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Advantages of Using Intraoral Scanner in Prosthodontic Dentistry

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Abstract

Digital dentistry holds a leading role in modern dentistry. Its development perfected dental service, simplified difficult clinical cases and created an opportunity for dentists to be fully involved in a treatment process. The ability to create 3D digital designs, including smile design, increases patient engagement and ensures treatment satisfaction. Using scanners in everyday practice enhances communication between dentists and technical laboratories. This review explores the technical aspects of intraoral scanners, highlighting their key components, such as the mirror, lens, and scanning depth, as well as their advantages over traditional methods. Currently, there are many types of intraoral scanners on the market which differ from each other by their shape, design, price, and functional capabilities. Intraoral scanners are particularly beneficial in cases involving dental implants, as scan bodies facilitate precise digital impressions. The choice depends on the doctor's needs and preferences, as well as the area of its use. This study shows the advantages of using intraoral scanners in prosthodontics dentistry, its priorities, and the nuances of their use. In conclusion, intraoral scanners have become an invaluable tool in modern prosthodontics, enhancing treatment quality, efficiency, and patient comfort.

Keywords: Intraoral scanner, abutment, scan body (ISB), Multi-Unit abutment, dental implants

Introduction

The intraoral scanner does not have a long development history. The first scanner was created in 1980 by Swiss dentist Verner Mormann and Italian electrical engineer Marco Brandestini. Modern scanners were perfected. Improvements include their design, functional and software capabilities. When selecting an intraoral scanner, much attention should be focused on its design. Its head must be comfortable to use to effectively scan distal areas. Other important factors to consider are the ability to adequately identify colors in each situation, scanning depth, and working efficiency. An intraoral scanner operates similarly to a regular camera. It can create a 3D digital impression by combining multiple quality images. From a technical standpoint, it consists of a mirror and a lens. When the light hits the object to be scanned, we receive a signal of the reflected light. The information about this object's shape and condition is then transmitted to a monitor, which should then be processed in a specific software. The most popular program is said to be Exocad. Receiving digital impressions accelerates the process of manufacturing prosthodontic constructions and simplifies the communication between technical laboratories and doctors, as the digital impression is sent as a file in STL and PLY format and it's not necessary to send impressions through the postal service.

Such a method of work is especially useful for small dental clinics that are not equipped with technical laboratories. Additionally, the existence of 3D models makes it possible for the doctor to be involved in the creation of construction design. The doctor can make changes to the construction and send a photo of the future construction to the patient. Scanning with an intraoral scanner also has an advantage in the creation of prosthetics on dental implants. While scanning the work is accurate, the implant cut profile is clearly visible on the scanned digital model. While taking the regular impression using transfers, the transfer can move while casting a model, causing the construction to be imprecise. We can avoid this complication by making construction through oral scanning.



Figure 1: photo session

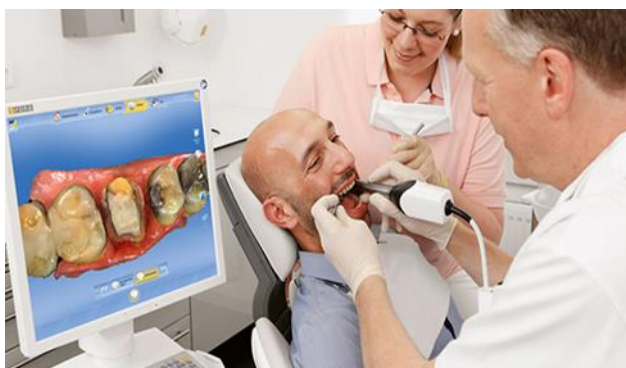


Figure 2: scanning process

To complete the scanning process effectively it is important to take into account various nuances: The mirror on top of a scanner's head, which is used for image reflection, should be clean; The environment that should be scanned must be as dry as possible. The scanning process is considerably more difficult on the lower jaw compared to the upper jaw during a complete edentia in the presence of multiple implants. Also scanning problems may occur when alveolar ridge is atrophied and scanner head movement is limited. In case of blood presence due to gum damage from tooth extraction or tooth stump preparation, the scanning process becomes more difficult, because scanner cant see the operation region as it covered with blood. In addition, in case deep pathological pockets presence, the scanner cannot fully perceive the depth of the pocket. Intraoral scanner in clinical practice can be used to scan Both, existing tooth stumps and dental implants. When tooth stumps are present no additional tools are necessary for scanning, but in case of dental implants, scan bodies are used. Companies that manufacture implants provide scan bodies that are suitable for their supplied implants. Multifunctional scan bodies exist: for example, they can be used for scanning, as well as transfer for close tray method of taking impression, or for fixing a temporary crown on a dental implant. Scan bodies' shapes differ from each other. The simpler the design,

the less effort the scanning process takes, which reduces the quantity of photo frames.

„Chiu A., Chen Y.-W., Hayashi J., Sadr A. Accuracy of CAD/CAM Digital Impressions with Different Intraoral Scanner Parameters.“



Figure 3: scan body

By using oral scans, photographs, and 3D computer tomography, it is possible to provide a patient with a digital design of their smile, which makes the appearance of the future construction visible and prevents the chance of disagreement between doctors and patients.

