INPLASY

Investigating the Impact of Different Scanning Speeds and Scanning Distances on the Accuracy and Quality of Digital Intraoral Scans: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - King Khalid University.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 January 2024 and was last updated on 30 January 2024.

INTRODUCTION

Review question / Objective 1. What is the impact of different scanning speeds on the accuracy and quality of digital intraoral scans? 2. How do different scanning distances affect the accuracy and quality of digital intraoral scans?

Rationale 1. Clinical Guidance: The systematic review will help establish guidelines regarding the optimal scanning speed and distance for digital intraoral scans. This information will assist dental practitioners in maximizing the accuracy and quality of their scans, ultimately improving the diagnosis and treatment planning process.
2. Standardization: The systematic review may identify any inconsistencies or variations in scanning speeds and distances utilized in the existing literature. This highlights the need for standardization in scanning protocols across different studies and practice settings. Standardized scanning procedures will enhance comparability between studies and improve the reliability and validity of future research.

Condition being studied Different type of Digital Intraoral Scanners.

METHODS

Search strategy The search was performed using three electronic databases: PubMed, ScienceDirect and Cochrane library. The scope of the systematic review was based on the inclusion and exclusion criteria which was formulated using the PICO format. We started by forming two or more search string to form a keyword using the Boolean operator" OR, AND" . The keywords were search within the title, abstract and link. A high number of results were returned, but we ensured that the most relevant studies in relation to the

study topic were obtained by manually selecting the relevant studies from the database results.

Participant or population Adults or children with Dental problem.

Intervention Different type of Digital Intraoral Scanners.

Comparator Precision, accuracy, trueness, speed, RMS and distance of digital intraoral scanners.

Study designs to be included Clinical trial, Randomized Controlled Trial, observational study, cross sectional study, Prospective study.

Eligibility criteria Studies published in English.

Information sources Scientific studies that specifically addressed the use of AI in prosthodontics were taken from several reliable sources, including Google Scholar, Pub-Med via MEDLINE, Springer, and Scopus, EBSCO host (Dentistry & Oral Sciences Source database), Science Direct, and Web of Science (All databases: WOS, KJD, MEDLINE, RSCI, SCIELO). The extensive collection of publications was analyzed to only include prosthodontics related articles . These publications were evaluated attentively before being included in the research process.

Main outcome(s) There was a significant difference in the accuracy and quality of both scanning distance and scanning speed when TRIOS 3 was used.

Data management Data was processed in Microsoft Excel (Excel 365; Microsoft Corp., Redmond, WA, USA). For export and data manipulation, Google Sheets (Alphabet Inc., Mountain View, CA, USA) were also used. This is an online spreadsheet program included as part of the free, web-based Google Docs Editors suite offered by Google.

Quality assessment / Risk of bias analysis Two researchers independently assessed the risk of bias of the included articles using —JBI critical appraisal tools. The potential risk of bias was categorized as low if a study provided detailed information pertaining to 70% or more of the applicable parameter s . Moderat e r i s k was considered if a study provided information corresponding to less than 70% to 50% of the applicable parameters, whereas if a study showed missing information regarding more than 50% of the applicable parameters, the study was categorized as exhibiting a high risk of bias.

Strategy of data synthesis Two review authors (RS and AK) used the studies to help select studies and document their decisions. This was done in two stages, with the first stage consisting of a title and abstract screening of all studies against the inclusion criteria, and the second stage being a full text assessment of papers that were deemed potentially relevant based on the initial screening [. RS and AK, the review's authors, discussed and settled their differences by consensus after consulting the procedure.

Subgroup analysis The data was compiled from a variety of articles:
• Author(s), year of publication, country, study design.
• Total number of patients/datasets.
• Training/validation datasets
• Test datasets
• Aim of the study.

Sensitivity analysis None.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia, West Indies.

Keywords Precision, accuracy, trueness, speed, RMS and distance of digital intraoral scanners.

Dissemination plans Data will be shared after the publication.

Contributions of each author

Author 1 - Ravinder Saini - Author 1 drafted the manuscript.
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