Randomized Trials of AI-Based Interventions for Oral Healthcare and Dental Education: A Systematic Review of Randomized Controlled Trials

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Table S1: PRISMA checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	2
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	3
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	3
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	3
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	3
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	4
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	4
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	4
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	5
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	5
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	5
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	5

Section and Topic	Item #	Checklist item	Location where item is reported
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	5
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	5
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	5
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	5
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	-
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	-
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	5
Study characteristics	17	Cite each included study and present its characteristics.	7
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	7
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	7
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	7
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	7
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	7
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	7
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	7
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	-
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	15

Section and Topic	Item #	Checklist item	Location where item is reported
	23b	Discuss any limitations of the evidence included in the review.	15
	23c	Discuss any limitations of the review processes used.	15
	23d	Discuss implications of the results for practice, policy, and future research.	15
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	3
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	3
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	3
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	18
Competing interests	26	Declare any competing interests of review authors.	18
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	18

Table S2: Search strategies

PubMed	("Artificial Intelligence"[Mesh] OR "Machine Learning"[Mesh] OR "Deep Learning"[Mesh] OR "Neural Networks, Computer"[Mesh] OR "artificial intelligence"[tiab] OR AI[tiab] OR "machine learning"[tiab] OR "deep learning"[tiab] OR "generative artificial intelligence"[tiab] OR GenAI[tiab] OR ChatGPT[tiab] OR "large language model*"[tiab] OR LLM[tiab] OR "computer vision"[tiab] OR "neural network*"[tiab]) AND ("Dentistry"[Mesh] OR "Oral Health"[Mesh] OR "Mouth Diseases"[Mesh] OR "Dental Care"[Mesh] OR dent*[tiab] OR oral[tiab] OR tooth[tiab] OR teeth[tiab] OR periodontal[tiab] OR periodont*[tiab] OR orthodont*[tiab] OR endodont*[tiab] OR prosthodont*[tiab] OR implant*[tiab] OR maxillofacial[tiab] OR caries[tiab]) AND (Randomized Controlled Trial[pt] OR Controlled Clinical Trial[pt] OR random*[tiab] OR randomly[tiab] OR placebo[tiab] OR trial[tiab]) NOT (animals[mh] NOT humans[mh]).
Embase	('artificial intelligence'/exp OR 'machine learning'/exp OR 'deep learning'/exp OR 'artificial neural network'/exp OR 'artificial intelligence':ti,ab OR ai:ti,ab OR 'machine learning':ti,ab OR 'deep learning':ti,ab OR 'generative artificial intelligence':ti,ab OR genai:ti,ab OR chatgpt:ti,ab OR 'large language model*':ti,ab OR llm:ti,ab OR 'computer vision':ti,ab OR 'neural network*':ti,ab) AND ('dentistry'/exp OR 'oral health'/exp OR 'mouth disease'/exp OR 'dental care'/exp OR dent*:ti,ab OR oral:ti,ab OR tooth:ti,ab OR teeth:ti,ab OR periodontal:ti,ab OR periodont*:ti,ab OR orthodont*:ti,ab OR endodont*:ti,ab OR prosthodont*:ti,ab OR implant*:ti,ab OR maxillofacial:ti,ab OR caries:ti,ab) AND ('randomized controlled trial'/exp OR 'controlled clinical trial'/exp OR random*:ti,ab OR randomly:ti,ab OR placebo:ti,ab OR trial:ti,ab) NOT ('animal'/exp NOT 'human'/exp)

