INPLASY PROTOCOL

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None declared.

Revolutionizing Dentistry: A Comprehensive Review of 3D Imaging and Digital Technologies in Dental Practice

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Review question / Objective: Reviewing and synthesizing existing information, as well as new developments in the field of 3D dentistry, including its applications in clinical settings, and locating gaps in the previously published literature are the goals of this study.

Information sources: 1. Electronic Databases: The primary source of literature for systematic review are electronic databases such as PubMed, Embase, Cochrane Library, Scopus, and Web of Science, as they index most of the relevant international journals and conference proceedings in the field. 2. Reference lists: Reviewing the reference list of the included articles can enable the identification of relevant studies that were not retrieved through the database searches.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 02 June 2023 and was last updated on 02 June 2023 (registration number INPLASY202360009).

INTRODUCTION

Review question / Objective: Reviewing and synthesizing existing information, as well as new developments in the field of 3D dentistry, including its applications in clinical settings, and locating gaps in the previously published literature are the goals of this study.

Rationale: Investigate the technical components of 3D dentistry, including software tools, imaging methodologies, and data processing methods, and evaluate whether these features are suitable for clinical translation.

Condition being studied: What is the role of virtual patients created by the 3D technique in dentistry?

METHODS

Search strategy: The PICO question What is the role of virtual patients created by the 3D technique in dentistry, was used in the search strategy. To ensure that as many opinions as possible have been considered, the word "Virtual dentals" was used as the only search term in medical-related datasets. A wider range of phrases were (3d dentistry, digital dentistry) included in the additional search parameters for PUBMED, the Web of Science, and Google Scholar. Google Scholar was searched using the main search method, and all relevant publications found on PUBMED and Web of Science were read. A similar process was used to conduct the literature review.

Participant or population: None the study is only related to the materials.

Intervention: 3d Dentistry.

Comparator: Digital Dentistry.

Study designs to be included: The PRISMA tools, which represent Preferred Reporting Items for Systematic Reviews and Meta-Analyses, are utilized in the process of evaluating the outcomes of the systematic analyses of the gathered studies.

Eligibility criteria: Studies comparing the marginal adaption of 3D-printed provisional fixed dental prosthesis (FDPs) and crown materials to other materials and methods used to make them.

Information sources: 1. Electronic Databases: The primary source of literature for systematic review are electronic databases such as PubMed, Embase, Cochrane Library, Scopus, and Web of Science, as they index most of the relevant international journals and conference proceedings in the field.
2. Reference lists: Reviewing the reference list of the included articles can enable the identification of relevant studies that were not retrieved through the database searches.

Main outcome(s): 1. Diagnostic accuracy: The accuracy of diagnosis using 3D imaging and digital technologies can be an important outcome of this systematic review.
2. Treatment planning: The ability of 3D imaging and digital technologies to aid in treatment planning such as virtual implant placement, orthognathic surgery, or orthodontic treatment can be an essential outcome of interest.
3. Quality of life and patient satisfaction: Assessing the impact of 3D imaging and digital technologies on the quality of life and patient satisfaction can be valuable.

Quality assessment / Risk of bias analysis:
1. Selection bias: This was assessed by analyzing the eligibility criteria of the included studies and examining how participants were selected. Studies with a high risk of selection bias might have inadequate sample sizes, imbalanced groups during assignment or grouping, or unsuccessful attempts at randomization.
2. Performance bias: This was assessed by examining how interventions were administered and comparing the degree of emphasis given to study groups. High-performance bias may occur when participants know which treatment they have been given, which could affect their behavior.
3. Detection bias: This was assessed by analyzing how outcomes were assessed and if outcome assessors were blinded to treatment group. High detection bias may occur if outcome assessors know which treatment group participants are in, which may lead to expectancy effects.

Strategy of data synthesis: Narrative synthesis: This involved summarizing the results of the included studies in a qualitative narrative form. This approach allowed for a comprehensive analysis of the available evidence and informed an overall understanding of the topic.

Subgroup analysis: By splitting the included studies into subgroups according to relevant study-level, patient-level or intervention-level factors, it was possible to further analyze the data based on these characteristics and determined different effects that the intervention was having on different subgroups.

Sensitivity analysis: The sensitivity analysis influence the study quality by analyzing the effect of excluding low-quality studies from the analysis. The quality of the studies were assessed using risk of bias tools, and the studies can then be ranked based on their quality. This analysis can be done by removing small studies, and the effect of the intervention can be re-analyzed to assess whether or not the results change significantly.

Language restriction: Articles only in English were Selected.

Country(ies) involved: Saudi Arabia.

Keywords: 3d , digital Dentistry.

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