

Dental Microchip Implants for Animal Identification

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Abstract

This paper provides a comprehensive review of dental chip implants as an innovative method for permanent animal identification. Unlike traditional subcutaneous microchip injections, dental implantation involves embedding RFID transponders within teeth or dental prostheses. This technique offers enhanced durability, biocompatibility, and privacy compared to conventional methods. The paper examines the technological foundations, implantation procedures, biological considerations, and practical applications of dental chips in veterinary medicine. Evidence from experimental studies, particularly canine models, demonstrates the feasibility and safety of this approach. While challenges remain regarding reader compatibility and standardization, dental chip technology represents a significant advancement in permanent animal identification with promising applications for companion animals, livestock, wildlife conservation, and even human identification in specialized contexts.

Keywords: Dental chip implant, animal identification, RFID transponder, veterinary dentistry, microchip implantation, canine identification.

1. Introduction

The identification of companion animals has become an increasingly critical issue in modern society. Stray animals, lost pets, and wildlife tracking present significant challenges for animal welfare organizations, veterinary professionals, and pet owners worldwide. Traditional identification methods, including collars, tattoos, and ear tags, have demonstrated substantial limitations regarding durability, readability, and animal welfare concerns [1-23].

Subcutaneous microchip implantation emerged in the late 20th century as a revolutionary solution for permanent animal identification. This method involves injecting a glass-encapsulated Radio Frequency Identification (RFID) transponder beneath the animal's skin, typically in the dorsal neck region. While widely adopted and generally effective, subcutaneous chips are not without limitations. These include potential migration from the implantation site, biocompatibility issues such as allergic inflammation or skin ulceration, and susceptibility to damage from external forces [24-39].

In response to these challenges, researchers and inventors have proposed an alternative approach: dental chip implantation. This technique involves embedding identification transponders within dental structures either within natural teeth, dental prostheses, or bone screws placed in the oral cavity [40-54]. The oral environment offers unique advantages, including the protective nature of dental tissues, excellent blood supply for healing, and the relative bio-inertness of tooth structures.

This paper aims to provide a comprehensive examination of dental chip technology for animal identification. The scope includes technological foundations, implantation methodologies, biological responses, practical applications, and comparative analysis with traditional identification methods. Particular attention is given to experimental evidence from canine studies, as dogs represent both the most common

recipients of identification chips and ideal models for dental implantation research [55-60].

2. Technological Foundations

2.1 RFID Technology in Animal Identification

RFID technology forms the backbone of modern electronic animal identification systems. A typical RFID transponder consists of three essential components: a microchip containing stored identification data, an antenna for signal transmission and reception, and a biocompatible encapsulating material usually glass or ceramic [61-70]. These transponders operate passively, meaning they require no internal power source; instead, they derive energy from the electromagnetic field generated by an external reader device.

Commercially available RFID chips for animal identification typically measure approximately 13.3 mm in length and 2 mm in diameter [71-80]. When interrogated by a reader operating at standard frequencies (commonly 125 kHz, 134.2 kHz for ISO-compliant devices, or 13.56 MHz for advanced applications), the transponder transmits its unique identification number. This number corresponds to a database entry containing the animal's medical history, ownership information, and other relevant data.

2.2 Miniaturization for Dental Applications

Dental implantation imposes stricter size constraints than subcutaneous placement. The confined spaces within dental pulp chambers, root canals, or between tooth roots require transponder miniaturization without compromising functionality. Research by Ishihata and colleagues (2007) demonstrated successful adaptation of 13.56 MHz RFID transponders for dental implantation, achieving a maximum communication distance of 30 mm with appropriately miniaturized devices [81-90].

The ideal dental chip should not exceed approximately 1 mm in width and 6 mm in length [91-103]. Such dimensions allow placement within the pulp chamber of endodontically treated teeth or within specially prepared cavities in dental prostheses. Advanced manufacturing techniques, including printed electronics on flexible substrates, have enabled the production of transponders meeting these stringent size requirements while maintaining adequate read range and data storage capacity.

