



The Accuracy of Digital Interocclusal Records: A Literature Review

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Background

Digital techniques are being utilized more widely for the fabrication of dental restorations.¹ Obtaining accurate interocclusal records is an essential part of the success of any final prosthesis.² The use of digital scanners in obtaining records has been proven to have many advantages. Some of these advantages are its accuracy, efficiency and cost-effectiveness.³ However, the accuracy of digital interocclusal records has not been studied extensively.

Objectives

The objective of this poster presentation is to review the current literature to determine the accuracy of digital interocclusal record techniques compared to conventional techniques.

Methods

A PubMed search was performed between 2015 and 2020 using key words including “virtual interocclusal records”, “digital bite registration”, “digital interocclusal records”, “virtual occlusal records AND scanners”. Selection criteria used were in vivo or in vitro studies that tested the accuracy of digital interocclusal records.

Results

A total of 30 articles were found, nine of which met the selection criteria and were reviewed. Different intraoral scanners produced varying occlusal contact areas and distortion rates. Many studies recommended quadrant scans for single units and one study recommended full arch scans for 3-unit FPDs.

Table 1: Full arch scan extent studies

Author/Type/Year	Type of digital scanner	Result
Gintaute et al. <i>In vitro</i> , 2019	- CEREC Omnicam - TRIOS (3Shape) - PLANMECA Emerald	Large variations in the occlusal contacts surface areas were found. TRIOS scanner was the closest to true value.
Wong et al. <i>In vitro</i> , 2018	- 3M True Definition (3M ESPE) - TRIOS (3Shape) - CEREC Omnicam	TRIOS had the least interocclusal distortion at -23.1 um.
Yee et al. <i>In vitro</i> , 2018	- Ceramill Map400 - In EOS X5 - Scanner S600 Arti	The inter-arch distortion of all three is less than 0.6%
Solaberrieta et al. <i>In vitro</i> , 2015	- ATOS Compact Scan 5M (GOM GmbH)	Contacts observed in the virtual environment are significantly more accurate than those of the physical one with a mean deviation of 0.069 mm

Table 2: Full arch and quadrant or half arch scan extent studies

Author/Type/Year	Type of digital scanner	Result
Arslan et al. <i>In vitro</i> , 2017	- CEREC Omnicam	For 3-unit FPD the highest precision was found with complete arch scans of nonprepared teeth.
Edher et al. <i>In vitro</i> , 2018	- CEREC Omnicam	Quadrant scans for a single unit preparation is indicated.
Solaberrieta et al. <i>In vitro & in vivo</i> 2016	- ATOS Compact Scan 5M (GOM GmbH) - TRIOS (3Shape) - Lava Cos (3M ESPE) - Zfx Intrascan	In vivo single unit accuracy between 78.0 μ m and 82.3 μ m In vivo complete arch accuracy between 0.2225 mm and 0.2296 mm. In vitro single unit accuracy between 8.8 and 9.4 μ m In vitro complete arch scan accuracy between 0.143 and 0.200 mm

Table 3: Quadrant arch scan extent studies

Author/Type/Year	Type of digital scanner	Result
Abdulateef et al. <i>In vivo</i> , 2020	- CEREC Omnicam	Virtual interocclusal records were acceptable with 87% sensitivity and 78% reproducibility .
Zimmerman et al. <i>In vivo</i> , 2018	- CEREC Bluecam - CEREC Omnicam - TRIOS (3Shape) - In EOS X5	Intraoral scanning systems give an accurate rotational and translational measurements compared to conventional registration methods.

Conclusion

Digital interocclusal record registrations produce clinically acceptable results. However, due to the limited available studies more research is needed.

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