ISSN: 2639-9237

Journal of Case Reports and Medical Images

Open Access | Case Study

Quantum Leaps in Imaging: Case Studies in Advanced Diagnostics

Patrik Kennet[1]*; Soren Falkner[2]

[1]*Massachusetts Institute of Technology, Massachusetts Ave, United States.*

[2]*Vienna University of Technology, Faculty of Computer Engineering, Austria.*

***Corresponding Author(s): Patrik Kennet**

Massachusetts Institute of Technology, Massachusetts Ave, Cambridge, MA 02139, United States.

Email: patrik.kennet@gmail.com

Received: May 15, 2025

Accepted: June 03, 2025

Published Online: June 10, 2025

Journal: Journal of Case Reports and Medical Images

Publisher: MedDocs Publishers LLC

Online edition: http://meddocsonline.org/

Keywords: Advanced medical imaging; Diagnostic imaging; Quantum imaging; Ultra-high-field MRI; Photon-counting CT; Molecular imaging; Quantitative imaging; Precision diagnostics; Case reports; Emerging technologies; Medical physics; Clinical innovation.

Abstract

The field of medical imaging is currently experiencing transformative advancements that promise to revolutionize diagnostic capabilities. This journal section, "Quantum Leaps in Imaging: Case Studies in Advanced Diagnostics," presents a compelling collection of clinical case reports that exemplify how cutting-edge, often physics-inspired, imaging technologies are enabling unprecedented insights into human health and disease. Each meticulously documented case illustrates the practical application and impact of novel modalities and techniques, including but not limited to, ultra-high-field MRI, photon-counting CT, advanced molecular imaging with innovative radiotracers, quantitative multiparametric imaging, and early integrations of quantum sensing principles. These reports highlight instances where these "quantum leaps" have provided diagnostically definitive information, facilitated earlier disease detection at a molecular or cellular level, enabled precise lesion characterization, guided highly targeted therapies, or offered prognostic indicators previously unattainable through conventional imaging. By showcasing real-world clinical scenarios, this collection underscores the pivotal role of these advanced diagnostic tools in refining our understanding of pathophysiology, personalizing patient management, and ultimately pushing the boundaries of precision medicine. These case studies serve as a vital resource for radiologists, physicists, clinicians, and researchers eager to explore and leverage the forefront of diagnostic visualization.

Introduction

The landscape of modern medicine is in a perpetual state of evolution, driven by an insatiable quest for deeper understanding, earlier detection, and more precise intervention. At the heart of this transformative journey lies medical imaging, a discipline that has, over the past century, repeatedly redefined our ability to visualize the invisible, unravel the complexities of disease, and guide therapeutic strategies. From the pioneering X-rays of Roentgen to the revolutionary advent of CT and MRI, each successive generation of imaging technology has represented a significant leap forward, fundamentally altering clinical practice and patient outcomes [1-21]. Today, we stand on the precipice of another such epochal shift, characterized by what can truly be described as "quantum leaps" in imaging – advancements that are pushing the very boundaries of physics, engineering, and data science to unlock an unprecedented level of diagnostic detail and prognostic power.

Cite this article: Patrik K. Quantum Leaps in Imaging: Case Studies in Advanced Diagnostics. J Case Rep Clin Images. 2025; 8(1): 1163.

This journal section, "Quantum Leaps in Imaging: Case Studies in Advanced Diagnostics," is dedicated to showcasing these groundbreaking advancements through the lens of real-world clinical application. It aims to illuminate how cutting-edge imaging modalities and techniques are not merely incremental improvements but rather fundamental paradigm shifts, offering insights at scales and sensitivities previously considered unattainable. The "quantum" in our title is not a literal claim of quantum computing integration in every instance, though that too is on the horizon for image processing. Instead, it signifies a conceptual leap – a dramatic, often discontinuous, improvement in resolution, specificity, sensitivity, or information content that empowers clinicians to make more informed decisions, often with profound implications for patient care.