2.3 Encapsulation and Biocompatibility

Dental chips require encapsulation materials that withstand the oral environment's unique challenges: moisture, temperature fluctuations, mechanical forces from mastication, and potential exposure to oral microorganisms. Biocompatible glass tubes remain the standard encapsulation method, providing hermetic sealing and excellent tissue compatibility [104-109].

For dental applications, titanium coating or housing offers additional advantages. Titanium demonstrates exceptional biocompatibility, corrosion resistance, and osseointegration potential when in contact with bone tissues [110]. When placed within prepared dental cavities or bone screws, titanium-encased transponders can achieve stable long-term positioning without eliciting adverse inflammatory responses.

3. Dental Implantation Carriers and Methods

3.1 Types of Dental Implantation Carriers

The versatility of dental chip technology stems from the variety of carriers available for transponder placement. According to patent literature and clinical descriptions, several carrier types have been developed [111-120]:

Dental Crowns: Artificial tooth crowns can be manufactured with integrated cavities for transponder placement. This approach is particularly suitable for teeth requiring restorative treatment, allowing simultaneous restoration and identification device implantation.

Dental Posts: Endodontic posts, used to reinforce root-canal-treated teeth, can be modified to accommodate identification chips. The post is cemented within the root canal, providing secure anchorage and protection for the transponder.

Dental Implants: Osseointegrated dental implants, typically made of titanium, can incorporate transponders within their internal structure. These implants are placed directly into the alveolar bone, offering maximum stability and permanence.

Bone Screws: Orthopedic bone screws placed in the alveolar bone or mandible can serve as carriers for identification devices. This option provides flexibility in implantation location and may be preferable when natural teeth are unavailable [121-135].

3.2 Implantation Procedure

The implantation of dental chips follows established dental surgical protocols, minimizing additional training requirements for veterinary practitioners. A typical procedure involves the following steps:

Preoperative Assessment: The animal undergoes oral examination and radiographic evaluation to identify suitable implantation sites. Teeth must be free from active pathology, and bone quality must be adequate for carrier placement.

Site Preparation: For intra-tooth placement, the selected tooth undergoes endodontic treatment if necessary, including pulp removal and canal cleaning. A cavity is prepared within the pulp chamber or root canal of appropriate dimensions for the transponder.

Transponder Placement: The encapsulated transponder is inserted into the prepared cavity. In crown or post designs, the

transponder is incorporated into the prosthetic component before cementation [136-150].

Sealing and Restoration: The cavity is sealed with dental restorative material, or the prosthetic carrier is cemented in place. The restoration must provide complete protection against oral fluids and mechanical stress.

Verification: A reader device confirms successful transponder function and readable range post-implantation.

3.3 Experimental Evidence from Canine Studies

The feasibility of dental chip implantation in animals has been demonstrated through experimental studies. Ishihata et al. (2007) conducted an animal experiment in which a miniaturized RFID transponder was fixed in the cavity of a mandibular canine tooth of a dog. The researchers successfully communicated with the implanted transponder using an RFID reader positioned close to the dog's face, achieving reliable identification [151-160].

This study provided critical proof-of-concept evidence that dental chips function effectively in living animals. The researchers noted that the system could be applicable for personal identification procedures, drawing parallels between veterinary and human medical applications.

4. Biological Considerations and Tissue Response

4.1 Comparison with Subcutaneous Implantation

Traditional subcutaneous microchips are injected into loose connective tissue beneath the skin. While generally safe, this location presents several biological challenges. The foreign body response may include chronic inflammation, fibrous encapsulation, and in some cases, migration of the chip from its original implantation site. Additionally, subcutaneous chips remain susceptible to physical trauma, as they are not protected by rigid structures.

Dental implantation addresses many of these concerns. Teeth and bone are relatively bio-inert tissues compared to subcutaneous tissues, meaning they are less likely to mount vigorous inflammatory responses against implanted devices. The rigid encasement provided by dental tissues protects the transponder from external mechanical forces, reducing the risk of damage or displacement [161-170].

