INPLASY

Impact of the artificial intelligence-generated digital dental smile on facial esthetic outcomes: 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 29 April 2025 and was last updated on 29 April 2025.

INTRODUCTION

Review question / Objective To determine how AI-driven digital smile design affects aesthetic outcomes.

Rationale Although AI tools promise accurate and effective smile planning, there is currently limited information on their practical implications.

Condition being studied Facial aesthetics, smile symmetry, dental rehabilitation, and patient satisfaction.

METHODS

Search strategy Google Scholar, PubMed, ScienceDirect, Scopus, Cochrane Library.

Participant or population Human subjects undergoing dental treatments for aesthetic smile improvement.

Intervention AI-based DSD tools like 3D digital models, REBEL, Invisalign Smileview.

Comparator Traditional/conventional smile design methods done by experienced clinicians.

Study designs to be included Randomized controlled trials (RCTs), non-RCTs, cross-sectional studies, case studies, and prospective clinical trials. Excluded: animal studies, reviews.

Eligibility criteria Inclusion: Studies (2004–2024) evaluating AI-generated DSD outcomes. Exclusion: Non-clinical studies, irrelevant outcomes.

Information sources Google Scholar, PubMed, Scopus, ScienceDirect, Cochrane Library, Gray literature.

Main outcome(s) Patient/dentist satisfaction, Improved smile parameters.

Additional outcome(s) Efficiency of AI tools in predicting smile aesthetics.

Data management Jamovi software used, Heterogeneity assessed.

Quality assessment / Risk of bias analysis ROBINS-I tool used.

Strategy of data synthesis Meta-analysis for qualitative synthesis of aesthetic results and aggregated satisfaction rates.

Subgroup analysis By AI tool type and Study design.

Sensitivity analysis Heterogeneity done via random effects model.

Language restriction Excluded Non-English articles.

Country(ies) involved Saudi Arabia, India.

Other relevant information PRISMA guidelines followed.

Keywords Artificial intelligence, AI, digital smile, DSD, smile design, facial rehabilitation, facial esthetic.

Dissemination plans Submit findings to peer-reviewed journals.

Contributions of each author

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