Table S3: List of excluded studies with reasons

#	Year	Title	Reason
1	2026	Ramezanzade S, Dascalu TL, Bakhshandeh A, Uribe SE, Ibragimov B, Bjørndal L. The Impact of Training Dental Students to Use an Artificial Intelligence-Based Platform for Pulp Exposure Prediction Prior to Deep Caries Excavation: A Proof-of-Concept Randomised Controlled Trial. Int Endod J. 2026 Jun;59(6):1248-1256. doi: 10.1111/iej.70046. Epub 2025 Oct 10. PMID: 41074395; PMCID: PMC13158546.	AI not as an intervention/comparator
2	2026	Tian M, Shu Z, Shi S, Wei H. Comparing Accuracy of Cylindrical and Tapered Implants Using Autonomous Robotic System: A Randomized Controlled Trial. Clin Implant Dent Relat Res. 2026 Jun;28(3):e70159. doi: 10.1111/cid.70159. PMID: 42117878.	AI not as an intervention/comparator
3	2026	Bespalez-Neto R, Mattos CT, Cevidanes LHS, Fernandes TMF, de Castro Ferreira Conti AC, de Almeida-Pedrin RR, Oltramari PVP. Quantifying Root Resorption on the Incisors After Clear Aligner and Fixed Appliance Therapy Using Artificial Intelligence Tool Based CBCT Surface Models: Randomized Clinical Trial. Orthod Craniofac Res. 2026 Apr;29(2):366-374. doi: 10.1111/ocr.70082. Epub 2025 Dec 30. PMID: 41467333; PMCID: PMC12972252.	AI not as an intervention/comparator
4	2026	Or A, Sukumar S, Ma A, Ang D, Liu M, Ritchie HE, Sarrafpour B. Enhancing Dental Students' History-Taking Skills With a Generative Artificial Intelligence Chatbot. J Dent Educ. 2026 Mar;90(3):384-390. doi: 10.1002/jdd.13952. Epub 2025 Jun 11. PMID: 40500171; PMCID: PMC13022446.	AI not as an intervention/comparator
5	2026	Usta SN, Silva EJNL, Tekkanat H, Keskin C. Virtual Reality Haptic Simulators and Mobile Applications-Potential AI-enhanced Tools for Improving Clinical Endodontic Training: A Randomized Controlled Trial. J Endod. 2026 Mar;52(3):337-344. doi: 10.1016/j.joen.2025.11.005. Epub 2025 Nov 14. PMID: 41242655.	AI system not identified
6	2026	Karande V, Ahmad MZ, Kulkarni V, Chandra P, Gunukula S, Kundu M, Kashwani R. AI-assisted versus traditional radiographic interpretation for early caries detection. Bioinformation. 2026 Apr 30;22(4):2278-2282. doi: 10.6026/973206300222278. PMID: 42282288; PMCID: PMC13252351.	AI system not identified
7	2026	Choo HJS, Xie JMJ, Lu XTJ, Lai WMC, Lim LP, Yeo BKA. The Immediate Effects of a 3D Intraoral Scanner as an Adjunctive Oral Hygiene Educational Tool: A Randomised Controlled Trial. Int J Dent Hyg. 2026 May 17. doi: 10.1111/idh.70091. Epub ahead of print. PMID: 42143740.	Unrelated
8	2026	Liu H, Ma X, Zheng Y, Zhao C, Liu Q, Zhu Z. AI-Based Virtual Standardized Patients Improve Oral Mucosal Disease Training in Fourth-Year Dental Students. J Dent Educ. 2026 Apr 15. doi: 10.1002/jdd.70236. Epub ahead of print. PMID: 41983547.	Not an RCT
9	2026	Wimalasiri C, Rathnayake P, Wijerathne S, Rasnayaka S, Bandara DL, Ragel RG, Thambawita V, Nawinne I. AI-assisted radiographic analysis in detecting alveolar bone-loss severity and patterns. Sci Rep. 2026 Feb 9;16(1):7974. doi: 10.1038/s41598-026-38061-1. PMID: 41663705; PMCID: PMC12957347.	Not an RCT
10	2026	Gajjada N, Rehman A, Tadakamalla P, Mir F, Jain A, Banik A; A Randomized Controlled Trial Comparing AI-Assisted and Conventional Radiographic Interpretation in Early Caries Detection.Int J Drug Deliv Technol. 2026;16(1s): 567-571; DOI: 10.25258/ijddt.16. 567-571	AI system not identified
11	2025	Hunsrisakhun J, Naorungroj S, Tangkuptanon W, Wattanasit P, Pupong K, Pithpornchaiyakul S. Impact of Oral Health Chatbot With and Without Toothbrushing Training on Childhood Caries. Int Dent J. 2025 Apr;75(2):1348-1359. doi: 10.1016/j.identj.2024.09.028. Epub 2024 Oct 23. PMID: 39443262; PMCID: PMC11976539.	AI not as an intervention/comparator
12	2025	Castro Dos Santos N, Mangussi A, Ribeiro T, Silva RNB, Santamaria MP, Feres M, VAN Dyke T, Lorena AC. Factors influencing the response to	AI not as an intervention/comparator