The current era of advanced diagnostics is characterized by several key trends. Firstly, we are witnessing the proliferation of ultra-high-field magnetic resonance imaging (UHF-MRI), pushing magnetic field strengths beyond the conventional 3 Tesla to 7 Tesla and even higher in clinical research settings [22-32]. These formidable fields offer inherently higher signal-to-noise ratios, translating into exquisite anatomical detail, particularly for small structures, and enhanced functional mapping of the brain and other organs. Beyond pure resolution, UHF-MRI opens doors to novel contrast mechanisms and spectroscopic techniques that provide metabolic and molecular information far beyond basic anatomical depiction. Secondly, the maturation of Photon-Counting Computed Tomography (PCCT) represents a monumental shift from conventional energy-integrating detectors. By directly counting individual X-ray photons and measuring their energy, PCCT dramatically improves image quality, offers superior contrast-to-noise ratios at lower radiation doses, and enables highly precise material decomposition, promising unparalleled insights into tissue composition and the identification of subtle pathologies.

Beyond these hardware innovations, the field is being profoundly reshaped by advancements in molecular imaging. While PET and SPECT have been cornerstones of functional imaging for decades, the development of novel radiotracers, targeting an ever-expanding array of biological pathways, is transforming our ability to visualize disease at its earliest, molecular stages. This includes highly specific agents for amyloid plaques and tau tangles in neurodegenerative diseases, Fibroblast Activation Protein (FAP) imaging for oncology and fibrosis, and new Prostate-Specific Membrane Antigen (PSMA) tracers for prostate cancer, to name but a few. These tracers, combined with hybrid imaging systems like PET/MRI, offer a comprehensive view that integrates metabolic activity with anatomical precision, facilitating earlier diagnosis, more accurate staging, and personalized treatment selection [33-44].

Furthermore, the integration of quantitative imaging across all modalities is becoming paramount. Moving beyond subjective visual assessment, quantitative imaging provides objective, reproducible metrics – such as perfusion rates, diffusion coefficients, stiffness measurements (elastography), and texture analysis (radiomics) – that can track disease progression, assess treatment response, and even predict patient outcomes. These advanced metrics are often derived from complex mathematical models and sophisticated image processing algorithms, bridging the gap between raw data and actionable clinical insights. The emergence of Artificial Intelligence (AI), particularly deep learning, is accelerating these quantitative capabilities, offering automated analysis, anomaly detection, and even predictive modeling from complex imaging datasets, thereby augmenting the diagnostic prowess of human interpreters.

The case reports featured in this section are carefully selected to illustrate these "quantum leaps" in action. Each case delves into a specific clinical scenario where an advanced imaging technique played a decisive role, providing critical information that was unavailable or ambiguous with conventional methods. We will witness how these technologies facilitate earlier and more accurate diagnoses, enabling timely interventions that can significantly alter the course of disease. We will explore how they guide complex surgical procedures with unprecedented precision, minimize invasiveness, and enhance patient safety. Moreover, these cases will demonstrate the power of advanced imaging in personalizing medicine – tailoring treatment strategies to individual patient characteristics based on unique physiological and molecular profiles revealed by these sophisticated scans.

While the promise of these technologies is immense, their widespread adoption and full clinical integration present challenges. These include the high cost of equipment, the need for specialized training for interpretation, and the development of robust workflows for data management and analysis. However, the compelling evidence presented in these case studies [45-60] provides a strong rationale for continued investment and research in this vital domain. By sharing these experiences, our aim is to foster knowledge exchange, stimulate further innovation, and accelerate the translation of these "quantum leaps" from the research laboratory to the bedside, ultimately transforming patient care globally. The future of diagnostics is not just brighter; it is more precise, more predictive, and ultimately, more personalized, offering new hope in the fight against disease.

Challenges

Despite the breathtaking "quantum leaps" in medical imaging discussed previously, the journey from cutting-edge research to widespread clinical implementation is fraught with significant challenges. These hurdles are multi-faceted, encompassing technological, financial, logistical, and human factors, all of which must be addressed to truly harness the transformative potential of advanced diagnostics.

