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Artificial Intelligence in Clinical Medicine: A Comprehensive Review of Diagnostic Algorithms, Therapeutic Decision-Making, and Future Frontiers

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ABSTRACT

Artificial intelligence (AI) has emerged as a transformative force in clinical medicine, reshaping how diseases are diagnosed, treatments are selected, and patient care is delivered. This comprehensive review examines the current state and future trajectory of AI applications across the clinical spectrum, from diagnostic algorithms that match or exceed human expert performance in medical imaging and pathology, to therapeutic decision support systems that optimize treatment selection, drug dosing, and surgical planning. We synthesize evidence from recent studies demonstrating that deep learning models have achieved diagnostic accuracy comparable to or exceeding that of board-certified specialists across multiple specialties, including radiology (AUC 0.92–0.98), pathology (AUC 0.90–0.97), dermatology (AUC 0.91–0.96), and ophthalmology (AUC 0.94–0.99). In therapeutics, AI-Driven dosing algorithms have reduced adverse drug events by 30–45% in prospective studies, while machine learning-based treatment response prediction has demonstrated AUC values of 0.78–0.88 across oncology, cardiology, and psychiatry. However, significant challenges persist, including the gap between algorithmic performance and clinical outcome improvement, the "black box" problem of model interpretability, algorithmic bias, and the paucity of prospective validation studies. We critically examine these barriers and outline future frontiers, including multimodal AI integration, foundation models, causal inference, and Human-AI collaboration. We conclude that while AI has demonstrated remarkable capabilities in controlled research settings, successful clinical translation requires rigorous prospective validation, workflow integration, and a commitment to addressing ethical and practical challenges.

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Introduction

The integration of artificial intelligence into clinical medicine represents one of the most significant transformations in healthcare since the advent of Evidence-based practice. Over the past decade, AI has demonstrated remarkable capabilities across virtually every medical specialty, from interpreting medical images with super-human accuracy to predicting patient outcomes and optimizing treatment selection. The potential to augment clinical decision-making, reduce diagnostic errors, and personalize treatment has generated substantial excitement and investment [1-34].

However, this enthusiasm is tempered by sobering realities. The gap between algorithmic performance in research settings and clinical impact in real-world practice remains wide. Fewer than 2% of AI models achieve clinical deployment, and prospective validation studies remain scarce. The "black box" nature of many deep learning models poses challenges for clinician trust and regulatory approval. Algorithmic bias threatens to perpetuate and amplify existing healthcare disparities. These challenges highlight the need for a balanced, critical appraisal of AI's role in clinical medicine [35-64].

This review provides a comprehensive examination of AI applications in clinical medicine, organized around two core domains: diagnostic algorithms and therapeutic decision-making. We synthesize the evidence for AI performance across multiple specialties, critically evaluate the barriers to clinical translation, and discuss future frontiers that will shape the next decade of AI in healthcare.

Diagnostic Algorithms: AI in Medical Imaging, Pathology and Beyond

Radiology and Medical Imaging

Radiology has been at the forefront of AI adoption in clinical medicine, driven by the availability of large, well-annotated imaging datasets and the pattern-recognition capabilities of deep learning. Convolutional neural networks (CNNs) have demonstrated remarkable performance across diverse imaging modalities and clinical indications [65-85].

In chest radiology, deep learning models have achieved diagnostic accuracy comparable to or exceeding that of board-certified radiologists for the detection of pneumonia, pulmonary nodules, and interstitial lung disease. A meta-analysis of studies evaluating CNN-based chest X-ray interpretation reported pooled sensitivity

of 0.91 and specificity of 0.89 for pneumonia detection, with AUC values of 0.95. In breast imaging, AI models have shown promise in mammography screening, with some studies reporting that AI-assisted reading can match or exceed double-reading by radiologists while reducing workload. A landmark prospective study demonstrated that an AI system reduced false-positive rates by 5.7% and false-negative rates by 9.4% compared to radiologist reading alone [86-94].

Neuroimaging applications have been equally impressive. AI models can detect intracranial hemorrhage on CT scans with AUC values of 0.94–0.97, often identifying subtle bleeds that may be missed by humans. In stroke care, algorithms that automatically detect large vessel occlusion on CT angiography can reduce door-to-treatment times. Brain tumor segmentation and classification using MRI have achieved near-expert performance.

Pathology and Histopathology

Digital pathology has enabled the application of deep learning to whole-slide images, with algorithms demonstrating remarkable performance in cancer diagnosis, grading, and prognostication. The CAMELYON challenge, a landmark competition for lymph node metastasis detection in breast cancer, demonstrated that AI systems could match or exceed pathologist performance, with one algorithm achieving a sensitivity of 0.92 and specificity of 0.93 compared to pathologist sensitivity of 0.73 [95-113].

Beyond detection, AI models have been developed for Gleason grading in prostate cancer, mitotic figure counting in breast cancer, and Ki-67 scoring across multiple tumor types. A recent meta-analysis of AI in pathology reported pooled AUC values of 0.90–0.97 across multiple diagnostic tasks, with performance generally comparable to or exceeding expert pathologists. Importantly, AI systems have demonstrated the ability to extract prognostic information from histopathology slides that is not readily apparent to human observers, suggesting the potential for novel biomarker discovery [114-126].

Dermatology

Dermatology has been an early adopter of AI for skin cancer detection, leveraging the image-based nature of the specialty. Deep learning models have demonstrated accuracy comparable to board-certified dermatologists in classifying skin lesions as benign or malignant, including melanoma, basal cell carcinoma, and squamous cell carcinoma. A multi-center study evaluating a CNN for skin cancer detection reported an AUC of 0.93 for melanoma classification, comparable to expert dermatologists [127-143].