		periodontal therapy in patients with diabetes: post hoc analysis of a randomized clinical trial using machine learning. J Appl Oral Sci. 2025 Jul 25;33:e20250211. doi: 10.1590/1678-7757-2025-0211. PMID: 40736087; PMCID: PMC12652437.	
13	2025	Estrella NF, Alexandra DS, Yun C, Palma-Fernández JC, Alejandro IL. AI-AIDED VOLUMETRIC ROOT RESORPTION ASSESSMENT FOLLOWING PERSONALIZED FORCES IN ORTHODONTICS: PRELIMINARY RESULTS OF A RANDOMIZED CLINICAL TRIAL. J Evid Based Dent Pract. 2025 Jun;25(2):102095. doi: 10.1016/j.jebdp.2025.102095. Epub 2025 Jan 31. PMID: 40335201.	AI not as an intervention/comparator
14	2025	You FT, Lin PC, Huang CL, Wu JH, Kabasawa Y, Chen CC, Huang HL. Artificial intelligence with counseling on the treatment outcomes and quality of life in periodontitis patients. J Periodontol. 2025 Jul;96(7):781-793. doi: 10.1002/JPER.24-0082. Epub 2024 Nov 16. PMID: 39549249.	Duplicated data
15	2025	Li Y, Ye H, Wu W, Li J, Zhao X, Liu Y, Zhou Y. Effectiveness and Methodologies of Virtual Reality Dental Simulators for Veneer Tooth Preparation Training: Randomized Controlled Trial. J Med Internet Res. 2025 May 22;27:e63961. doi: 10.2196/63961. PMID: 40402564; PMCID: PMC12121536.	Unrelated
16	2025	Kapil Laddha DDS BDS, Dr. Pallavi Jain BDS MDS, & Dr. Manish Jain BDS MDS. (2025). Comparative Study on AI-Based Computer-Guided Implant Placement and Manual Surgical Planning. International Journal of Pharmacy Research & Technology (IJPRT), 15(2), 3861–3865. Retrieved from https://www.ijprt.org/index.php/pub/article/view/1324	AI system not identified
17	2024	Chan RSM, Wong WWS, Zhou TY, Liu Y, Tsang HT, Luk CL, Chan TH, Lam WYH, Tsoi JKH. Human-AI collaboration improves adults' oral biomechanical functions: A multi-centre, self-controlled clinical trial. J Dent. 2024 Nov;150:105354. doi: 10.1016/j.jdent.2024.105354. Epub 2024 Sep 21. PMID: 39312995.	AI not as an intervention/comparator
18	2024	Rampf S, Gehrig H, Möltner A, Fischer MR, Schwendicke F, Huth KC. Radiographical diagnostic competences of dental students using various feedback methods and integrating an artificial intelligence application-A randomized clinical trial. Eur J Dent Educ. 2024 Nov;28(4):925-937. doi: 10.1111/eje.13028. Epub 2024 Jul 31. PMID: 39082447.	AI not as an intervention/comparator
19	2024	Ntovas P, Marchand L, Finkelman M, Revilla-León M, Att W. Accuracy of manual and artificial intelligence-based superimposition of cone-beam computed tomography with digital scan data, utilizing an implant planning software: A randomized clinical study. Clin Oral Implants Res. 2024 Oct;35(10):1262-1272. doi: 10.1111/clr.14313. Epub 2024 Jun 10. PMID: 38858787.	AI not as an intervention/comparator
20	2024	Rajan RSS, Kumar HSK, Sekhar A, Nadakkavukaran D, Feroz SMA, Gangadharappa P. Evaluating the Role of AI in Predicting the Success of Dental Implants Based on Preoperative CBCT Images: A Randomized Controlled Trial. J Pharm Bioallied Sci. 2024 Feb;16(Suppl 1):S886-S888. doi: 10.4103/jpbs.jpbs_1117_23. Epub 2024 Feb 29. PMID: 38595393; PMCID: PMC11000953.	AI system not identified
21	2024	Gaonkar P, Mohammed I, Ribin M, Kumar DC, Thomas PA, Saini R. Assessing the Impact of AI-Enhanced Diagnostic Tools on the Treatment Planning of Orthodontic Cases: An RCT. J Pharm Bioallied Sci. 2024 Apr;16(Suppl 2):S1798-S1800. doi: 10.4103/jpbs.jpbs_1147_23. Epub 2024 Apr 16. PMID: 38882868; PMCID: PMC11174246.	AI system not identified
22	2024	Das M, Shahnawaz K, Raghavendra K, Kavitha R, Nagareddy B, Murugesan S. Evaluating the Accuracy of AI-Based Software vs Human Interpretation in the Diagnosis of Dental Caries Using Intraoral Radiographs: An RCT. J Pharm Bioallied Sci. 2024 Feb;16(Suppl 1):S812-S814. doi: 10.4103/jpbs.jpbs_1029_23. Epub 2024 Feb 29. PMID: 38595404; PMCID: PMC11001121.	AI system not identified
23	2023	The Impact of Training Dental Students for Using a Novel Artificial Intelligence-based Platform for Pulp Exposure Prediction Before Deep	Protocol of an included study