One of the most prominent challenges is the exorbitant cost associated with acquiring, maintaining, and upgrading these state-of-the-art imaging systems. Ultra-high-field MRI scanners, photon-counting CT systems, and advanced PET/MRI hybrids represent substantial capital investments for healthcare institutions. This high entry barrier often limits their availability to large academic centers or specialized research hospitals, creating a disparity in access to advanced diagnostic capabilities, particularly in underserved regions or resource-constrained healthcare systems. Beyond the initial purchase, the ongoing operational costs, including specialized power requirements, cryogenics for MRI, and maintenance contracts, further contribute to the financial burden. The development and regulatory approval of novel radiotracers for molecular imaging also incur significant research and development costs, which are ultimately reflected in patient charges.

Linked to cost is the challenge of reimbursement policies. For many emerging advanced imaging techniques, established reimbursement codes may not exist, or the allocated reimbursement may not adequately cover the true cost of the procedure, including radiopharmaceutical expenses, specialized technologist time, and physician interpretation. This lack of appropriate reimbursement can disincentivize healthcare providers from investing in and utilizing these technologies, regardless of their clinical benefit. Furthermore, demonstrating the cost-effectiveness and improved patient outcomes of these advanced modalities compared to conventional methods is often required for broader reimbursement, necessitating robust, long-term clinical trials that are time-consuming and expensive [61-75].

The complexity of the technology itself presents a significant challenge. Operating and interpreting advanced imaging modalities requires highly specialized expertise. Radiographers and technologists need extensive training to manage the sophisticated controls, optimize image acquisition protocols, and handle the vast datasets generated by these systems. Similarly, radiologists and other clinicians interpreting these images must possess a deep understanding of the underlying physics, the nuances of the acquired data (e.g., quantitative metrics, molecular targets), and the potential artifacts. The learning curve for these advanced techniques is steep, and there is a critical shortage of professionals with this specialized training. Educational programs need to evolve rapidly to meet this growing demand, integrating advanced physics, computational analysis, and AI principles into medical curricula.

Data management and interpretation pose another formidable obstacle. Advanced imaging generates enormous volumes of complex data – terabytes per patient study are not uncommon. Storing, transmitting, and processing this data require robust IT infrastructure, high-performance computing capabilities, and secure networks, all of which are expensive to implement and maintain. Beyond storage, the sheer volume and complexity make manual interpretation increasingly challenging and time-consuming. While Artificial Intelligence (AI) and machine learning offer promising solutions for automated analysis, quantification, and triage, their development, validation, and seamless integration into clinical workflows are still ongoing. Ensuring the explainability, bias mitigation, and regulatory approval of AI algorithms in a clinical context adds further layers of complexity.

Standardization and reproducibility are crucial for translating research findings into routine clinical practice. Variations in imaging protocols, equipment calibration, and post-processing techniques across different institutions can lead to inconsistencies in image quality and quantitative measurements. Establishing widely accepted, harmonized protocols for advanced imaging modalities is essential to ensure that results are comparable and reliable, facilitating multicenter studies and enhancing clinical decision-making. International collaborations and professional societies play a vital role in developing and promoting these standards.

Finally, the ethical and regulatory landscape is evolving rapidly to keep pace with technological advancements. Issues such as patient data privacy and security with large-scale image datasets, the responsible deployment of AI [76-81] in diagnostic decision-making, and the ethical implications of revealing highly predictive or prognostic information to patients (e.g., risk of future disease) require careful consideration. Regulatory bodies face the challenge of developing agile frameworks for approving novel devices, tracers, and AI algorithms without stifling innovation, while simultaneously ensuring patient safety and efficacy.

Future works: Charting the course for "Quantum leaps in imaging"

The rapid advancements in medical imaging, as showcased by the "quantum leaps" highlighted in this collection of case studies, present not only immediate clinical benefits but also open vast avenues for future research and development. To fully realize the transformative potential of these technologies, several key areas demand focused attention, pushing the boundaries of what is currently achievable in advanced diagnostics.

Firstly, a critical area for future work lies in enhanced integration and multi-modal fusion. While individual advanced modalities offer unparalleled insights, the true power of future diagnostics will likely emerge from their synergistic combination. This includes further developing seamless platforms for PET/MRI, refining sophisticated image registration techniques for multi-modal data, and exploring novel methods to fuse data from different sources (e.g., imaging, genomics, proteomics, clinical wearables, electronic health records) to create comprehensive "digital twins" of patients. Future work will focus on not just overlaying images, but on developing sophisticated algorithms that can extract and synthesize information from these disparate data streams, providing a holistic and predictive understanding of disease progression and response to therapy.