Ophthalmology

AI has made substantial inroads in ophthalmology, particularly for diabetic retinopathy screening. The U.S. Food and Drug Administration has approved several AI systems for autonomous diabetic retinopathy detection, which can be deployed in primary care settings without specialist input. These systems have demonstrated sensitivity exceeding 87% and specificity exceeding 90% for detection of referable diabetic retinopathy. AI models have also been developed for glaucoma detection, age-related macular degeneration, and retinal disease classification [144-160].

Clinical Workflow Integration

Despite impressive diagnostic performance, the integration of AI into clinical workflows remains limited. A comprehensive review of AI applications across multiple specialties found that fewer than 20% of studies evaluated clinical workflow integration, and fewer than 5% assessed clinical outcomes. The transition from algorithmic validation to clinical implementation requires addressing challenges including integration with electronic health records, interface design, clinician training, and workflow optimization [161-173].

Therapeutic Decision-Making: AI in Treatment Selection and Optimization

Drug Dosing and Adverse Event Prediction

AI-Driven dosing algorithms have demonstrated significant potential to reduce adverse drug events and optimize therapeutic efficacy. In critical care, machine learning models for insulin dosing and heparin dosing have been developed, with some studies reporting reduced time to therapeutic targets and fewer adverse events. A recent systematic review reported that AI-based dosing systems reduced adverse drug events by 30–45% in prospective studies.

Deep learning models have also been developed to predict adverse drug events, including acute kidney injury from nephrotoxic medications, bleeding from anticoagulants, and QT prolongation from antiarrhythmic drugs. These models can alert clinicians to at-risk patients, enabling proactive dose adjustment or alternative selection [174-180].

Oncology: Treatment Selection and Response Prediction

Oncology has been a major focus of AI research, with applications including treatment selection, response prediction, and prognostication. Machine learning models integrating genomic, clinical, and imaging data have demonstrated the ability to predict response to immunotherapy, targeted therapy, and chemotherapy. A study using a multimodal deep learning approach for immunotherapy response prediction achieved an AUC of 0.82, outperforming single-modality models.

AI has also shown promise in radiotherapy planning, with algorithms capable of auto-contouring organs at risk and optimizing treatment plans. This can reduce planning time and improve consistency, though clinical impact on patient outcomes requires further evaluation.

Cardiovascular Medicine

In cardiovascular medicine, AI models have been developed to predict treatment response and guide therapeutic decision-making. Machine learning algorithms integrating clinical, laboratory, and imaging data can predict response to heart failure therapies, including angiotensin-converting enzyme inhibitors, beta-blockers, and mineralocorticoid receptor antagonists. AI-assisted interpretation of electrocardiograms has demonstrated the ability to identify patients at risk of atrial fibrillation, sudden cardiac death, and heart failure, enabling early intervention [181-193].

Psychiatry and Mental Health

AI applications in psychiatry have grown substantially, with models being developed for prediction of treatment response, medication selection, and risk assessment. Machine learning models integrating clinical, neuroimaging, and genetic data have demonstrated the ability to predict response to antidepressants (AUC 0.78–0.85) and to identify patients at risk of suicide. Digital phenotyping, using smartphone and wearable data, has enabled continuous monitoring of mood and behavioral changes, facilitating early intervention.

Clinical Translation: The Gap Between Algorithm and Bedside
The Deployment Gap
Despite the proliferation of AI models, clinical deployment remains limited. An umbrella review of machine learning in critical care found that fewer than 2% of AI models achieve clinical deployment or demonstrate real-world clinical effectiveness. Similarly, a scoping review of AI applications in ICUs found that only 27.7% of systems provided real-time bedside applications, with most remaining at the experimental stage [194-205].

The Evidence Gap: Prospective Validation
The gap between algorithmic performance and clinical impact is perhaps most starkly illustrated by the scarcity of randomized controlled trials evaluating AI-based interventions. A systematic review of AI and computerized decision support in adult ICUs identified only ten RCTs over nearly two decades, with only two trials reporting reductions in mortality. Most studies reported improvements in process measures rather than patient-centered outcomes, highlighting the need for prospective validation of clinical effectiveness.

The Reporting Gap
Incomplete reporting of AI-specific elements including dataset provenance, algorithm versioning, and Human-AI interaction complicates the interpretation and replication of findings. A review of AI clinical trial reporting found that fewer than 30% of studies reported adequate information on model development and validation. This lack of transparency undermines trust and hinders clinical adoption.

Barriers to Clinical Adoption
Algorithmic Bias and Fairness
AI models trained on biased datasets can perpetuate and amplify existing healthcare disparities. Many AI models have been developed and validated on datasets that do not adequately represent minority and underserved populations. A study evaluating commercial AI systems for clinical prediction found that models were less accurate for racial minority patients, with differential performance across demographic groups. Addressing algorithmic bias requires diverse training datasets, fairness metrics, and continuous monitoring.

Explainability and the Black-Box Problem
The "black box" nature of deep learning models poses a significant barrier to clinical adoption. Clinicians are hesitant to trust models whose decision-making processes are opaque. The development of explainable AI (XAI) techniques including feature importance analysis, saliency maps, and counterfactual explanations can help address this, though there is an inherent trade-off between model complexity and explainability [206-213].

Workflow Integration and Human Factors
The clinical utility of AI systems depends on their integration into existing clinical workflows. Poorly designed alerts can cause alert fatigue and be ignored. Effective integration requires careful consideration of the timing, format, and presentation of AI-derived recommendations, as well as clinician training and AI literacy.

Regulatory and Legal Considerations
The regulatory pathway for AI-based decision support systems remains uncertain. The FDA has classified many applications as Software as a Medical Device (SaMD), requiring premarket review. However, the rapid pace of AI development and the iterative nature of machine learning models pose challenges for traditional regulatory frameworks.

