International Journal of Community Medicine and Public Health
Ahmed MA et al. Int J Community Med Public Health. 2026 Aug;13(8):4697-4703
https://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20262763

Review Article

Artificial intelligence and technology in paediatric dentistry: a review

Murtada A. Ahmed[1]*, Maha S. Alqahtani[2], Sultana A. Alsadoon[2], Razan A. Almohareb[2], Rania A. Kalantan[2], Ebtehal K. Alanquri[2], Ghaida A. Alduhayan[2]

[1]Department of Dentistry, Tamam Al-ilaj Medical Complex, Riyadh, KSA
[2]Department of Paediatric Dentistry, Prince Sultan Military Medical City, Riyadh, KSA

Received: 15 July 2026
Accepted: 30 July 2026

***Correspondence:**
Dr. Murtada A. Ahmed,
E-mail: murtada_elimam@hotmail.com

ABSTRACT

The field of pediatric dentistry is undergoing a paradigm shift, moving from a reactive model to one that embraces precision, prevention and the power of Artificial Intelligence (AI) and Digital Technologies (DT). These innovations offer exciting opportunities to transform diagnosis, management and treatment of paediatric oral health conditions. This study evaluates the role of AI and DT in pediatric dentistry, with emphasis on diagnostics, behavioral management, prevention and orthodontic planning. A thorough evaluation of the literature was carried out using Google Scholar, PubMed, Scopus and the Cochrane Library. A comprehensive review was conducted of peer-reviewed publications, clinical trials and meta-analyses published between 2015 and 2026 and included 38 studies. Four areas of evidence were combined: computer-aided orthodontic planning, digital behavioral therapies, smart preventative tracking and automated diagnostics. Deep learning (DL) models, including convolutional neural network (CNN), you only look once version 8 (YOLOv8) and inception residual network version 2 (Inception-ResNet-v2), demonstrated specialist-level accuracy in early caries detection, pathology mapping and cervical vertebral maturation staging. Virtual reality (VR) reduced procedural anxiety, while social robotics improved patient cooperation. Internet of Things (IoT)-enabled smart toothbrushes and machine learning models (ML) supported remote monitoring and personalized prevention; whereas intraoral scanning combined with three-dimensional (3D) printing enabled rapid fabrication of high-precision pediatric dental appliances. AI and DT are transforming pediatric dentistry by improving diagnostic accuracy, patient engagement, preventive care and treatment efficiency. However, their wider adoption requires robust datasets, standardized validation and multicenter clinical studies to ensure safe and effective implementation.

Keywords: 3D printing, Artificial intelligence, Digital therapeutics, Diagnostics, Pediatric dentistry, Robotics

INTRODUCTION

The behavioral and developmental requirements of children, particularly those with complicated health issues, are the main emphasis of paediatric dentistry. It recommends establishing a "Dental Home" and conducting treatments by the age of one to improve preventive, parental, developmental and comprehensive oral health measures.[1] The early years are crucial for preventing tooth cavities. Early intervention lessens the long-term consequences of children's tooth decay, encourages proactive care and supports lifetime oral health behaviors.[2]

THE DIGITAL REVOLUTION

Artificial intelligence

AI is revolutionizing healthcare by utilizing machine learning and massive datasets to improve diagnosis accuracy, optimize processes and strike a balance between clinical efficiency and ethical norms.[3] It serves as a crucial, data-driven co-pilot rather than replacing human therapists. Its ideal function is to automate heavy data triage and administrative duties, reducing clinician fatigue and freeing up doctors to spend more concentrated time managing patient care.[4]

Machine learning

By using dynamic algorithms to evaluate massive biomedical information, ML improves diagnostic precision, customizes treatment regimens and speeds up clinical decision-making.[5]

It transforms medical robotics beyond software applications into adaptive clinical systems with responsive physical rehabilitation, tremor reduction and real-time surgical navigation. Surgical accuracy is increased and human error is reduced through integrated computer vision and continuous sensory input, ultimately creating a highly accurate environment for patient-centered care.[6]

Machine robotics

By using dynamic algorithms to evaluate massive biomedical information, ML improves diagnostic precision, customizes treatment regimens and speeds up clinical decision-making.[7]

These technologies, which are powered by high-precision, AI-integrated systems, completely change surgical procedures by improving dexterity, maximizing visualization and reducing human error to guarantee less invasive execution and quicker patient recovery.[8]

In the end, three fundamental medical domains autonomous surgical navigation, sensory-driven physical rehabilitation and automated hospital logistics use this operational safety and clinical accuracy.[7]

Why do we need AI in pediatric dentistry?