4.2 Periodontal and Pulpal Responses

Research on dental implantology provides insight into tissue responses around intra-dental devices. A study examining mini-implant anchorage for tooth movement in dogs documented the histological changes occurring during and after force application [171-175]. While this study focused on orthodontic applications rather than identification chips, its findings regarding tissue healing are relevant.

The study observed that following initial tissue remodeling including bone and cementum resorption the periodontium demonstrated significant repair capacity after the cessation of mechanical force application. New bone deposition occurred in resorbed areas, and periodontal ligament fibers reorganized into ordered arrangements [176-180]. These findings suggest that dental tissues possess substantial regenerative capacity, supporting the long-term stability of appropriately placed dental devices.

For dental chips placed within the pulp chamber, endodontic treatment (pulp removal) is typically required. This eliminates the vital pulp tissue that might otherwise react to the implanted device. The remaining dentinal walls provide a biologically inert encasement, minimizing direct tissue contact with the transponder.

4.3 Long-term Biocompatibility

The long-term biocompatibility of dental chips depends on several factors: encapsulation material quality, sealing effectiveness, and host factors. Titanium, widely used in dental and orthopedic implants, demonstrates excellent long-term tissue compatibility. When used as a coating or housing for dental chips, titanium prevents leaching of potentially toxic materials while promoting stable integration with adjacent bone or dental tissues [181].

Glass encapsulation, the standard for subcutaneous chips, also demonstrates good biocompatibility. However, glass is more brittle than titanium and may fracture under extreme mechanical stress. For dental applications where transponders are subject to masticatory forces, titanium reinforcement or alternative robust materials may be preferable [182].

5. Advantages of Dental Chips for Animal Identification

5.1 Durability and Protection

The most significant advantage of dental chip implantation is the physical protection afforded by dental tissues. Teeth are the hardest structures in the mammalian body, composed of enamel (the most mineralized tissue), dentin, and cementum. A transponder embedded within a tooth or beneath a dental restoration is shielded from external trauma that might damage a subcutaneous chip [183-185].

This protection is particularly valuable for working dogs, hunting animals, or any animal engaged in activities that might subject the body to impact or abrasion. Subcutaneous chips in the dorsal neck region may be damaged by collision, rough handling, or even aggressive scratching. Dental chips remain safely encased within the oral cavity, far from such external forces.

5.2 Migration Prevention

Chip migration remains a recognized complication of subcutaneous implantation. Transponders have been reported to migrate from the original injection site to distant locations within the body, potentially complicating detection or, in rare cases, causing clinical issues. The rigid encasement of dental chips within prepared cavities or prosthetic carriers eliminates the possibility of migration [186-192].

This stability ensures that the chip remains at a known, accessible location throughout the animal's life. For shelters and veterinary clinics scanning for identification, predictable chip location reduces scanning time and improves detection rates.

5.3 Privacy and Security

Privacy considerations apply primarily to human applications but have relevance for certain animal contexts as well. The oral cavity represents a highly private location not readily inspected without the animal's cooperation or conscious examination. For valuable animals or those at risk of theft, this concealment may provide security benefits, as potential thieves may not know to check for an identification chip in the mouth.

For human applications of similar technology, privacy is a paramount concern. Unlike external identification or subcutaneous chips detectable by full-body scanning, dental chips are not apparent without specific intraoral examination. This characteristic has been cited as an advantage for individuals concerned about unauthorized tracking or identification.

5.4 Ease of Implantation for Dental Professionals

Dental chip implantation leverages existing veterinary dental skills and equipment. The procedures involved cavity preparation, endodontic treatment, crown placement, or implant placement are standard techniques within veterinary dentistry. This means that practices already offering veterinary dental services can incorporate chip implantation with minimal additional training or equipment investment.

Furthermore, many dental procedures are performed under anesthesia for other reasons (e.g., dental cleaning, extractions, restorative work). Chip implantation can be added to these procedures with minimal additional anesthetic time or patient discomfort.

6. Limitations and Challenges

6.1 Invasiveness and Anesthesia Requirements

Unlike subcutaneous chip injection, which can be performed in conscious animals using a hypodermic needle, dental chip implantation requires general anesthesia or profound sedation. Cavity preparation, endodontic treatment, and prosthetic placement are invasive procedures that would cause pain and distress if performed without appropriate anesthesia.