		Caries Excavation: A Randomized Controlled Trialclinicaltrials.gov (2023). Date of Publication: 24 May 2023 (2023) NCT05912361	
24	2022	Schwendicke F, Mertens S, Cantu AG, Chaurasia A, Meyer-Lueckel H, Krois J. Cost-effectiveness of AI for caries detection: randomized trial. J Dent. 2022 Apr;119:104080. doi: 10.1016/j.jdent.2022.104080. Epub 2022 Mar 1. PMID: 35245626.	Secondary data from an RCT
25	2021	Impact of Intensive Oral Hygiene Regimen Based on Individualized Messages and an Intelligent Power-driven Toothbrush on Non-surgical Treatment of Stage II and III Periodontitis: A Randomized, Standard of Care-controlled Trialclinicaltrials.gov (2021). Date of Publication: 3 Nov 2021 (2021) NCT05137392	Protocol of an included study
26	2020	Using Artificial Intelligence-platform on Plaque Control and Periodontal Treatment Outcome in Patients With Periodontal Disease-Preliminary Resultsclinicaltrials.gov (2020). Date of Publication: 24 Sep 2020 (2020) NCT04567030	Protocol of an included study
27	2015	Ariji Y, Nakayama M, Nishiyama W, Ogi N, Sakuma S, Katsumata A, Kurita K, Ariji E. Potential clinical application of masseter and temporal muscle massage treatment using an oral rehabilitation robot in temporomandibular disorder patients with myofascial pain. Cranio. 2015 Oct;33(4):256-62. doi: 10.1080/08869634.2015.1097303. Epub 2015 Dec 29. PMID: 26714800.	AI system not identified
28	2000	Goodey RD, Brickley MR, Hill CM, Shepherd JP. A controlled trial of three referral methods for patients with third molars. Br Dent J. 2000 Nov 25;189(10):556-60. doi: 10.1038/sj.bdj.4800828. PMID: 11128259.	Unrelated