Diagnostic subjectivity, observer tiredness and the difficulties of controlling patient behavior and dental fear are persistent problems in traditional paediatric dentistry. AI has become a crucial clinical tool to optimize diagnostic accuracy and enable the ultra-early diagnosis of carious lesions to address these vulnerabilities.[9]

Additionally, by analyzing multi-factorial information, AI frameworks are able to accurately forecast treatment trajectories and child behavior patterns, which minimizes chair time, lessens practitioner bias and promotes a safer, more efficient dental experience for paediatric cohorts.[10]

The primary aim is to transition pediatric dentistry from reactive treatment to a proactive, precision-based model by integrating AI and advanced Digital Technologies (DT).

This review is structured to achieve the following academic objectives define AI and robotics applications in pediatric dentistry. Evaluate diagnostic accuracy improvements in caries and growth monitoring. Assess technology-led behavioral management techniques. Identify practical workflows for digital treatment and prevention. Critique the ethical implications and future of digital pediatric care.

A systematic literature search was conducted across PubMed, Scopus, Cochrane Library and Google Scholar using six core keywords combined with Boolean operators: ("artificial intelligence", "robotics", "digital therapeutics", "pediatric dentistry", "diagnostics", "3D printing".

The search was limited to articles published between 2015 and 2026; however, seminal studies published before 2015 were included when they provided foundational concepts or technical frameworks relevant to the review.

Peer-reviewed studies on AI and DT in pediatric dentistry were included if they reported clinical or quantitative outcomes related to diagnosis, treatment, behavior or prevention. Studies focused on adult populations, non-digital workflows, non-English publications, conference abstracts, duplicates or lacking relevant outcome data were excluded.

Following eligibility assessment, 38 studies published between 2015 and 2026 were included and categorized into four domains: AI-assisted diagnostics, digital behavioral therapeutics, smart preventive technologies and computer-aided orthodontic planning and appliance fabrication.

AI IN DIAGNOSTICS AND RADIOGRAPHY

Caries detection

Tichý et al conclude that diagnostic assistance of DL models was objective in nature thanks to the quality of training data and was superior to conventional analysis of bitewing radiographs in terms of detecting incipient and proximal lesions.[11]

A research by Bayati et al claims that the YOLOv8 model lowers diagnostic subjectivity and mistakes, improves early-stage caries detection on bitewing radiographs and permits precise real-time diagnosis of interproximal caries.[12] According to Lee et al by providing sensitive, objective detection and trustworthy decision support, the inception residual network version 2 (Inception-ResNet-v2) model was able to detect early-stage enamel caries on bitewing radiographs with clinician-level accuracy.[13]

DL decreases subjectivity and error while attaining clinician-level accuracy in caries detection with strong sensitivity for early and proximal lesions, according to an exciting meta-analysis research by Shindé et al, However, clinical integration and data quality are critical to performance.[14]

Pathology identification

Septina et al, found that DL models achieve high accuracy in detecting periapical lesions, especially on cone beam computed tomography (CBCT) and periapical radiographs, minimizing diagnostic subjectivity, albeit performance varies on imaging modality and data quality.[15]

Furthermore, Uzel et al found that DL models accurately detect additional teeth on paediatric panoramic radiographs, reducing diagnostic mistakes and encouraging early dental abnormality treatment.[16]

Interestingly, Zheng et al found that both YOLOv8 and Faster R-convolutional neural network (CNN) can accurately detect a large number of additional teeth, with YOLOv8 providing faster clinical findings, reducing human error and improving preoperative planning accuracy.[17]

According to research by Makrygiannakis et al AI-based software detects extra and missing teeth on panoramic radiographs with clinician-level accuracy, reducing diagnostic monitoring and supporting early orthodontic intervention.[18]

Issa et al, found that AI can identify periapical periodontitis with specialist-level accuracy, reducing diagnostic variability and boosting sensitivity on 2D radiographs as a useful tool for doctors.[19]

Bone age assessment

The study by Kavasoglu et al confirmed that AI-driven wrist radiography accurately classifies skeletal maturation stages, reducing diagnostic subjectivity and helping with growth prediction and the optimal timing for orthodontic treatment.[20]