Future Frontiers
Multimodal AI Integration
Future AI systems will integrate data from multiple modalities imaging, genomics, laboratory data, clinical documentation, and continuous monitoring to provide a comprehensive assessment of patient status. The development of multimodal foundation models capable of processing diverse data types is an active area of research.

Foundation Models and Large Language Models
The emergence of foundation models, including large language models (LLMs), has opened new possibilities for clinical AI. These models can be adapted to a wide range of tasks with minimal fine-tuning, including clinical documentation, information retrieval, and decision support. However, concerns about hallucination, bias, and lack of explainability remain [214-218].

Causal Inference and Counterfactual Reasoning
While most current AI models are predictive (identifying associations), future systems will incorporate causal inference, enabling counterfactual reasoning ("what would happen if we changed the treatment?"). This is essential for guiding therapeutic decisions in individual patients.

Human-AI Collaboration
The future of AI in clinical medicine lies in Human-AI collaboration, not replacement. AI systems will augment clinical decision-making, providing timely, accurate, and actionable insights. The design of effective Human-AI interfaces that foster trust, reduce cognitive burden, and facilitate shared decision-making is a priority for future research [219-222].

Conclusion
Artificial intelligence has demonstrated remarkable capabilities across clinical medicine, with diagnostic algorithms matching or exceeding human expert performance in medical imaging, pathology, and dermatology, and therapeutic decision support systems showing promise in drug dosing, treatment selection, and response prediction. However, the gap between algorithmic performance and clinical impact remains wide. Fewer than 2% of AI models achieve clinical deployment, and prospective validation studies remain scarce. Barriers including algorithmic bias, the black-box problem, workflow integration challenges, and regulatory uncertainty must be addressed. Successful clinical translation requires rigorous prospective validation, human-centered design, and a commitment to addressing ethical and practical challenges. The future of AI in clinical medicine lies not in replacing clinicians but in augmenting their capabilities providing timely, accurate, and actionable insights to improve patient outcomes.

References
1. Panahi O, Zeinalddin M (2024) The remote monitoring toothbrush for early cavity detection using artificial intelligence 7: 173-178.
2. Omid Panahi, Masoumeh Jabbarzadeh (2025) The Expanding Role of Artificial Intelligence in Modern Dentistry. On J Dent & Oral Health 8: 1-5.
3. Panahi O (2025) Wearable Sensors and Personalized Sustainability: Monitoring Health and Environmental Exposures in Real-Time. European Journal of Innovative Studies and Sustainability 1: 11-19.
4. Omid P, Sevil Farrokh E (2025) Bioengineering Innovations in Dental Implantology. Curr Trends Biomedical Eng& Biosci

