

Digital Splint PubMed search

AL CE Broker

Video tutorial to set up

<https://vimeo.com/788481363/caf8c64ee5>

<https://pubmed.ncbi.nlm.nih.gov/33498902/>

Marques S, Ribeiro P, Falcão C, Lemos BF, Ríos-Carrasco B, Ríos-Santos JV, Herrero-Climent M. Digital Impressions in Implant Dentistry: A Literature Review. *Int J Environ Res Public Health*. 2021 Jan 24;18(3):1020. doi: 10.3390/ijerph18031020. PMID: 33498902; PMCID: PMC7908474.

Conclusions: The accuracy of digital impressions in implant dentistry depends on several aspects. The depth/angulation of the implant, the experience of the operator, the intra-oral scanner used, and environmental conditions may influence the accuracy of digital impressions in implant dentistry.

<https://pubmed.ncbi.nlm.nih.gov/34987708/>

Igai F, Junior WS, legami CM, Neto PT. Assessment of different types of intra oral scanners and 3D printers on the accuracy of printed models: An *in vitro* study. *J Clin Exp Dent*. 2021 Dec 1;13(12):e1174-e1181. doi: 10.4317/jced.58765. PMID: 34987708; PMCID: PMC8715558.

Results: In relation to precision, all five groups presented similar and acceptable results. The trueness analysis indicated that both the printed and the plaster models had average measurements that were different from the reference model.

<http://www.ncbi.nlm.nih.gov/pmc/articles/pmc7509929/>

Nulty A. A comparison of trueness and precision of 12 3D printers used in dentistry. *BDJ Open*. 2022 May 26;8(1):14. doi: 10.1038/s41405-022-00108-6. PMID: 35618716; PMCID: PMC9135705.

Results: When grouped into homogenous subsets, the cheapest 3D printers in the group, namely the Anycubic printers and the Elegoo Mars, are statistically not dissimilar to the higher priced Asiga Max UV or even the mid-priced Formlabs printers in the X and Z dimensions. However, the Envisiontec One and D4K Pro, Ackuretta Sol and Asiga Max UV were statistically superior in terms of consistently accurate Y dimension. Although these printers use different technologies to print, no specific type of printer technology is more accurate than the others.

<http://www.ncbi.nlm.nih.gov/pmc/articles/pmc9032305/>

Di Fiore A, Graiff L, Savio G, Granata S, Basilicata M, Bollero P, Meneghello R. Investigation of the Accuracy of Four Intraoral Scanners in Mandibular Full-Arch Digital Implant Impression: A Comparative In Vitro Study. *Int J Environ Res Public Health*. 2022 Apr 13;19(8):4719. doi: 10.3390/ijerph19084719. PMID: 35457583; PMCID: PMC9032305.

Abstract

Background: We compare the accuracy of new intraoral scanners (IOSs) in full-arch digital implant impressions. **Methods:** A master model with six scan bodies was milled in poly(methyl methacrylate), measured by using a coordinate measuring machine, and scanned 15 times with four IOSs: PrimeScan, Medit i500, Vatech EZ scan, and iTero. The software was developed to identify the position points on each scan body. The 3D position and distance analysis were performed. **Results:** The average and \pm standard deviation of the 3D position analysis was $29 \mu\text{m} \pm 6 \mu\text{m}$ for PrimeScan, $39 \mu\text{m} \pm 6 \mu\text{m}$ for iTero, $48 \mu\text{m} \pm 18 \mu\text{m}$ for Mediti500, and $118 \mu\text{m} \pm 24 \mu\text{m}$ for Vatech EZ scan ($p < 0.05$). **Conclusions:** All IOSs are able to make a digital complete implant impression in vitro according to the average misfit value reported in literature ($150 \mu\text{m}$); however, the 3D distance analysis showed that only the Primescan and iTero presented negligible systematic error sources.

<http://www.ncbi.nlm.nih.gov/pmc/articles/pmc9658356/>

Wada J, Wada K, Gibreel M, Wakabayashi N, Iwamoto T, Vallittu PK, Lassila L. Effect of 3D Printer Type and Use of Protection Gas during Post-Curing on Some Physical Properties of Soft Occlusal Splint Material. *Polymers (Basel)*. 2022 Oct 31;14(21):4618. doi: 10.3390/polym14214618. PMID: 36365611; PMCID: PMC9658356.

Abstract

Despite the fact that three-dimensional (3D) printing is frequently used in the manufacturing of occlusal splints, the effects of the 3D printer type and post-curing methods are still unclear. The aim of this study was to investigate the effect of the printer type (digital light processing: DLP; and liquid crystal display: LCD) as well as the post-curing method with two different atmospheric conditions (air and nitrogen gas (N_2)) on the mechanical and surface properties of 3D-printed soft-type occlusal splint material. The evaluated properties were flexural strength, flexural modulus, Vickers hardness (VHN), fracture toughness, degree of double bond conversion (DC%), water sorption, water solubility, and 3D microlayer structure. The printer type significantly affected all the evaluated properties. Flexural strength, flexural modulus, and fracture toughness were significantly higher when specimens were printed by a DLP printer, while VHN and DC% were significantly higher, and a smoother surface was noticeably obtained when printed by an LCD printer. The post-curing at an N_2 atmosphere

significantly enhanced all of the evaluated properties except water sorption, 3D microlayer structure, and fracture toughness. The current results suggested that the printer type and the post-curing methods would have an impact on the mechanical and surface properties of the evaluated material.

<http://www.ncbi.nlm.nih.gov/pmc/articles/pmc9600557/>

Tsolakis IA, Papaioannou W, Papadopoulou E, Dalampira M, Tsolakis AI. Comparison in Terms of Accuracy between DLP and LCD Printing Technology for Dental Model Printing. Dent J (Basel). 2022 Sep 28;10(10):181. doi: 10.3390/dj10100181. PMID: 36285991; PMCID: PMC9600557.

Abstract

Background: The aim of this study is to evaluate the accuracy of a Liquid Crystal Display (LCD) 3D printer compared to a Direct Light Processing (DLP) 3D printer for dental model printing.

Methods: Two different printers in terms of 3D printing technology were used in this study. One was a DLP 3D printer and one an LCD 3D printer. The accuracy of the printers was evaluated in terms of trueness and precision. Ten STL reference files were used for this study. For trueness, each STL file was printed once with each 3D printer. For precision, one randomly chosen STL file was printed 10 times with each 3D printer. Afterward, the models were scanned with a model scanner, and reverse engineering software was used for the STL comparisons.

Results: In terms of trueness, the comparison between the LCD 3D printer and DLP 3D printer was statistically significant, with a p -value = 0.004. For precision, the comparison between the LCD 3D printer and the DLP 3D printer was statistically significant, with a p -value = 0.011.

Conclusions: The DLP 3D printer is more accurate in terms of dental model printing than the LCD 3D printer. However, both DLP and LCD printers can accurately be used to print dental models for the fabrication of orthodontic appliances.