AI models achieve specialist-level accuracy in detecting bone age through cervical vertebral growth, reducing diagnostic variability and supporting correct orthodontic treatment scheduling as a reliable therapeutic tool, according to a study by Kazimierczak et al.[21]

A fascinating meta-analysis was carried out by Sadeghi et al 2025 showed that AI effectively detects cervical vertebral development, reducing inter-observer variability and enabling precise scheduling of orthodontic therapy, even if rigorous training data are still needed.[22] Cervical vertebrae and frontal sinus measures were used in a study conducted by Alfawzan to establish AI as a reliable technique for evaluating skeletal maturity in Saudi patients, enhancing growth prediction and treatment time.[23]

BEHAVIORAL MANAGEMENT AND PATIENT ENGAGEMENT

Virtual reality and augmented reality

According to a review by Acharya et al VR reduces discomfort and anxiety during dental procedures, while AR promotes children's compliance with oral hygiene. These non-invasive techniques enhance behavior management and clinical experience.[24]

The review research by Kalikanov et al verified that although VR and AR use non-invasive, technology-based techniques to improve behavioral control and patient outcomes, VR decreases pain perception through immersive distraction.[25]

Similarly, Ciubean et al's review study confirmed that VR reduces procedure pain through cognitive diversion, while AR and gamification boost patient engagement and compliance and improve treatment outcomes using non-pharmacological digital strategies.[26]

Social robots

Akyazi and Bastemur's study demonstrated how interactive robots improve teamwork, reduce children's fear and enable kid-friendly behavioral control during medical operations.[27]

According to Ferrari et al social robots enhance rehabilitation by lowering children's anxiety, pain perception and discomfort through interesting, kid-centered interactions.[28]

Meta-analysis study conducted by Ruo-yan et al found that social robots effectively reduce paediatric anxiety, promote teamwork and enhance the therapeutic environment through interactive help and distraction.[29]

However, via interactive support and diversion, social robots promote emotional coping, lessen paediatric pain and anxiety and improve the quality of paediatric care, according to Jeong et al's study.[30]

Humanoid robots promote paediatric teamwork, reduce preoperative anxiety and enhance mental wellness through interactive distraction and training, according to fascinating study by Franconi et al.[31]

PREVENTIVE DENTISTRY

Smart toothbrushes

In their review research, Maini et al verified that AI-powered smart toothbrushes enhance kids' dental hygiene by tracking brushing patterns, offering immediate feedback and promoting preventative behaviors through gamified instruction.[32]

Additionally, a research by Adeghe et al confirmed that Internet of Things) IoT (-integrated smart toothbrushes improve early intervention, lifelong oral hygiene behaviors and real-time monitoring to support paediatric preventive care.[33]

In order to promote paediatric oral health, Goodwin et al verified that smart toothbrushes offer objective monitoring of children's brushing behaviors, overcoming errors in self-reported data and providing customized educational interventions.[34]

According to Choi et al's survey, smart toothbrushes provide for precise telemonitoring of kids' oral hygiene, enhancing remote supervision, objective habit tracking and preventative treatment through improved clinician-family cooperation.[35]

Risk prediction models

By analyzing nutrition, socioeconomic characteristics and saliva composition, AI predicts future caries, allowing for early risk diagnosis and individualized preventative therapy, according to the scoping study conducted by Bhatia et al.[36]

Abbott et al's meta-analysis, which looked at diet, socioeconomic factors and saliva composition, confirmed that AI predicts caries risk. This promotes tailored, data-driven preventative dental treatment and enables early risk detection.[37]

By combining clinical, sociodemographic and behavioural data, light gradient boosting machine (LightGBM)-based ML correctly predicts paediatric caries, providing early detection and individualized prevention, according to intriguing research by Bahammamm.[38]

Ramos-Gomez et al confirmed that random forest models predict caries in young children using behavioural, socioeconomic and dietary factors, enabling early identification of high-risk patients and supporting tailored prevention.[39]

Interestingly, by looking at carer's knowledge, diet and socioeconomic status, Yuan et al, confirmed that eXtreme Gradient Boosting (XGBoost) with SHapley Additive exPlantation (SHAP) accurately predicts paediatric caries, enabling precise early risk classification and customized prevention.[40]