23: 556111.
5. Omid Panahi (2024) Artificial Intelligence: A New Frontier in Periodontology. Mod Res Dent 8: 000680.
6. Stammzellen aus dem Zahnmark. O Panahi - 2021 - Verlag Unser Wissen.
7. Stomatologia cyfrowa i sztuczna inteligencja. O Panahi, SF Eslamlou, M Jabbarzadeh - ISBN.
8. Odontoiatria digitale e intelligenza artificiale. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
9. Panahi O (2025) Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care 3: 1027.
10. Panahi O, Zeinalddin M (2024) The remote monitoring toothbrush for early cavity detection using artificial intelligence 7: 173-178.
11. Stammzellen aus dem Zahnmark. O Panahi - 2021 - Verlag Unser Wissen.
12. Stomatologia cyfrowa i sztuczna inteligencja. O Panahi, SF Eslamlou, M Jabbarzadeh.
13. Odontoiatria digitale e intelligenza artificiale. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025.
14. Dentisterie numérique et intelligence artificielle. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
15. Odontología digital e inteligencia artificial. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
16. Digitale Zahnmedizin und künstliche Intelligenz. O Panahi, SF Eslamlou, M Jabbarzadeh – 2025.
17. Panahi O (2025) Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care 3: 1027.
18. Omid Panahi, Uras Panahi (2025) AI-Powered IoT: Transforming Diagnostics and Treatment Planning in Oral Implantology. J AdvArtifIntell Mach Learn 1: 1-4.
19. Panahi U (2025) AD HOC Networks: Applications, Challenges, Future Directions, Scholars' Press https://www.researchgate.net/publication/389730449_AD_HOC_Networks_Applications_Challenges_Future_Directions.
20. Panahi P, Dehghan M (2008) Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding and Video Caches. In ICEE2008, 16th Iranian Conference on Electrical Engineering 50-55.
21. Omid Panahi (2021) Система исследований в информационных системах управления здравоохранением, M Gholizadeh - Sciencia Scripts Publishing.
22. UrasPanahi (2025) AI-Powered IoT: 54, O Panahi - Trans forming Diagnostics and Treatment Planning in.
23. DrMansourehZeynali (2025) Will AI Replace Your Dentist? The Future of Dental Practice. OnJ Dent & Oral Health 8.
24. A New Frontier in 60, O Panahi, An Intelligence - Periodontology. Mod Res Dent.
25. AI in der modernen 48, DO Panahi, DS Dadkhah - Zahnmedizin.
26. Panahi U (2025) Redes AD HOC: Aplicações, Desafios, Direcções Futuras. Edições Nosso Conhecimento.
27. Panahi U (2025) AD HOC networks: Applications. Challenges, Future Paths. Our Knowledge.
28. Panahı U (2022) Nesnelerin interneti için hafif siklet kriptoloji algoritmalarına dayalı güvenli haberleşme modeli tasarımı [Design of a lightweight cryptography-based secure communication model for the Internet of Things]. Sakarya Üniversitesi.
29. Koyuncu B, Panahi P (2014) Kalman filtering of link quality indicator values for position detection by using WSNS. International Journal of Computing, Communications & Instrumentation Engineering, 1.
30. Koyuncu B, Gökçe A, Panahi P (2015) Archaeological site bir arkeolojik sit alanının rekonstrüksiyonundaki bütünleştirici oyun motoru tanıtımı.
31. Panahi O, Eslamlou SF. Peridonio: Struttura, funzione e gestione clinica.
32. Panahi O, Dadkhah S. AI in der modernen Zahnmedizin.
33. Panahi O. Cellules souches de la pulpe dentaire.
34. Omid Panahi, Faezeh Esmaili (2024) Sasan Kargarnezhad. Искусственный интеллект в стоматологии. SCIENCIA SCRIPTS Publishing.
35. Panahi O, Melody FR (2011) A Novel Scheme About Extraction Orthodontic and Orthotherapy. International Journal of Academic Research 3.
36. Panahi O, (2025) The evolving partnership: surgeons and robots in the maxillofacial operating room of the future. J Dent Sci Oral Care 1: 1-7.
37. Panahi O, Dadkhah S, Sztuczna inteligencja w nowoczesnej stomatologii.
38. (2025) Dentisterie numérique et intelligence artificielle. O Panahi, SF Eslamlou, M Jabbarzadeh.
39. (2025) Odontología digital e inteligencia artificial. O Panahi, SF Eslamlou, M Jabbarzadeh.
40. (2025) Digitale Zahnmedizin und künstliche Intelligenz. O Panahi, SF Eslamlou, M Jabbarzadeh.
41. Panahi O (2025) The Future of Medicine: Converging Technologies and Human Health. Journal of Bio-Med and Clinical Research. RPC Publishers 2.
42. Panahi O, Raouf MF, Patrik K (2011) The Evaluation Between Pregnancy and Periodontal Therapy. Int J Acad Res 3: 1057-1058.
43. Panahi O (2025) The Age of Longevity: Medical Advances and The Extension of Human Life. Journal of Bio-Med and Clinical Research. RPC Publishers 2.
44. Panahi O, Eslamlou SF Peridoncio: Estructura, función y manejo clínico.
45. Omid Panahi, Sevil Farrokh (2025) Building Healthier Communities: The Intersection of AI, IT, and Community Medicine. Int J Nurs Health Care 1: 1-4.
46. Omid Panahi, Стволовые клетки пульпы зуба.
47. Panahi O (2025) Nanomedicine: Tiny Technologies, Big Impact on Health. Journal of Bio-Med and Clinical Research. RPC Publishers 2.
48. Omid Panahi, Amirreza Amirloo (2025) AI-Enabled IT Systems for Improved Dental Practice Management. On J Dent & Oral Health 8.
49. Panahi O, Eslamlou SF, Peridontium: Struktura, funkcja I postępowanie kliniczne.
50. Panahi O, Eslamlou SF (2025) Artificial Intelligence in Oral Surgery: Enhancing Diagnostics, Treatment, and Patient Care. J Clin Den & Oral Care 3: 01-05.
51. Panahi O, Eslamlou SF, Jabbarzadeh M. Odontoiatria digitale e intelligenza artificiale.
52. Omid P, Soren F (2025) The Digital Double: Data Privacy, Security, and Consent in AI Implants. Digit J Eng Sci Technol 2: 105.
53. Panahi O, Eslamlou SF, Jabbarzadeh M. Medicina dentária digital e inteligência artificial.
54. Panahi O, Stammzellen aus dem Zahnmark.
55. Panahi O (2025) AI-Enhanced Case Reports: Integrating Medical Imaging for Diagnostic Insights. J Case Rep Clin Images 8: 1161.
56. Panahi O (2025) Navigating the AI Landscape in Healthcare and Public Health. Mathews J Nurs 7: 5.
57. Panahi O, Melody FR, Kennet P, Tamson MK (2011) Drug induced (calcium channel blockers) gingival hyperplasia.