Table S4: List of registered trials included in this systematic review

Title	Publication Year	Link	Status
Artificial Intelligence for Proximal Caries Detection and Its Impact on Treatment Threshold: Randomized Trial	2026	https://clinicaltrials.gov/study/NCT07648212	Not yet recruiting
Accuracy of Computer Guided Implant Placement in Edentulous or Partially Edentulous Patients Using Artificial Intelligence Technology vs Conventional Method A Randomized Clinical Trial	2026	https://clinicaltrials.gov/study/NCT07627841	Completed
Instrument-Specific Effects of an AI-Generated Animated Video Series on Dental Anxiety in Paediatric Patients: A Randomized Controlled Trial	2026	https://clinicaltrials.gov/study/NCT07596771	Completed
Hyaluronic Acid With AI-Guided Immediate Implant Placement Using a Modified Socket Shield for Black Triangle Management: A Randomized Controlled Clinical Trial	2026	https://clinicaltrials.gov/study/NCT07586228	Not yet recruiting
Impact of Vital Pulp Therapy in Acute Irreversible Pulpitis With Incipient Apical Periodontitis Cases Diagnosed by the Aid of Artificial Intelligence: A Randomized Controlled Clinical Trial	2026	https://clinicaltrials.gov/study/NCT07549620	Active, not recruiting, no longer looking for participants
Assessment of the Accuracy of Artificial Intelligence Assisted Workflow Versus Conventional Workflow in Computer Guided Implant Placement: A Randomized Controlled Clinical Trial.	2026	https://clinicaltrials.gov/study/NCT07523815	Recruiting
Artificial Intelligence-Guided Versus Manual CBCT Planning for Immediate Implant Placement in Molar Extraction Sites: A Randomized Controlled Trial	2026	https://clinicaltrials.gov/study/NCT07459036	Not yet recruiting
Evaluation of Passive Fit in Implant-Supported Complete-Arch Prostheses Using Three Digital Workflows, Including an Automated AI-Assisted Protocol: A Randomized Clinical Trial	2025	https://clinicaltrials.gov/study/NCT07315620	Recruiting
Clinical ,Microbiological and Compliance Outcomes of AI-based vs Standard Electric and Manual Toothbrushes in Adults With Plaque-Induced Gingivitis: A 6-Week Randomized Controlled Trial	2025	https://clinicaltrials.gov/study/NCT07308522	Not yet recruiting
Impact of an Artificial Intelligence-Based Chatbot on Implant Patient Management: A Randomised Controlled Trial	2025	https://clinicaltrials.gov/study/NCT07300657	Completed
Comparative Study Between Artificial Intelligence-Assisted/Computer-Guided Versus Conventional Ridge Splitting Utilizing Electromagnetic	2025	https://clinicaltrials.gov/study/NCT07256730	Recruiting

Mallet for Reconstruction of Horizontal Ridge Defects: A Randomized Controlled Clinical Study			
Comparison of Traditional Instructions Vs AI Based Instructions With Customized Chat GPT as Remote Support System on Education of Orthodontic Patients:A Randomised Control Trial	2025	https://clinicaltrials.gov/study/NCT07183111	Recruiting
Effectiveness of an Artificial Intelligence-Enabled Electric Toothbrush and Visual Pedagogy Materials on Oral Hygiene of Children With Autism Spectrum Disorder	2025	https://clinicaltrials.gov/study/NCT07160517	Not yet recruiting
DECIDE-AI:The Impact of Artificial Intelligence on Dentists' Decision-Making Process During Caries Detection: A Randomized Controlled Study	2025	https://clinicaltrials.gov/study/NCT07027189	Not yet recruiting
Efficacy of Artificial Intelligence-Generated Music Therapy in Reducing Dental Anxiety Among Adults Undergoing Impacted Third Molar Extraction: A Randomized Controlled Clinical Trial	2025	https://clinicaltrials.gov/study/NCT06998979	Completed
Accuracy of Guided Implant Placement Using Artificial Intelligence Segmentation Versus Conventional Technique: A Randomized Clinical Trial	2025	https://clinicaltrials.gov/study/NCT06967090	Not yet recruiting
Improving Oral and Systemic Health in Individuals With Prediabetes Through Personalized Oral Hygiene Advice Provided by Dentists or by Artificial Intelligence: A Randomized Clinical Trial	2025	https://clinicaltrials.gov/study/NCT06980701	Recruiting
Artificial Intelligence-Assisted/Computer-Guided Crestal Sinus Lifting With Immediate Implant Placement in Periodontally-Compromised Patients Utilizing Electromagnetic Mallet and Autologous Dentin Block Graft: Randomized Clinical Trial	2025	https://clinicaltrials.gov/study/NCT06887582	Active, not recruiting, no longer looking for participants
A Comparative Study of AI-Powered/Computer-Guided Versus Conventional Linear Micro-Perforation Split Approach for Treatment of Horizontal Mandibular Ridge Atrophy (A Randomized Clinical Trial)	2025	https://clinicaltrials.gov/study/NCT06887595	Completed
Success Rate of Full Pulpotomy in Mature Permanent Molars With Irreversible Pulpitis With Apical Periodontitis Detected Using Artificial Intelligence and Those Without Apical Periodontitis: A Randomized Controlled Trial	2024	https://clinicaltrials.gov/study/NCT06767371	Completed