ORTHODONTIC AND SURGICAL PLANNING

Digital impressions: the shift from physical molds to intraoral scanners

Digital intraoral scanners provide real-time 3D visualization, decrease mistakes in dental restoration fabrication and increase accuracy, patient comfort and workflow efficiency, according to a review research by Divya et al.[41]

Digital imprints offer precise, dependable substitutes for physical moulds, lowering distortion and enhancing computer-aided design and computer-aided manufacturing (CAD/CAM) workflow efficiency and predictability, according to a systematic review research by Shah et al.[42]

Intraoral scanners are more precise, pleasant and time-efficient than conventional moulds, according to Palomino et al. They strengthen the basis for high-precision restorative dentistry by removing material distortions and integrating directly with CAD/CAM technologies.[43]

According to Rupan et al intraoral scanners perform better than physical imprints in terms of accuracy, workflow efficiency and diagnostic capabilities. They also eliminate material-related mistakes and improve patient comfort.[44]

3D printing: fabrication of space maintainers, surgical guides and orthodontic appliances

Through digital scanning and additive manufacture for paediatric appliances and surgical guides, Zarean et al, systematic review discovered that 3D printing increases accuracy, decreases chair time, improves biocompatibility and enables a more predictable and efficient workflow.[45]

According to Trivedi et al 3D-printed lingual arches eliminate fabrication mistakes, improve fit, comfort and overall, CAD/CAM workflow efficiency in paediatric orthodontics and are more accurate, long-lasting and time-efficient than traditional space maintainers.[46]

Pawar verified that 3D-printed band-and-loop space maintainers are more precise, solder-free and effective than traditional appliances, providing better fit and longevity via additive manufacturing and digital design.[47]

Whitley et al verified that employing desktop stereolithography (SLA) equipment and digital planning software, in-office 3D printing provides high precision and optimized processes for the accurate, economical and efficient manufacturing of surgical guides.[48]

AI IN DIAGNOSTICS AND RADIOGRAPHY

Caries detection

When it comes to identifying early and interproximal caries, DL models typically perform better than traditional radiography interpretation. CNN-based systems increase sensitivity while decreasing diagnostic subjectivity, YOLOv8 allows real-time lesion identification and Inception-ResNet-v2 reaches clinician-level accuracy in enamel caries. However, clinical integration and dataset quality continue to be key factors in success.[11-14]

Pathology identification

AI does a great job of detecting more common dental conditions such periapical lesions, additional teeth and developmental anomalies. Advanced models (YOLOv8, Faster R-CNN) improve surgical planning and detection time while reducing human error and variability in panoramic and CBCT interpretation.[15-19]

Bone age assessment

Orthodontic timing accuracy is increased and inter-observer variability is decreased by AI-based skeletal maturation evaluation utilizing wrist radiographs and cervical vertebral analysis. Reliable yet data-dependent performance for growth prediction and treatment scheduling is supported by meta-analytic evidence.[20-23]

BEHAVIORAL MANAGEMENT & PATIENT ENGAGEMENT

Virtual reality and augmented reality

While AR improves long-term engagement through gamification and interactive dental hygiene teaching, VR offers immersive distraction that dramatically lowers procedural pain and anxiety. When combined, they enhance both at-home compliance and in-clinic behavior.[24-26]

Social robots

Through interactive communication and behavioral modeling, social and humanoid robots enhance children's collaboration, emotional comfort and anxiety reduction. Meta-analytic data supports non-pharmacological behavior control by demonstrating consistent advantages in paediatric dentistry settings.[27-31]

PREVENTIVE DENTISTRY

Smart toothbrushes

IoT and AI-enabled toothbrushes improve preventative care by overcoming the constraints of self-reported compliance and offering real-time feedback, gamification and objective monitoring of brushing behavior.[32-35]

Risk prediction models

Early caries risk prediction and individualized prophylaxes are made possible by ML models (LightGBM, Random Forest, XGBoost with SHAP) that incorporate clinical, behavioral and socioeconomic aspects. These strategies change dental treatment from being reactive to being proactive and data-driven.[36-40]

ORTHODONTIC AND SURGICAL PLANNING

Digital impressions

By removing distortion, enabling real-time 3D visualization and increasing accuracy, patient comfort and CAD/CAM workflow efficiency, intraoral scanners take the role of traditional impressions.[41-44]

3D printing

Orthodontic appliances, space maintainers and surgical guides may be precisely made with more precision, less chair time and better biocompatibility thanks to additive manufacturing. It improves predictability and clinical efficiency by supporting completely digital processes from scanning to manufacture.[45-48]

Clinical outlook and limitations

While these innovations could significantly streamline operations and reduce the clinician's workload, this technology is designed to serve as an advanced "co-pilot," assisting professionals rather than replacing them. The value and accuracy of such programs undoubtedly rely on the quality, variety and consistency of the data used for training.