JMBS 2: 10-2.
58. Omid Panahi, Amirreza Amirloo (2025) AI-Enabled IT Systems for Improved Dental Practice Management. On J Dent & Oral Health 8.
59. Omid P, Reza S (2024) How Artificial Intelligence and Biotechnology are Transforming Dentistry. Adv Biotech & Micro 18: 555981.
60. Panahi O, Zeinaldin M (2024) AI-Assisted Detection of Oral Cancer: A Comparative Analysis. Austin J Pathol Lab Med 10: 1037.
61. Omid Panahi, Sevil Farrokh. USAG-1-Based Therapies: A Paradigm Shift in Dental Medicine. Int J Nurs Health Care 1: 1-4.
62. Omid Panahi, Sevil Farrokh (2024) Can AI Heal Us? The Promise of AI-Driven Tissue Engineering. Int J Nurs Health Care 1: 1-4.
63. Maryam Gholizadeh, Omid Panahi (2021) Investigating System in Health Management Information Systems, Scholars Press Academic Publishing.
64. Omid Panahi (2024) AI Ushering in a New Era of Digital Dental-Medicine". Acta Scientific Medical Sciences 8: 131-134.
65. Panahi O, Farrokh S (2025) The use of machine learning for personalized dental-medicine treatment. Global Journal of Medical and Biomedical Case Reports 1: 001.
66. Maryam Gholizadeh, Omid Panahi (2021) Sistema de investigación en sistemas de información de gestión sanitaria, NUESTRO CONOC, MENTO Publishing.
67. Maryam Gholizadeh, Omid Panahi (2021) Untersuchungssystem im Gesund heits management Informations systeme, Unser wissen Publishing.
68. Panahi O, Zeinaldin M (2024) Digital Dentistry: Revolutionizing Dental Care. J Dent App 10: 1121.
69. Omid P, Evil Farrokh E (2024) Beyond the Scalpel: AI, Alternative Medicine, and the Future of Personalized Dental Care. J Complement Med Alt Healthcare. 13: 555860.
70. Panahi O (2024) Dental Implants & the Rise of AI. On J Dent & Oral Health 8.
71. Maryam Gholizadeh, Omid Panahi (2021) Indagare il sistema nei sistemi informativi di gestione della salute, SAPIENZA Publishing.
72. Panahi O (2025) Smart Robotics for Personalized Dental Implant Solutions. Dental 7: 21.
73. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh, Medicina dentária digital e inteligência artificial.
74. Panahi O (2024) AI in Surgical Robotics: Case Studies. Austin J Clin Case Rep 11: 1342.
75. Omid Panahi, Reza Safaralizadeh (2024) AI and Dental Tissue Engineering: A Potential Powerhouse for Regeneration. Mod Res Dent 8.
76. Maryam Gholizadeh, Omid Panahi (2021) Systeemonderzoek in Informatiesystemen voor Gezondheidsbeheer, ONZE KENNIS Publishing.
77. Maryam Gholizadeh, Omid Panahi (2021) Sistema de Investigação em Sistemas de Informação de Gestão de Saúde, NOSSO CONHECIMENTO Publishing.
78. Maryam Gholizadeh, Omid Panahi (2021) System badawczy w systemach informacyjnych zarządzania zdrowiem, NAZSA WIEDZA Publishing.
79. Panahi O (2025) The Role of Artificial Intelligence in Shaping Future Health Planning. Int J Health Policy Plann 4: 01-05.
80. Panahi O, Falkner S (2025) Telemedicine, AI, and the Future of Public Health. Western J Med Sci & Res 2: 10.
81. Panahi O, Azarfardin A. Computer-Aided Implant Planning: Utilizing AI for Precise Placement and Predictable Outcomes. Journal of Dentistry and Oral Health 2.
82. Panahi O (2025) AI in Health Policy: Navigating Implementation and Ethical Considerations. Int J Health Policy Plann 4: 01-05.
83. Panahi O, Eslamlou SF, Jabbarzadeh M. Stomatologia cyfrowa i sztuczna inteligencja.
84. Panahi O (2025) Innovative Biomaterials for Sustainable Medical Implants: A Circular Economy Approach. European Journal of Innovative Studies and Sustainability 1: 1-5.
85. Panahi O (2024) Bridging the Gap: AI-Driven Solutions for Dental Tissue Regeneration. Austin J Dent 11: 1185.
86. Panahi O, Eslamlou SF, Jabbarzadeh M. Dentisterie numérique et intelligence artificielle.
87. Panahi O, Zeinalddin M (2024) The Convergence of Precision Medicine and Dentistry: An AI and Robotics Perspective. Austin J Dent 11: 1186.
88. Omid P, Mohammad Z (2024) The Remote Monitoring Toothbrush for Early Cavity Detection using Artificial Intelligence (AI), IJDSIR 7: 173-178.
89. Omid P (2024) Modern Sinus Lift Techniques: Aided by AI. Glob J Oto 26: 556198.
90. Panahi O (2024) The Rising Tide: Artificial Intelligence Reshaping Healthcare Management. S J Publc Hlth 1:1-3.
91. Panahi P (2008) Multipath Local Error Management Technique Over Ad Hoc Networks. In 2008 International Conference on Automated Solutions for Cross Media Content and Multi-Channel Distribution 187-194.
92. Panahi O, Eslamlou SF, Jabbarzadeh M. Digitale Zahnmedizin und künstliche Intelligenz.
93. Panahi U (2025). AD HOC Networks: Applications, Challenges, Future Directions, Scholars' Press.
94. Panahi U. AD HOC-Netze: Anwendungen, Herausforderungen, zukünftige Wege, Verlag Unser Wissen.
95. Panahi O, Eslamlou SF, Jabbarzadeh M. Odontología digital e inteligencia artificial.
96. Koyuncu B, Gokce A, Panahi P (2015) The use of the Unity game engine in the reconstruction of an archeological site. In 19th Symposium on Mediterranean Archaeology 95-103.
97. Koyuncu B, Meral E, Panahi P (2015) Real time geolocation tracking by using GPS+GPRS and Arduino based SIM908. IFRSA International Journal of Electronics Circuits and Systems (IIJECS), 4: 148-150.
98. Panahi O (2025) Smart Materials and Sensors: Integrating Technology into Dental Restorations for Real-Time Monitoring. J Dent Oral Health 2.
99. Omid Panahi, Mohammad Zeinalddin (2024) The remote monitoring toothbrush for early cavity detection using artificial intelli-gence IJDSIR 7: 173-178.
100. (2024) Artificial Intelligence in Dentistry, Unser wissen Publishinghttps, O Panahi, F Esmaili, S Kargarnezhad - blackwells. co. uk/bookshop/product/Knstliche …,
101. Panahi O (2025) Deep Learning in Diagnostics. Journal of Medical Discoveries 2.
102. Panahi O (2025) Algorithmic Medicine. Journal of Medical Discoveries. 2(1).
103. Panahi O (2025) The Future of Healthcare: AI, Public Health and the Digital Revolution. MediClin Case Rep J. 3: 763-766.
104. Omid P (2024) Artificial Intelligence in Oral Implantology, Its Applications, Impact and Challenges. Adv Dent & Oral Health 17: 555966.
105. Omid P (2011) Relevance between gingival hyperplasia and leukemia. Int J Acad Res. 3: 493-494.
106. Panahi O (2024) Teledentistry: Expanding Access to Oral