This requirement significantly increases the cost and risk associated with dental chip implantation compared to conventional microchipping. For many pet owners, the additional expense and anesthetic risk may outweigh the benefits of dental placement, particularly for young, healthy animals undergoing initial identification.

6.2 Tooth Selection and Availability

Dental chip implantation requires suitable teeth for placement. Ideal candidates are large teeth with adequate pulp chamber volume, such as canine teeth or large premolars. Small teeth or those with compromised structural integrity may not accommodate a transponder without excessive risk of tooth fracture.

Edentulous animals (those missing teeth) or young animals with incompletely developed teeth may not have suitable implantation sites. In such cases, alternative carriers such as bone screws or dental implants placed in edentulous areas may be necessary, though these options further increase invasiveness and cost.

6.3 Reader Compatibility and Standardization

The animal identification industry has largely standardized on specific RFID frequencies (125 kHz and 134.2 kHz) and ISO protocols (11784/11785). However, dental chips, particularly miniaturized versions for intra-pulpal placement, may utilize different frequencies to achieve adequate read range with smaller antenna sizes [193-196]. The 13.56 MHz frequency used in some dental chip research is not universally compatible with standard animal chip readers.

This compatibility issue presents a significant practical barrier. An animal with a dental chip that cannot be read by standard shelter scanners may be effectively unidentifiable, defeating the purpose of implantation. Widespread adoption of dental chips would require either technological standardization or the deployment of compatible readers across the animal welfare infrastructure.

6.4 Potential for Dental Complications

Any dental procedure carries risks, including post-operative pain, infection, tooth fracture, restoration failure, and pulp exposure. While these risks are generally low when procedures are performed appropriately, they are not zero. A tooth containing an implanted chip may be structurally weakened by cavity preparation, potentially increasing fracture risk under heavy masticatory loads.

Furthermore, if the restoration sealing the chip within the tooth fails, the transponder could become exposed to the oral environment. Bacteria could penetrate around the chip, leading to pulpal or periapical infection requiring retreatment or extraction.

7. Comparative Analysis with Identification Methods

7.1 Subcutaneous Microchips (Current Standard)

Subcutaneous microchips remain the gold standard for permanent animal identification, with millions of implants performed worldwide. Advantages include minimal invasiveness, rapid procedure time, low cost, and universal reader compatibility. However, limitations include potential migration, rare biocompatibility issues, and susceptibility to external damage [197-199].

Dental chips offer superior protection and stability but at the cost of increased invasiveness and expense. For most pet owners, the benefits of dental implantation likely do not justify the additional risks and costs compared to conventional subcutaneous chips. However, for specific populations such as valuable breeding animals, working dogs, or animals with recurrent chip migration problems dental chips may represent a worthwhile alternative [200].

7.2 External Tags (Collars, Ear Tags)

External identification methods such as collar tags or ear tags are inexpensive and visible without specialized equipment. However, they are subject to loss, damage, and removal. A collar may slip off or be deliberately removed, while ear tags may tear out or become illegible over time [201-204].

Dental chips, being internal and permanent, cannot be lost or removed without surgical intervention. This permanence is advantageous for long-term identification but eliminates the possibility of updating information without database modification (external tags can be simply replaced).

7.3 Tattoos and Branding

Tattoos and branding provide permanent visual identification but require restraint and often anesthesia for application. They may fade over time, become obscured by hair growth, or be altered. Welfare concerns are significant for branding, which causes thermal injury.

Dental chips offer superior permanence and readability (electronic vs. visual) without the welfare concerns associated with branding. However, tattoos require no special equipment

for reading (only visual inspection), while dental chips require RFID readers [205-209].

8. Applications and Future Directions

8.1 Companion Animal Identification

Companion animals particularly dogs and cats represent the primary market for identification chips. Dental chips could find application in specific subsets of this population. Animals that have repeatedly lost or migrated subcutaneous chips, valuable show or breeding animals, and animals undergoing dental procedures for other reasons may be appropriate candidates.