The long-term success of this endeavor depends on a combination of responsible data utilization, multi-center research and clinician collaboration. By integrating such technologies with robotics, digital dentistry has the potential to provide a safe and highly accurate solution, offering each patient a unique and personalized experience in managing their oral health care needs.

CONCLUSION

The integration of AI, ML and cutting-edge technology in pediatric dentistry can lead to a paradigm shift in the approach to managing patients. The use of convolutional neural networks allows for reducing diagnostic subjectivity to a minimum, thus improving the quality of diagnostics, primarily of interproximal caries detection, dental anomaly recognition or growth assessment.

At the same time, the implementation of VR, augmented reality and robotic-assisted systems into the daily practice provides dentists with an opportunity to reduce the stress of the patients and manage their behavior during treatment. Other emerging technologies, such as smart toothbrushes, also play a role in creating a better experience for patients, as well as an essential role in preventing caries.

In addition, the use of intraoral scanners and 3D printers allows dentists to make the process of taking dental impressions more comfortable and create more accurate pediatric dental prostheses. Thus, AI and other DT can indeed become a valuable tool for managing patient care.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. American Academy of Pediatric Dentistry. Overview. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2024:7-9
2. Deaconu, D., Racek, C., Czirfusz, A. Early Intervention in pediatric Dentistry: Nurturing lifelong Oral health Habits. Clin Soc Work Health Interv. 2024;15(3):14–21.
3. Kamalesh R, Thamarai P, Shaji A, Deivayanai VC, Saravanan A, Vickram AS, et al. The Role of Artificial Intelligence in Modern Medicine: Clinical Applications, Economic Implications and Ethical Considerations. Curr Pharm Des. 2026;32(12):918-35.
4. Bhattad PB, Jain V. Artificial Intelligence in Modern Medicine - The Evolving Necessity of the Present and Role in Transforming the Future of Medical Care. Cureus. 2020;12(5):8041.
5. Ting Sim JZ, Fong QW, Huang W, Tan CH. Machine learning in medicine: what clinicians should know. Singapore Med J. 2023;64(2):91-7.
6. EIT Health. Machine learning in healthcare: Uses, benefits and pioneers in the field. Available at: https://eithealth.eu/news-article/machine-learning-in-healthcare-uses-benefits-and-pioneers-in-the-field. Accessed on 21 January 2026.
7. Agrawal A, Soni R, Gupta D, Dubey G. The role of robotics in medical science: Advancements, applications and future directions. J Autonomous Intel. 2024;11;7(3):97.
8. Wah JNK. The rise of robotics and AI-assisted surgery in modern healthcare. J Robot Surg. 2025;19(1):311.
9. Ghabchi B, Uzel İ, Çoğulu D. Artificial Intelligence in Pediatric Dentistry. Int Arch Dent Sci. 2025;46(1):59-63
10. Vishwanathaiah S, Fageeh HN, Khanagar SB, Maganur PC. Artificial intelligence its uses and application in pediatric dentistry: a review. Biomedicines. 2023;11(3):788.