EFFECTIVENESS OF ORAL HYGIENE INSTRUCTIONS GIVEN BY AI-GENERATED VIDEOS VS. TRADITIONAL APPROACH IN PERIODONTAL PATIENTS	2024	https://clinicaltrials.gov/study/NCT06622863	Not yet recruiting
Implementing a Corrective Annotation No Code Artificial Intelligence-based Software to Detect Several Radiographic Features Associated With Unsatisfactory Endodontic Treatment: A Randomized Controlled Trial	2024	https://clinicaltrials.gov/study/NCT06450938	Not yet recruiting
Clinical and Radiographic Outcomes of Computer Guided Immediate Implant Placement Utilizing Artificial Intelligence Assisted Socket Shield Approach: Randomized Clinical Trial	2024	https://clinicaltrials.gov/study/NCT06299449	Completed
Positive Psychological Deconditioning of Pediatric Patients With Dental Anxiety Through Artificial Intelligence: Randomized Clinical Trial	2024	https://clinicaltrials.gov/study/NCT06276478	Completed
Artificial Intelligence-Assisted/Computer Guided Ridge Splitting for the Treatment of Horizontal Ridge Defects With Simultaneous Guided Implant Placement: Randomized Controlled Clinical Study	2023	https://clinicaltrials.gov/study/NCT06135506	Completed
The Effect of An Artificial Intelligence ("AI") Mobile Dental Application ("Dental Monitoring") in the Promotion of Self-Administered Plaque Control: A Randomized Controlled Trial	2021	https://clinicaltrials.gov/study/NCT05073107	Completed

Table S5: Detailed results of the ROB2 analysis2

Study	D1 Randomization	D2 Deviations	D3 Missing data	D4 Outcome measurement	D5 Selective reporting	Overall
Wang 2026	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Xiaoting 2026	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Keles 2026	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Lim 2026	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns
Xie 2026	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Veerabhadrappa 2026	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Zhang 2026	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Benli 2026	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns
Tasgaonkar 2026	Some concerns	Low	Low	Low	Some concerns	Some concerns
Pul 2025	Low	Low	Low	Low	Some concerns	Some concerns
Santonocito 2025	Low	Some concerns	Low	Low	Some concerns	Some concerns
Hu 2025	Low	Low	Low	Low	Low	Low
Haupt 2025	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Gokkurt Yilmaz 2025	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Huang 2025	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Fang 2025	High	Some concerns	Low	High	Some concerns	High
Mankar 2025	High	Some concerns	Some concerns	Some concerns	High	High
Li 2024	Low	Low	Low	Low	Low	Low
Chang 2024	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Arsiwala-Scheppach 2024	Low	Low	Some concerns	Low	Low	Some concerns
Schropp 2024	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Shi 2023	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Ayan 2024	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Bhatia 2024	Some concerns	Some concerns	Low	Some concerns	Some concerns	Some concerns
Mahrous 2023	Some concerns	Some concerns	Low	Low	Some concerns	Some concerns
Shen 2022	Some concerns	Low	Some concerns	Low	Some concerns	Some concerns
Mertens 2021	Low	Low	Low	Low	Low	Low
Devlin 2021	Some concerns	Low	Low	Low	Some concerns	Some concerns