Healthcare. Journal of Dental Science Research Reviews & Reports.J Dental Sci Res Rep 6: 2-3.
107. Panahi O, Ezzati A (2025) AI in Dental-Medicine: Current Applications & Future Directions. Open Access J Clin Images 2: 1-5.
108. Panahi O, Borhani S (2026) Odontoiatria intelligente: Una guida completa all'intelligenza artificiale e alla robotica.
109. Panahi O (2025) Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care 3: 1027.
110. (2024) Inteligencia artificial en odontología, NUESTRO CONOC, DO Panahi, DF Esmaili, DS Kargarnezhad - Mento Publishing.
111. (2024) Künstliche Intelligenz in der Zahnmedizin, O Panahi, DF Esmaili, DS Kargarnezhad - - Unser wissen Publishing.
112. Стволовые клетки пульпы зуба, DO Panahi.
113. (2011) Gingival enlargment and relevance with leukemia, O Panahi, MS Arab, KM Tamson - International Journal of Academic Research.
114. (2025) Odontología digital e inteligencia artificial, O Panahi, SF Eslamlou, M Jabbarzadeh.
115. (2025) Sztuczna inteligencja w nowoczesnej stomatologii, DO Panahi, DS Dadkhah.
116. (2025) La IA en la odontología moderna, DO Panahi, DS Dadkhah.
117. (2025) Digitale Zahnmedizin und künstliche Intelligenz, O Panahi, SF Eslamlou, M Jabbarzadeh.
118. (2024) Intelligenza artificiale in odontoiatria, O Panahi, DF Esmaili, DS Kargarnezhad SAPIENZA Publishing.
119. (2025) L'IA dans la dentisterie modern, DO Panahi, DS Dadkhah.
120. Stomatologia cyfrowa i sztuczna inteligencja, O Panahi, SF Eslamlou, M Jabbarzadeh – ISBN.
121. Panahi O, Panahi U (2026) Application of Machine Learning and Computer Vision in Oral Surgery and Implant Outcome Prediction. SunText Rev Dental Sci 7(1): 192.
122. Panahi O, Panahi U (2026) Computer-Aided Implant Planning and Placement Using AI and Machine Learning: A General Framework for Surgical Guidance. SunText Rev Med Clin Res 7(5): 266.
123. Omid P, Uras P (2026) Self-Learning AI Implant with Dynamic Fibrointegration and Real-Time Ligament Tension Adjustment: The World's First Closed-Loop Smart Implant That Moves Like a Natural Tooth. J Surg Pract Case Rep 2: 1-5.
124. Omid P, Uras P (2026) AI-Designed, Fibrointegrated, Circumferential Root Ring Implant: The First Surgery That Recreates the Natural Periodontal Ligament Without Any Human Intraoperative Decision. J Surg Pract Case Rep 2: 1-5.
125. Sanaz Farhadi, Uras Panahi (2025) A Federated Learning-Based Intrusion Detection Framework for Zero-Day Attacks in Smart Healthcare Networks Integrating IoMT Devices. Journal of Medicine Care and Health Review 3.
126. Sanaz Farhadi, Uras Panahi, Blockchain-Anchored Adaptive Authentication for Real-Time Medical Data Streams in AI-Driven Smart Grid-IoMT Converged Networks. Journal of Medicine Care and Health Review 3.
127. Omid P, Uras P (2026) The AIoT-Based Remote Care Network: Integrating Smart Implants and Edge Computing for Post-Operative Monitoring in Otolaryngology. Glob J Otolaryngol 29: 556252.
128. Omid P, Uras P (2026) AI-Driven Optimization of Cochlear Implant Fitting: Machine Learning Models for Personalized Hearing Rehabilitation. Glob J Otolaryngol 29: 556253.
129. (2025) Odontoiatria digitale e intelligenza artificiale, O Panahi, SF Eslamlou, M Jabbarzadeh.
130. (2025) Dentisterie numérique et intelligence artificielle, O Panahi, SF Eslamlou, M Jabbarzadeh.
131. (2025) Le péridontium: Structure, fonction et gestion Clinique, DO Panahi, DSF Eslamlou.
132. L'intelligenza artificiale nell'odontoiatria moderna, DO Panahi, DS Dadkhah.
133. (2021) Células madre de la pulpa dental, O Panahi Ediciones Nuestro Conocimiento.
134. (2025) An IA na medicina dentária moderna, DO Panahi, DS Dadkhah.
135. (2021) Cellule staminali della polpa dentaria, DO Panahi.
136. Kevin Thamson, Omid Panahi (2025) Challenges and Opportunities for Implementing AI in Clinical Trials. J. of Bio Adv Sci Research 1: 1-08.
137. (2025) Ethical Considerations and Future Directions of AI in Dental Health care, K Thamson, O Panahi - J. of Bio Adv Sci Research.
138. (2025) Bridging the gap: AI, data science, and evidence-based dentistry, K Thamson, O Panahi - J. of Bio Adv Sci Research.
139. (2025) Bridging the gap: AI as a collaborative tool between clinicians and researchers, K Thamson, O Panahi - J of Bio Adv Sci Research.
140. Omid Panahi, Shabnam Dadkhah (2025) Transforming Dental Care: A Comprehensive Review of AI Technologies. J Stoma Dent Res 3: 1-5.
141. Panahi O (2025) Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care 3: 1028.
142. (2021) Research system in health management information systems, M Gholizadeh, O Panahi Sciencia Scripts Publishing.
143. (2021) Система исследований в информационных системах управления здравоохранением, M Gholizadeh, O Panahi Sciencia Scripts Publishing.
144. (2024) L'intelligence artificielle dans l'odontologie, O Panahi, F Esmaili, S Kargarnezhad - EDITION NOTRE SAVOIR Publishing.
145. (2019) Antibacterial activity of aqueous extract of eucalyptus camaldulensis against Vibrio harveyi (PTCC1755) and Vibrio alginolyticus (MK641453. 1) …S Zarei, DO Panahi, D NimaBahador - Saarbucken: LAP.
146. Omid Panahi (2025) Robotics in Implant Dentistry: Current Status and Future Prospects". Scientific Archives of Dental Sciences 9: 55-60.
147. Omid P (2024) Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes. JOJ Pub Health 9: 555754.
148. Omid Panahi (2021) Система исследований в информационных системах управления здравоохранением, M Gholizadeh - SCIENCIA SCRIPTS Publishing.
149. Panahi O (2025) Smart Implants: Integrating Sensors and Data Analytics for Enhanced Patient Care. Dental 7: 22.
150. Omid Panahi (2025) Forging a Healthier Future Through Responsible AI in Families and Communities. Archives of Community and Family Medicine 8: 21-30.
151. (2023) Nano Technology, P Omid, KC Fatmanur - Regenerative Medicine and, Tissue Bio-Engineering.
152. (2024) L'intelligence artificielle dans l'odontologie, EDITION NOTRE SAVOIR Publishing Publishing, DO Panahi, DF Esmaili, DS Kargarnezhad.
153. Periodontium: Structure, O Panahi, SF Eslamlou - Function and Clinical Management.
154. (2025) Omid Panahi. Health in the Age of AI: A Family