11. Tichý A, Kunt L, Nagyová V, Kybic J. Automatic caries detection in bitewing radiographs—Part II: experimental comparison. Clinical Oral Invest. 2024;28(2):133.
12. Bayati M, Alizadeh Savareh B, Ahmadinejad H, Mosavat F. Advanced AI-driven detection of interproximal caries in bitewing radiographs using YOLOv8. Sci Rep. 2025;15(1):4641.
13. Lee S, Oh SI, Jo J, Kang S, Shin Y, Park JW. Deep learning for early dental caries detection in bitewing radiographs. Sci Rep. 2021;11(1):16807.
14. Shindé M. Evaluation of Performance of Deep Learning Algorithms in Detecting and Diagnosing Dental Carious Lesions Using Intraoral Radiographic Imaging: A Systematic Review and Meta-Analysis (Master's thesis, The University of Iowa).
15. F, Kiswanjaya B. Evaluating Deep Learning AI for Periapical Lesion Detection Across Panoramic, Periapical and CBCT Radiographs: A Systematic Review. Open Dent J. 2026;20:91708.
16. Uzel İ, Ghabchi B, Çoğulu D. Deep learning-based automated detection of supernumerary teeth in pediatric panoramic radiographs. PLoS One. 2025;20(11):335845.
17. Zheng J, Li H, Wen Q, Fu Y, Wu J, Chen H. Artificial intelligent recognition for multiple supernumerary teeth in periapical radiographs based on faster R-CNN and YOLOv8. J Stomatol Oral Maxillofac Surg. 2025;126(4):2293.
18. Makrygiannakis MA, Giannakopoulos K, Kavadella A, Paraskevis D, Kaklamanos EG. Diagnostic accuracy of an artificial intelligence-based software in detecting supernumerary and congenitally missing teeth in panoramic radiographs. Eur J Orthod. 2025;47(4):54.
19. Issa J, Jaber M, Rifai I, Mozdziak P, Kempisty B, Dyszkiewicz-Konwińska M. Diagnostic Test Accuracy of Artificial Intelligence in Detecting Periapical Periodontitis on Two-Dimensional Radiographs: A Retrospective Study and Literature Review. Medicina (Kaunas). 2023;59(4):768.
20. Kavasoglu N, Ertugrul OF, Kotan S, Hazar Y, Eratilla V. Artificial Intelligence-Assisted Wrist Radiography Analysis in Orthodontics: Classification of Maturation Stage. Applied Sciences. 2025;15(21):11681.
21. Kazimierczak W, Jedliński M, Issa J, Kazimierczak N, Janiszewska-Olszowska J, Dyszkiewicz-Konwińska M, et al. Accuracy of Artificial Intelligence for Cervical Vertebral Maturation Assessment-A Systematic Review. J Clin Med. 2024;13(14):4047.
22. Sadeghi TS, Ourang SA, Sohrabniya F, Sadr S, Shobeiri P, Motamedian SR. Performance of artificial intelligence on cervical vertebral maturation assessment: a systematic review and meta-analysis. BMC Oral Health. 2025;25(1):187.
23. Alfawzan AA. Assessment of Skeletal Maturity in a Sample of the Saudi Population Using Cervical Vertebrae and Frontal Sinus Index: A Cephalometric Study Using Artificial Intelligence. Cureus. 2023;15(7):41811.
24. Acharya S, Godhi BS, Saxena V, Assiry AA, Alessa NA, Dawasaz AA, et al. Role of artificial intelligence in behavior management of pediatric dental patients-a mini review. J Clin Pediatr Dent. 2024;48(3):24-30.
25. Kalikanov S, Baizhanova A, Tungushpayev M, Viderman D. Virtual reality for the management of musculoskeletal pain: an umbrella review. Front Med (Lausanne). 2025;12:1572464.
26. Ciubean AD, Popa T, Ciortea VM, Dogaru GB, Ungur RA, Borda IM, et al. Digital therapeutics” in

