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Comparative Analysis of Virtual Articulator Software Platforms or Software Applications: Accuracy, User-friendliness, and Clinical Applicability

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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 05 February 2024 and was last updated on 05 February 2024.

INTRODUCTION

Review question / Objective 1. Evaluate the accuracy of virtual articulator software platforms for precise digital articulation analysis in dental procedures. 2. Assess the user-friendliness of virtual articulator software applications to ensure seamless integration into dental workflows and enhance practitioner experience. 3. Investigate the clinical applicability of virtual articulator software platforms, examining their effectiveness in real-world scenarios for improved patient outcomes and treatment planning.

Condition being studied This study presents a comprehensive comparative analysis of various virtual articulator software platforms or applications, focusing on key parameters such as accuracy, user-friendliness, and clinical applicability.

METHODS

Search strategy The search strategy used the PICO (Participants, Intervention, Comparators or Controls, and Outcome) framework.

Participant or population Dental implants.

Intervention Virtual articulators.

Comparator Other techniques (traditional/manual articulators). Virtual software platforms.

Study designs to be included Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) criteria.

Eligibility criteria Studies published in English.

Information sources Using diverse databases, including PubMed, Google Scholar, ScienceDirect, The Cochrane Library, and Scopus, relevant

research publications were identified following the PRISMA guidelines and PICO framework. Furthermore, the quality of the research papers was evaluated using the CONSORT scale and Mixed Methods Appraisal Tool, with qualitative criteria guiding the construction of the research papers.

Main outcome(s) The diversity of software, platforms, and systems for virtual articulators prevents the formulation of a definitive and succinct conclusion. Nevertheless, in a general assessment, virtual articulators demonstrated comparable accuracy and precision when juxtaposed with their traditional counterparts.

Additional outcome(s) Accuracy, user-friendliness, and clinical applicability.

Data management Selected studies meeting the inclusion criteria underwent information retrieval, and the data extraction protocol involved various crucial elements. Initially, demographic details such as author information, country of origin, study design, sample size (patients/implants), and the virtual articulation used were documented. Additionally, accuracy assessment characteristics were extracted, including the technique employed for accuracy measurement, dental implant position, and marginal fit measurements. User-friendliness and clinical applicability features were also captured. The protocol was designed to encompass the reporting of conclusions and identifying and reporting any limitations or potential biases identified in the studies.

Quality assessment / Risk of bias analysis The methodological quality of the in vitro studies was evaluated using the CONSORT scale, which comprises 14 items for the included studies. In contrast, non-in vitro studies underwent evaluation using the Mixed Methods Appraisal Tool (MMAT). Quality scores for these studies were calculated according to the procedure outlined by Charette, McKenna. The studies were then classified as either low quality (scoring ≤ 3) or high quality (score > 3) based on their affirmative responses garnering 1 point and negative responses receiving 0 points, as per the criteria established.

Strategy of data synthesis The systematic review included articles by employing a qualitative analysis process. The PRISMA checklist framework guided the systematic selection of relevant literature, and a methodical step-by-step approach was utilized to choose articles.

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.

Sensitivity analysis None.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia.

Keywords Silicone materials, Tear strength, Tensile strength, Prosthetic rehabilitation.

Dissemination plans All the data and the article will be share after the publication.

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