Secondly, the role of Artificial Intelligence (AI) and Machine Learning (ML) in image analysis and interpretation is poised for exponential growth. While current applications primarily focus on tasks like lesion detection, segmentation, and quantification, future work will delve into more complex areas. This includes developing AI models for:

- **Predictive analytics:** Forecasting disease progression, treatment response, and patient outcomes based on imaging biomarkers and other clinical data.
- **Generative AI for image synthesis and augmentation:** Creating realistic synthetic images for training purposes, or even "filling in" missing data from limited scans.
- **Autonomous imaging systems:** Developing AI-powered systems that can optimize scan protocols, guide patient positioning, and even perform initial interpretations, thereby streamlining workflows and potentially expanding access to diagnostics in remote areas.
- **Explainable AI (XAI):** Ensuring that AI's diagnostic recommendations are transparent and understandable to clinicians, fostering trust and facilitating clinical adoption. Research will focus on developing methods to visualize and interpret the "reasoning" behind AI's decisions, rather than treating them as black boxes.
- Thirdly, the development and clinical translation of novel imaging biomarkers and contrast agents will continue to be a fertile ground for future research. This includes:
- **Targeted molecular probes:** Designing and synthesizing highly specific agents that can visualize disease at the cellular and molecular level, enabling earlier detection and more precise therapeutic targeting, particularly in oncology, neurology, and cardiology.
- **"Smart" contrast agents:** Developing agents that respond to specific physiological or biochemical cues (e.g., pH, enzyme activity, gene expression), providing dynamic and function-

ally rich information.

- **Non-invasive alternatives:** Exploring and validating techniques that reduce or eliminate the need for ionizing radiation or exogenous contrast agents, such as advanced forms of photoacoustic imaging, electrical impedance tomography, or low-field MRI for point-of-care applications.

- Fourthly, future work will focus on democratizing access and improving affordability of advanced imaging. This involves:

- **Development of portable and point-of-care imaging devices:** Making advanced diagnostic capabilities accessible in diverse settings, from rural clinics to emergency rooms, through miniaturization, cost reduction, and AI-driven automation.

- **Cloud-based imaging solutions:** Leveraging cloud computing for image storage, processing, and AI analysis, reducing the need for extensive on-site infrastructure and facilitating remote interpretation and collaborative diagnostics.

- **Value-based healthcare models:** Developing robust evidence and economic models that demonstrate the long-term cost-effectiveness and improved patient outcomes associated with early and precise diagnosis facilitated by advanced imaging, thereby justifying reimbursement and investment.

- Finally, addressing the ethical and societal implications of these "quantum leaps" will be a continuous and critical area of future work. As imaging technologies become more powerful and predictive, there is an increasing need to:

- **Develop robust ethical guidelines:** For data privacy, informed consent in complex AI-driven diagnostics, and the responsible communication of predictive health information to patients.

- **Ensure equitable access:** Mitigating the risk that these expensive and complex technologies exacerbate health disparities.

- **Address workforce changes:** Preparing radiologists and other healthcare professionals for new roles alongside AI, focusing on oversight, complex problem-solving, and patient communication.

- **Establish clear regulatory frameworks:** For the safe and effective deployment of novel imaging devices, AI algorithms, and radiopharmaceuticals.

Conclusion

Looking ahead, the future of medical imaging is characterized by a relentless pursuit of greater insight and efficiency. Continued advancements in AI will move beyond mere assistance to truly augment human intelligence, enabling more sophisticated pattern recognition, predictive modeling, and even autonomous analysis. The development of novel biomarkers and "smart" contrast agents will unlock new biological information, while miniaturization and cost reduction will democratize access to advanced diagnostics, extending their reach to underserved communities and point-of-care settings.

In essence, the "quantum leaps" in imaging are propelling us into an era of proactive, predictive, and personalized healthcare. By meticulously documenting and sharing the real-world impact of these innovations, as we have striven to do in this collection of case studies, we contribute to a collective understanding that will accelerate their adoption and refinement. The invisible is becoming visible, the unknown knowable, and the future of medicine is being reshaped, one extraordinary image at a time. The diagnostic revolution is not just imminent; it is already underway, and its promise to elevate human health is profound.