musculoskeletal pain management: a narrative review of Gamification, Virtual Reality and Augmented Reality approaches. Balneo and PRM Res J. 2024;15(2):691.
27. Akyazi KG, Baştemur Ş. Interactive Robots: therapy robots. Psikiyatride Guncel Yakasimlar - Current Approaches in Psychiatry. 2023;16(1):16–30.
28. Ferrari OI, Zhang F, Braam AA, Van Gurp JaM, Broz F, Barakova EI. Design of Child-robot Interactions for Comfort and Distraction from Post-operative Pain and Distress. Data Archiving and Networked Services (DANS). 2023;13;686-90.
29. Wu RY, Li XH, Li YC, Ren ZH, Yang BX, Liu ZT, et al. The effect of social robot interventions on anxiety in children in clinical settings: a systematic review and meta-analysis. J Affect Disord. 2025;1;382:304-15.
30. Jeong, S, Logan, DE, Goodwin, MS, et al. A Social Robot to Mitigate Stress, Anxiety and Pain in Hospital Pediatric Care. HRI'15 Extended Abstracts. 2025;2:103–4.
31. Franconi I, Faragalli A, Palego G, Canonici S, Gatti L, Simonini A, et al. Preoperative anxiety management in children. Benefits of humanoid robots: an experimental study. Front Surg. 2023;10:1322085.
32. Maini V, Roy R, Gandhi G, Chopra A, Bhat SG. Artificial-Intelligence-Based Smart Toothbrushes for Oral Health and Patient Education: A Review. Hygiene. 2025;4;5(1):15-9.
33. Adeghe EP, Okolo CA, Ojeyinka OT. Integrating IoT in pediatric dental health: A data-driven approach to early prevention and education. Int J Front Life Sci Res. 2023;6(1):22–35.
34. Goodwin M, Kitsaras G, Muzammil M, Boothman N, Gomez J, Gangaraju BA, et al. Exploring brushing and questionnaire data from a feasibility randomised control trial of a school-based smart, connected toothbrushing program. BMC Oral Health. 2025;25(1):1330.
35. Choi Y, Kim J, Song Y, Park W. Perceptions and telemonitoring potential of smart toothbrushes among dental professionals and the public: A cross-sectional survey. Digit Health. 2025;3;11:82816.
36. Bhatia S, Gupta VK, Kumar S, Mishra G, Malhotra S, Arif K, et al. Artificial intelligence-based techniques for caries risk prediction and assessment: A scoping review. J Oral Biol Craniofac Res. 2025;15(6):1497-507.
37. Abbott LP, Saikia A, Anthonappa RP. Artificial Intelligence Platforms in Dental Caries Detection: A Systematic Review and Meta-Analysis. J Evidence-Based Dental Pract. 2024;25(1):102077.
38. Bahammam SA. Prediction of dental caries in children through machine learning. J Clinical Pediatric Dentistry. J Clin Pediatr Dent. 2025;49(5):158-67.
39. Ramos-Gomez F, Marcus M, Maida CA, Wang Y, Kinsler JJ, Xiong D, et al. Using a machine learning algorithm to predict the likelihood of presence of dental caries among children aged 2 to 7. Dent J (Basel). 2021;9(12):141.
40. Yuan X, Chu Y, Cai W. Developing an Interpretable Machine Learning Framework to Predict and Analyse Early Childhood Caries in Children Aged 2 to 6 Years: A Single-centre Observational Study. Int Dent J. 2026;76(2):109419.
41. Divya R, Diva Dharani R, Rathna Piriyanga RS, Anand Sherwood I. Digital Impressions in Dentistry - A Comprehensive Review. Shanlax Int J Arts, Sci Humanities. 2024;12(2):1-7.
42. Shah N, Thakur M, Gill S, Shetty O, Alqahtani NM, Al-Qarni MA, et al. Validation of Digital Impressions' Accuracy Obtained Using Intraoral and Extraoral Scanners: A Systematic Review. J Clin Med. 2023;12(18):5833.
43. Palomino-Granados RC, Solar C, Mas J. Dental digital impressions with intraoral scanners: a review of the literature. Rev Estomatol Herediana. 2024;34(1):67-72.
44. Virk RK, Bhullar KK, Singh SJ, Arora S, Dhillon JK, Jyotika. Intraoral Scanners in Contemporary Dental Practice: Recent Advances, Diagnostic Capabilities and Clinical Integration. Int Clinc Med Case Rep J. 2025;4(5):1-14.
45. Zarean P, Zarean P, Sendi P, Neuhaus KW. Advances in the Manufacturing Process of Space Maintainers in Pediatric Dentistry: A Systematic Review from Traditional Methods to 3D-Printing. Applied Sciences. 2023;13(12):6998.
46. Trivedi AV, Aduri R, Khan R, Pande MS. Three-Dimensional Printed Lingual Arch Space Maintainer: A Game Changer in Pediatric Dentistry. Cureus. 2024;2;16(7):63680.
47. Pawar BA. Maintenance of space by innovative three-dimensional-printed band and loop space maintainer. J Indian Soc Pedod Prev Dent. 2019;37(2):205-8.
48. Whitley D, Eidson RS, Rudek I, Bencharit S. In-office fabrication of dental implant surgical guides using desktop stereolithographic printing and implant treatment planning software: A clinical report. J Prosthetic Dentistry. 2017;118(3):256–63.

Cite this article as: Ahmed MA, Alqahtani MS, Alsadoon SA, Almohareb RA, Kalantan RA, Alanquri EK et al. Artificial intelligence and technology in paediatric dentistry: a review. Int J Community Med Public Health 2026;13:4697-703.