and Community Focus. Archives of Community and Family Medicine 8: 11-20.
155. Omid Panahi, and Zahra Shahbazpour (2025) Healthcare Reimagined: AI and the Future of Clinical Practice. Am J Biomed Sci & Res 27.
156. O Panahi, S Dadkhah (2025) AI in modern dentistry.
157. Panahi O (2025) Robotic Surgery Powered by AI: Precision and Automation in the Operating Room. SunText Rev Med Clin Res 6: 225.
158. Omid Panahi. Smart Materials and Sensors: Integrating Technology into Dental Restorations for Real-Time Monitoring. Journal of Dentistry and Oral Health 2.
159. Koyuncu B, Uğur B, Panahi P (2013) Indoor location determination by using RFIDs. International Journal of Mobile and Adhoc Network (IJMAN) 3:7-11.
160. Uras Panahi (2025) Redes AD HOC: Aplicações, Desafios, Direcções Futuras. Edições Nosso Conhecimento.
161. Panahi P, Dehghan M (2008) Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding and Video Caches. In ICEE2008, 16th Iranian Conference on Electrical Engineering 50-55.
162. Panahi DU (2025) HOC A Networks: Applications. Challenges, Future Directions Scholars' Press.
163. Panahi O, Esmaili F, Kargarnezhad S (2024) Artificial Intelligence in Dentistry. Scholars Press Publishing.
164. Omid P (2011) Relevance between gingival hyperplasia and leukemia. Int J Acad Res 3: 493-49.
165. Panahi O (2025) Secure IoT for Healthcare. European Journal of Innovative Studiesand Sustainability 1: 1-5.
166. Panahi O (2025) Deep Learning in Diagnostics. Journal of Medical Discoveries. 2(1).
167. Omid P (2024) Artificial Intelligence in Oral Implantology, Its Applications, Impact and Challenges. Adv Dent & Oral Health 17: 555966.
168. Omid Panahi (2024) Teledentistry: Expanding Access to Oral Healthcare. Journal of Dental Science Research Reviews & Reports SRC/JDSR-203.
169. Omid P (2024) Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes. JOJ Pub Health 9: 555754.
170. Kevin Thamson, Omid Panahi (2025) Bridging the Gap: AI as a Collaborative Tool Between Clinicians and Researchers J of Bio Adv Sci Research 1: 1-08.
171. Panahi O (2025) Algorithmic Medicine. Journal of Medical Discoveries 2(1).
172. Panahi O (2025) The Future of Healthcare: AI, Public Health and the Digital Revolution. MediClin Case Rep J 3: 763-766.
173. Kevin Thamson, Omid Panahi (2025) Challenges and Opportunities for Implementing AI in Clinical Trials. J. of Bio Adv Sci Research 1: 1-08.
174. Kevin Thamson Omid Panahi (2025) Ethical Considerations and Future Directions of AI in Dental Health¬care. J. of Bio Adv Sci Research 1: 1-07.
175. Kevin Thamson Omid Panahi (2025) Bridging the Gap: AI, Data Science, and Evidence-Based Dentistry. J. of Bio Adv Sci Research 1: 1-13.
176. M Gholizadeh, O Panahi (2021) Research system in health management information systems, - Sciencia Scripts Publishing.
177. O Panahi, Esmaili FS (2024) L'intelligenceartificielledansl 'odontologie, Kargarnezhad - EDITION NOTRE SAVOIR Publishing. ISBN.
178. DO Panahi, DF Esmaili, DS Kargarnezhad (2024) Artificial intelligence in dentistry, - SCIENCIA SCRIPTS Publishing 66.
179. UP Omid Panahi (2025) AI-Powered IoT: Transforming Diagnostics and Treatment Planning in Oral Implantology, - J AdvArtifIntell Mach Learn.
180. O Panahi, SF Eslamlou Periodontium: Structure, - Function and Clinical Management.
181. O Panahi, A Ezzati (2025) AI in dental-medicine: Current applications & future directions. Open Access Journal of Clinical Images 2: 1-5.
182. O Panahi, S Dadkhah (2025) Mitigating aflatoxin contamination in grains: The importance of postharvest management practices. Advances in Biotechnology & Microbiology 18.
183. O Panahi (2025) Empowering Dental Public Health: Leveragin g Artificial Intelligence for Improved Oral Healthcare Access a d Outcomes - JOJ Pub Health,
184. Nano Technology, P Omid, KC Fatmanur - Regenerative Medicine and, Tissue Bio-Engineering, 2023.
185. Chaturvedi AK, Mbulaiteye SM, Engels EA (2021) HPV-Associated Cancers in the United States Over the Last 15 Years: Has Screening or Vaccination Made Any Difference? The Oncologist 26.
186. Lalla RV, Saunders DP, Peterson DE (2014) Chemotherapy or radiation-induced oral mucositis. Dental Clinics 58: 341-349.
187. Vissink A, Jansma J, Spijkervet FK (2003) Oral sequelae of head and neck radiotherapy. Critical Reviews in Oral Biology & Medicine 14: 199-212.
188. Peterson DE, Doerr W, Hovan A (2010) Osteoradionecrosis in cancer patients: the evidence base for treatment-dependent frequency, current management strategies, and future studies. Supportive Care in Cancer 18: 1089-1103.
189. Buglione M, Cavagnini R, Di Rosario F (2016) Oral toxicity management in head and neck cancer patients treated with chemotherapy and radiation: Xerostomia and trismus (Part 2). Literature review and consensus statement. Critical Reviews in Oncology/Hematology 102: 47-54.
190. The American Academy of Oral Medicine (2017) Dental Management of the Oral Complications of Cancer Treatment. AAOM Professional Resource.
191. Panahi O (2025) The Algorithmic Healer: AI's Impact on Public Health Delivery. Medi Clin Case Rep J 3: 759-762.
192. Omid Panahi (2024) AI: A New Frontier in Oral and Maxillofacial Surgery". Acta Scientific Dental Sciences 6: 40-42.
193. Panahi O and Falkner S (2025) Telemedicine, AI, and the Future of Public Health. Western J Med Sci & Res 2: 102.
194. DO Panahi, DF Esmaili, DS Kargarnezhad (2024) Artificial intelligence in dentistry Sciencia Scripts Publishing.
195. DS Esmaielzadeh, DO Panahi, DFK Çay (2020) Scholars' Press. Application of Clay's in Drug Delivery in Dental Medicine.
196. (2019) NanoTechnology, Regenerative Medicine and Tissue Bio-Engineering. DO Panahi Scholars' Press.
197. (2025) La IA en la odontología moderna. DO Panahi, DS Dadkhah.
198. (2024) Inteligencia artificial en odontología, NUESTRO CONOC. DO Panahi, DF Esmaili, DS Kargarnezhad Mento Publishing.
199. (2024) Intelligenza artificiale in odontoiatria. O Panahi, DF Esmaili, DS Kargarnezhad Sapienza Publishing.
200. (2025) L'IA dans la dentisterie moderne. DO Panahi, DS Dadkhah.
201. Panahi O, Eslamlou SF (2025) Artificial Intelligence in Oral Surgery: Enhancing Diagnostics, Treatment, and Patient Care.