References

1. Panahi O. The Rising Tide: Artificial Intelligence Reshaping Healthcare Management. S J Publc Hlth. 2024; 1: 1-3.
2. Panahi O. Dental Implants & the Rise of AI. On J Dent & Oral Health. 2024: 8.
3. Panahi O. Bridging the Gap: AI-Driven Solutions for Dental Tissue Regeneration. Austin J Dent. 2024; 11: 1185.
4. Panahi DU, HOC A. Networks: Applications. Challenges, Future Directions, Scholars' Press. 2025: 978-3.
5. Panahi O, Zeinaldin M. The Convergence of Precision Medicine and Dentistry: An AI and Robotics Perspective. Austin J Dent. 2024; 11: 1186.
6. Omid P. Modern Sinus Lift Techniques: Aided by AI. Glob J Oto. 2024; 26: 556198.
7. Omid Panahi. Teledentistry: Expanding Access to Oral Healthcare. Journal of Dental Science Research Reviews & Reports. SRC/JDSR-203. 2024.
8. Omid P, Reza S. How Artificial Intelligence and Biotechnology are Transforming Dentistry. Adv Biotech & Micro. 2024; 18: 555981.
9. Omid Panahi. "AI: A New Frontier in Oral and Maxillofacial Surgery". Acta Scientific Dental Sciences. 2024; 8: 40-42.
10. Omid Panahi, Reza Safaralizadeh. AI and Dental Tissue Engineering: A Potential Powerhouse for Regeneration. Mod Res Dent. 2024: 8.
11. Panahi O, Zeinaldin M. The Remote Monitoring Toothbrush for Early Cavity Detection using Artificial Intelligence (AI). IJDSIR. 2024; 7: 173-178.
12. Omid Panahi. Artificial Intelligence: A New Frontier in Periodontology. Mod Res Dent. 2024: 8.
13. Omid P. Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes. JOJ Pub Health. 2024; 9: 555754.
14. Omid P. Artificial Intelligence in Oral Implantology, Its Applications, Impact and Challenges. Adv Dent & Oral Health. 2024; 17: 555966.
15. Omid Panahi. "AI Ushering in a New Era of Digital Dental-Medicine". Acta Scientific Medical Sciences. 2024; 8: 131-134.
16. Panahi O, Zeinaldin M. AI-Assisted Detection of Oral Cancer: A Comparative Analysis. Austin J Pathol Lab Med. 2024; 10: 1037.
17. Panahi O. AI in Surgical Robotics: Case Studies. Austin J Clin Case Rep. 2024; 11: 1342.
18. Panahi O, Zeinaldin M. Digital Dentistry: Revolutionizing Dental Care. J Dent App. 2024; 10: 1121.
19. Panahi O. Wearable Sensors and Personalized Sustainability: Monitoring Health and Environmental Exposures in Real-Time. European Journal of Innovative Studies and Sustainability. 2025; 1: 1 1-19.
20. Omid Panahi, Sevil Farrokh. USAG-1-Based Therapies: A Paradigm Shift in Dental Medicine. Int J Nurs Health Care. 2024; 1: 1-4.

21. Omid Panahi, Sevil Farrokh. Can AI Heal Us? The Promise of AI-Driven Tissue Engineering. Int J Nurs Health Care. 2024; 1: 1-4.

22. O Panahi. Algorithmic Medicine, Journal of Medical Discoveries. 2025: 2.

23. O Panahi. Deep Learning in Diagnostics, Journal of Medical Discoveries. 2025: 2.

24. Omid P, Soren F. The Digital Double: Data Privacy, Security, and Consent in AI Implants West J Dent Sci. 2025; 2: 108.

25. Panahi O. Ketenci Çay F. NanoTechnology. Regenerative Medicine and Tissue Bio-Engineering. Acta Sci Dent Sci. 2023; 7: 118-122.

26. Panahi O, et al. Smart Robotics for Personalized Dental Implant Solutions. Dental. 2025: 7.

27. Panahi P, Bayılmış C, Çavuşoğlu U, Kaçar S. Performance evaluation of lightweight encryption algorithms for IoT-based applications. Arabian Journal for Science and Engineering. 2021; 46: 4015-4037.