Table S6: List of registered trials included in this systematic review

	SCORE	Clinical Relevance (out of 4)	Data Quality (out of 24)	Methodological Conduct (out of 20)	Robustness of Results (out of 20)	Reporting Quality (out of 12)	Reproducibility (out of 20)
Wang et al. (2026)	60.0%	100.0%	54.2%	70.0%	25.0%	100.0%	45.0%
Xiaoting et al. (2026)	51.0%	100.0%	66.7%	55.0%	20.0%	91.7%	15.0%
Keles et al. (2026)	40.0%	100.0%	37.5%	55.0%	0.0%	91.7%	15.0%
Lim et al. (2026)	50.0%	100.0%	62.5%	60.0%	10.0%	91.7%	15.0%
Xie et al. (2026)	44.0%	100.0%	25.0%	50.0%	35.0%	91.7%	20.0%
Veerabhadrappa et al. (2026)	37.0%	100.0%	29.2%	50.0%	10.0%	83.3%	10.0%
Zhang et al. (2026)	48.0%	100.0%	45.8%	55.0%	25.0%	100.0%	15.0%
Benli et al. (2026)	46.0%	100.0%	33.3%	45.0%	25.0%	91.7%	30.0%
Tasgaonkar et al. (2026)	44.0%	100.0%	41.7%	50.0%	25.0%	91.7%	10.0%
Pul et al. (2025)	52.0%	100.0%	37.5%	65.0%	45.0%	100.0%	15.0%
Santonocito et al. (2025)	46.0%	100.0%	41.7%	50.0%	30.0%	91.7%	15.0%
Hu et al. (2025)	45.0%	100.0%	50.0%	55.0%	0.0%	100.0%	20.0%
Haupt et al. (2025)	40.0%	100.0%	33.3%	50.0%	0.0%	100.0%	20.0%
Gokkurt Yilmaz et al. (2025)	39.0%	100.0%	41.7%	40.0%	0.0%	91.7%	20.0%
Huang et al. (2025)	44.0%	100.0%	33.3%	35.0%	35.0%	100.0%	20.0%
Fang et al. (2025)	35.0%	100.0%	25.0%	50.0%	0.0%	83.3%	15.0%
Mankar et al. (2025)	42.0%	100.0%	41.7%	35.0%	35.0%	83.3%	10.0%
Li et al. (2024)	43.0%	100.0%	41.7%	55.0%	10.0%	100.0%	15.0%
Chang et al. (2024)	45.0%	100.0%	33.3%	50.0%	30.0%	100.0%	15.0%
Arsiwala-Scheppach et al. (2024)	41.0%	100.0%	37.5%	45.0%	10.0%	100.0%	15.0%
Schropp et al. (2024)	42.0%	100.0%	37.5%	45.0%	20.0%	91.7%	15.0%
Shi et al. (2024)	43.0%	100.0%	37.5%	50.0%	20.0%	91.7%	15.0%
Ayan et al. (2024)	46.0%	100.0%	37.5%	60.0%	0.0%	91.7%	35.0%
Bhatia et al. (2024)	38.0%	100.0%	41.7%	50.0%	0.0%	83.3%	10.0%
Mahrous et al. (2023)	40.0%	100.0%	25.0%	45.0%	25.0%	91.7%	15.0%
Shen et al. (2022)	45.0%	100.0%	37.5%	55.0%	20.0%	100.0%	15.0%
Mertens et al. (2021)	46.0%	100.0%	33.3%	50.0%	35.0%	100.0%	15.0%
Devlin et al. (2021)	42.0%	100.0%	37.5%	70.0%	0.0%	91.7%	10.0%