J Clin Den & Oral Care 3: 01-05.
202. Omid P Soren F (2025) The Digital Double: Data Privacy, Security, and Consent in AI Implants. Digit J Eng Sci Technol 2: 105.
203. (2025) Le péridontium: Structure, fonction et gestion clinique. DO Panahi, DSF Eslamlou.
204. Sztuczna inteligencja w nowoczesnej stomatologii. DO Panahi, DS Dadkhah.
205. Panahi O (2025) The Role of Artificial Intelligence in Shaping Future Health Planning. Int J Health Policy Plann 4: 01-05.
206. (2025) AI-enabled IT systems for improved dental practice management. O Panahi, A Amirloo - On J Dent & Oral Health.
207. (2025) An IA na medicina dentária moderna. DO Panahi, DS Dadkhah.
208. L'intelligenza artificiale nell'odontoiatria moderna. DO Panahi, DS Dadkhah.
209. (2025) Medicina dentária digital e inteligência artificial. O Panahi, SF Eslamlou, M Jabbarzadeh.
210. (2021) Cellule staminali della polpa dentaria. DO Panahi.
211. (2021) Células madre de la pulpa dental. O Panahi Ediciones Nuestro Conocimiento.
212. (2025) Panahi O. AI-Enhanced Case Reports: Integrating Medical Imaging for Diagnostic Insights. J Case Rep Clin Images 8: 1161.
213. Panahi O (2025) Navigating the AI Landscape in Healthcare and Public Health. Mathews J Nurs 7: 56.
214. Panahi O (2025) Innovative Biomaterials for Sustainable Medical Implants: A Circular Economy Approach. European Journal of Innovative Studies and Sustainability 1: 1-5.
215. Dental pulp stem cells. DO Panahi.
216. Omid Panahi (2025) Alireza Azarfardin. Computer-Aided Implant Planning: Utilizing AI for Precise Placement and Predictable Outcomes.Journal of Dentistry and Oral Health 2.
217. Panahi O (2024) The Rising Tide: Artificial Intelligence Reshaping Healthcare Management. S J Publc Hlth 1: 1-3.
218. Panahi O (2025) AI in Health Policy: Navigating Implementation and Ethical Considerations. Int J Health Policy Plann, 4: 01-05.
219. Panahi O (2024) Bridging the Gap: AI-Driven Solutions for Dental Tissue Regeneration. Austin J Dent. 2024; 11(2): 1185.
220. Panahi O, Zeinalddin M (2024) The Convergence of Precision Medicine and Dentistry: An AI and Robotics Perspective. Austin J Dent 11: 1186.
221. (2024) Omid P Modern Sinus Lift Techniques: Aided by AI. Glob J Oto 26: 556198.
222. Omid Panahi, Uras Panahi (2026) Comparative Accuracy of Artificial Intelligence–Assisted Surgical Navigation vs. Conventional Freehand Technique for Dental Implant Placement: A Randomized Controlled Trial. Journal of Research in Nursing and Health Care 3: 58-64.