shortens bonding times and requires fewer repositioning appointments.



Though it is not well documented, patients with facial asymmetries can also be monitored for active growth on the affected side, which might reduce in the future the need for multiple TMJ x-rays. Every practice had problems with patients after the treatment was completed. The ability of the facial scanner to superimpose two sets of data is quite fascinating in terms of showing the patient the improvement that happened after the treatment detent.

Conclusion

Technology cannot, at least not in the near future, replace humans, but doctors should always embrace new developments in the field because they save time and effort while providing the best care possible. Patients are increasingly fascinated by new devices and perceive doctors who use them as more modern and competent. The more you invest in your practice and yourself, the faster you will be able to treat patients and achieve better results, which will allow you to see more of them.

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