„Ting-Shu S., Jian S. Intraoral Digital Impression Technique: A Review. *J. Prosthodont.* 2014;24:313–321. doi: 10.1111/jopr.12218”

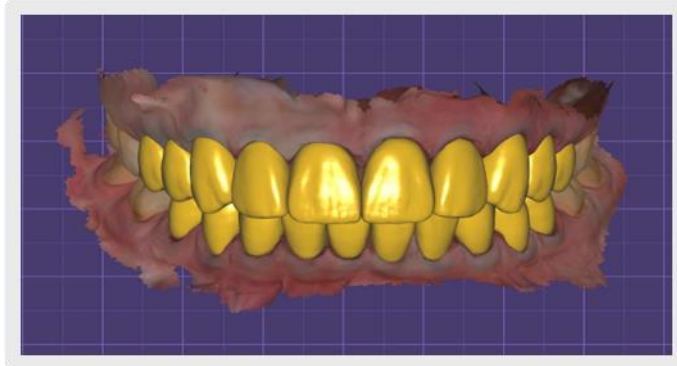


Figure 4: digital planning



Figure 5: scan bodies of different companies

The results and aim of the research

Based on the literature review and conclusions based on clinical practice in the article, we can confidently say that there is no alternative to using an intraoral scanner. A digital dental impression produced by an intraoral scanner is accurate, which, as mentioned above, accelerates the treatment process and, most importantly, makes the treatment comfortable for both, the doctor and the patient. Clinical mistakes, such as inaccuracy in color, size, and positioning in prosthodontic constructions, are brought to a minimum, as smile designing, and the use of temporary constructions enable patients to be involved in the treatment. Digital dentistry is also to be credited for the correct bite registration, which is also an important factor in making an ideal dental construction. “Fraile C., Ferreiroa A., Romeo M., Alonso R., Pradés G. Clinical study comparing the accuracy of interocclusal records, digitally obtained by three different devices. *Clin. Oral*”



Figure 6: scanned lower jaw, with scan bodies and tooth stumps

The advantages of intraoral scanning are:

1. Simplification of the work process.
2. Process efficiency and image accuracy.
3. Easy to take standard dental impressions in patients with a strong vomiting reflex to produce prosthodontic constructions.
4. Full engagement in the construction of prosthodontic constructions.
5. Accurate management of stages in the production of prosthodontic constructions and the reduction in clinical stages due to the presence of a digital impression.



Figure 7: smile design

Conclusion

Based on the above, the implementation of digital dentistry developed dental services to a higher level. Intraoral Scanning represents a new word in prosthodontic dentistry. By producing a digital impression, scanning the patient's initial condition of the oral cavity and using photo images, it became possible to produce high-level prosthodontic constructions aesthetically. By the clinical practice and by analyzing the literature review it can be said that the intraoral scanner is an unrivaled modern prosthodontic tool in the treatment process of a patient.

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References:

1. Chiu A., Chen Y.-W., Hayashi J., Sadr A. Accuracy of CAD/CAM Digital Impressions with Different Intraoral Scanner Parameters. *Sensors*. 2020;20:1157. doi: 10.3390/s20041157. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
2. doi: 10.1016/j.dental.2019.07.023. [PubMed] [CrossRef] [Google Scholar]
3. Davidovich E., Dagon S., Tamari I., Etinger M., Mijiritsky E. An Innovative Treatment Approach Using Digital Workflow and CAD-CAM Part 2: The Restoration of Molar Incisor Hypomineralization in Children. *Int. J. Environ. Res. Public Health*. 2020;17:1499. doi: 10.3390/ijerph17051499. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
4. Fraile C., Ferreiroa A., Romeo M., Alonso R., Pradés G. Clinical study comparing the accuracy of interocclusal records, digitally obtained by three different devices. *Clin. Oral*

- Investig.* 2022;26:1957–1962. doi: 10.1007/s00784-021-04174-2. [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
5. Imburgia M., Logozzo S., Hauschild U., Veronesi G., Mangano C., Mangano F.G. Accuracy of four intraoral scanners in oral implantology: A comparative in vitro study. *BMC Oral Health.* 2017;17:1–13. doi: 10.1186/s12903-017-0383-4. [[PMC free article](#)] [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
 6. Mangano F., Gandolfi A., Luongo G., Logozzo S. Intraoral Scanners in dentistry: A review of the current literature. *BMC Oral Health.* 2017;17:149. doi: 10.1186/s12903-017-0442-x. [[PMC free article](#)] [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
 7. Mizumoto R.M., Yilmaz B. Intraoral scan bodies in implant dentistry: A systematic review. *J. Prosthet. Dent.* 2018;120:343–352. doi: 10.1016/j.prosdent.2017.10.029. [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
 8. Revilla-León M., Raney L., Piedra-Cascón W., Barrington J., Zandinejad A., Özcan M. Digital workflow for an esthetic rehabilitation using a facial and intraoral scanner and an additive manufactured silicone index: A dental technique. *J. Prosthet. Dent.* 2020;123:564–570.
 9. 3Shape TRIOS Intraoral Scanners—Compare All Models. [(accessed on 29 March 2023)]. Available online: <https://www.3shape.com/en/scanners/trios>
 10. Ting-Shu S., Jian S. Intraoral Digital Impression Technique: A Review. *J. Prosthodont.* 2014;24:313–321. doi: 10.1111/jopr.12218. [[PubMed](#)] [[CrossRef](#)] [[Google Scholar](#)]
 11. Virtuo Vivo™ Intraoral Scanners. [(accessed on 29 March 2023)]. Available online: <https://www.straumann.com/en/dental-professionals/products-and-solutions/cares-digital-solutions/equipment/io-scanners/virtuo-vivo.html>