28. Panahi U, Bayılmış C. Enabling secure data transmission for wireless sensor networks based IoT applications. Ain Shams Engineering Journal. 2023; 14: 101866.

29. Omid Panahi, Uras Panahi. AI-Powered IoT: Transforming Diagnostics and Treatment Planning in Oral Implantology. J Adv Artif Intell Mach Learn. 2025; 1: 1-4.

30. Panahi P, Dehghan M. Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding and Video Caches. In ICEE2008, 16th Iranian Conference on Electrical Engineering. 2008: 50-55.

31. Bakikoyuncu, Pejmanpanahi. Kalman Filtering of Link Quality Indicator Values for Position Detection by Using WSNS, Int'l Journal of Computing, Communications & Instrumentation Engg. (IJCCIE). 2014: 1.

32. Pejman Panahi, Cneyt Baylm. "Car indoor gas detection system", International Conference on Computer Science and Engineering (UBMK). 2017.

33. Panahi P. Providing consistent global sharing service over VANET using new plan. In 2009 14th International CSI Computer Conference. IEEE. 2009: 213-218.

34. Panahi P, Dehghan M. Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding and Video Caches. In ICEE 2008, 16th Iranian Conference on Electrical Engineering. 2008: 50-55.

35. Uras Panahi, Redes AD HOC: Aplicações, Desafios, Direcções Futuras, Edições Nosso Conhecimento, ISBN: 978-620-8-72962-2.

36. Uras Panahi, Sieci AD HOC: Zastosowania, wyzwania, przyszłe kierunki, Wydawnictwo Nasza Wiedza, ISBN: 978-620-8-72967-7.

37. Uras Panahi, Reti AD HOC: Applicazioni, sfide e direzioni future, Edizioni Sapienza, ISBN: 978-620-8-72965-3.

38. Uras Panahi, Redes AD HOC: Aplicaciones, retos y orientaciones futuras, Ediciones Nuestro Conocimiento, ISBN: 978-620-8-72966-0.

39. Uras Panahi, Réseaux AD HOC: Applications, défis et orientations futures, Editions Notre Savoir, ISBN: 978-620-8-72964-6.

40. Uras Panahi, AD HOC-Netze: Anwendungen, Herausforderungen, zukünftige Wege, Verlag Unser Wissen, ISBN: 978-620-8-72963-9.

41. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Künstliche Intelligenz in der Zahnmedizin, qUnser wissen Publishing. 2024.

42. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Artificial Intelligence in Dentistry, Scholars Press Publishing. 2024.

43. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Inteligencia artificial en odontología, NUESTRO CONOC, MENTO Publishing. 2024.

44. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. L'intelligence artificielle dans l'odontologie, EDITION NOTRE SAVOIR Publishing Publishing. ISBN: 978-620-6622771. 2024.

45. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Intelligenza artificiale in odontoiatria, SAPIENZA Publishing. ISBN: 978-620-6622788. 2024.

46. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Inteligência Artificial em Medicina Dentária, NOSSO CONHECIMENTO Publishing. ISBN: 978-620-6622795. 2024.

47. Omid Panahi, Sevil Farrokh Eslamlou. Peridontium: Estrutura, função e gestão clínica. ISBN: 978-620-8-74561-5.

48. Omid Panahi, Shabnam Dadkhah. AI in der modernen Zahnmedizin. ISBN:978-620-8-74877-7.

49. Omid Panahi, Shabnam Dadkhah. La IA en la odontología moderna. ISBN:978-620-8-74881-4.

50. Omid Panahi, Shabnam Dadkhah. L'IA dans la dentisterie moderne. ISBN:978-620-8-74882-1.

51. Omid Panahi, Shabnam Dadkhah. L'intelligenza artificiale nell'odontoiatria moderna. ISBN:978-620-8-74883-8.

52. Omid Panahi, Shabnam Dadkhah. Sztuczna inteligencja w nowoczesnej stomatologii. ISBN:978-620-8-74884-5.

53. Omid Panahi, Shabnam Dadkhah, A IA na medicina dentária moderna. ISBN: 978-620-8-74885-2.

54. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh. Digitale Zahnmedizin und künstliche Intelligenz. ISBN: 978-620-8-73910-2.

55. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh. Odontología digital e inteligencia artificial. ISBN: 978-620-8-73911-9.

56. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh, Dentisterie numérique et intelligence artificielle. ISBN: 978-620-8-73912-6.

57. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh, Odontoiatria digitale e intelligenza artificiale. ISBN: 978-620-8-73913-3.

58. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh. Stomatologia cyfrowa i sztuczna inteligencja. ISBN: 978-620-8-73914-0.

59. Omid Panahi, Sevil Farrokh Eslamlou, Masoumeh Jabbarzadeh, Medicina dentária digital e inteligência artificial.

60. Omid Panahi, Stammzellen aus dem Zahnmark. ISBN: 978-620-4-05355-4.

61. Omid Panahi, Células madre de la pulpa dental. ISBN: 978-620-4-05356-1

62. Omid Panahi, Стволовые клетки пульпы зуба. ISBN: 978-620-4-05357-8.

63. Omid Panahi, Cellules souches de la pulpe dentaire. ISBN: 978-620-4-05358-5.

64. Omid Panahi, Cellule staminali della polpa dentaria. ISBN: 978-620-4-05359-2.

65. Omid Panahi, Sevil Farrokh Eslamlou. Peridontium: Struktur, Funktion und klinisches Management. ISBN: 978-620-8-74556-1.

66. Omid Panahi, Sevil Farrokh Eslamlou. Peridoncio: Estructura, función y manejo clínico. ISBN:978-620-8-74557-8.

67. Omid Panahi, Sevil Farrokh Eslamlou. Le péridontium : Structure, fonction et gestion Clinique. ISBN: 978-620-8-74558-5.

68. Omid Panahi, Dr Sevil Farrokh Eslamlou, Peridonio: Struttura, funzione e gestione clinica. ISBN: 978-620-8-74559-2.

69. Omid Panahi, Dr Sevil Farrokh Eslamlou, Peridontium: Struktura, funkcja i postępowanie kliniczne. ISBN:978-620-8-74560-8.

70. Maryam Gholizadeh, Omid Panahi. Sistema de Investigação em Sistemas de Informação de Gestão de Saúde, NOSSO CONHECIMENTO Publishing. 2021.

71. Maryam Gholizadeh, Omid Panahi. Система исследований в информационных системах управления здравоохранением, SCIENCIA SCRIPTS Publishing. 2021.

72. Leila Ostovar, Kamal Khadem Vatan, Omid Panahi. Clinical Outcome of Thrombolytic Therapy, Scholars Press Academic Publishing. 2020.

73. Maryam Gholizadeh, Omid Panahi. Investigating System in Health Management Information Systems, Scholars Press Academic Publishing. 2021.

74. Maryam Gholizadeh, Omid Panahi. Untersuchungssystem im Gesund heits management Informations systeme, Unser wissen Publishing. 2021.

75. Maryam Gholizadeh, Omid Panahi. Sistema de investigación en sistemas de información de gestión sanitaria, NUESTRO CONOC, MENTO Publishing. 2021.

76. Maryam Gholizadeh, Omid Panahi. Système d'investigation dans les systèmes d'information de gestion de la santé, EDITION NOTRE SAVOIR Publishing. 2021.

77. Maryam Gholizadeh, Omid Panahi. Indagare il sistema nei sistemi informativi di gestione della salute, SAPIENZA Publishing. 2021.

78. Maryam Gholizadeh, Omid Panahi. Systeemonderzoek in Informatiesystemen voor Gezondheidsbeheer, ONZE KENNIS Publishing. 2021.

79. Maryam Gholizadeh, Omid Panahi. System badawczy w systemach informacyjnych zarządzania zdrowiem, NAZSA WIEDZA Publishing. 2021.

80. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Искусственный интеллект в стоматологии, SCIENCIA SCRIPTS Publishing. 2024.

81. Shima Esmaielzadeh, Omid Panahi, Fatmanur Ketenci Çay. Application of Clay's in Drug Delivery in Dental Medicine, Scholars Press Academic Publishing. 2020.