For shelters and veterinary clinics, the ability to definitively identify animals with chips that cannot be lost or removed offers significant advantages in reuniting lost pets with owners and maintaining accurate medical records [210-215].

8.2 Livestock and Equine Identification

Livestock identification presents unique challenges, including the need for durable identification throughout the animal's productive life, resistance to environmental exposure, and protection against tampering or fraud. Dental chips could address these requirements more effectively than ear tags or subcutaneous chips.

For horses, which often receive significant dental care throughout their lives, dental chip implantation could be integrated with routine floating (rasping) or other dental procedures. The valuable nature of many horses justifies the additional expense of dental chip placement for enhanced security.

8.3 Wildlife and Conservation Applications

Wildlife tracking and identification require identification methods that are durable, cannot be removed by the animal or other wildlife, and do not interfere with natural behaviors. Dental chips, being internal and protected, could meet these requirements more effectively than external collars or ear tags [216].

For endangered species, dental chips could provide permanent identification that resists tampering by poachers who might remove external identification marks. However, the invasiveness of dental procedures in wild animals presents significant practical and ethical challenges.

8.4 Human Applications (Comparative Context)

While this paper focuses on animal applications, the human context provides valuable comparative insights. Dental chips for human identification have been proposed for individuals at risk of becoming lost or unable to communicate, including elderly individuals with dementia, children, and military personnel [217].

The privacy and security advantages cited for dental chips concealment within the oral cavity, resistance to unauthorized reading, and permanence are particularly relevant for human applications. However, ethical concerns regarding mandatory implantation and potential misuse of identification technology have limited human adoption [218-225].

9. Conclusions

Dental chip implantation for animal identification represents an innovative approach that addresses several limitations of conventional subcutaneous microchipping. By embedding RFID transponders within dental structures or prosthetic

carriers, this technique offers enhanced durability, protection from external damage, elimination of migration risk, and improved biocompatibility compared to subcutaneous placement.

Experimental evidence, including studies in canine models, demonstrates the technical feasibility of dental chip implantation. Miniaturized transponders can be successfully placed within prepared dental cavities and read using external RFID readers. The biological response to such implants appears favorable, with dental tissues demonstrating good compatibility and healing capacity.

However, significant practical barriers limit widespread adoption. The requirement for general anesthesia, increased procedural complexity and cost, potential for dental complications, and reader compatibility issues all present challenges that must be addressed before dental chips can compete with conventional subcutaneous chips in the mainstream companion animal market.

Nevertheless, dental chips offer compelling advantages for specific applications and populations. Valuable animals, those with recurrent chip problems, and situations requiring maximum identification security may benefit from dental implantation. Additionally, as veterinary dental expertise becomes more widely available and technology continues to miniaturize, the risk-benefit ratio of dental chips may become increasingly favorable.

Future research directions should focus on long-term biocompatibility studies in diverse animal species, development of universally compatible miniaturized transponders, refinement of minimally invasive implantation techniques, and clinical outcome studies comparing dental with subcutaneous chips. Additionally, cost-effectiveness analyses would help identify populations for whom dental chips provide optimal value.

In conclusion, dental chip technology represents a promising advancement in permanent animal identification. While not likely to replace conventional microchipping for the general pet population, it fills an important niche for animals requiring maximum identification security and durability. As technology continues to evolve and veterinary dental capabilities expand, dental chips may play an increasingly significant role in animal identification systems worldwide.

References

1. Omid Panahi, Shabnam Dadkhah. Transforming Dental Care: A Comprehensive Review of AI Technologies. J Stoma Dent Res. 2025. 3(1): 1-5. DOI: doi.org/10.61440/JSDR.2025.v3.16.
2. Panahi O. Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care. 2025; 3(1): 1028.
3. Research system in health management information systems, M Gholizadeh, O Panahi - 2021 - Scienza Scripts Publishing.
4. Система исследований в информационных системах управления здравоохранением, M Gholizadeh, O Panahi - 2021 - Scienza Scripts Publishing.
5. L'intelligence artificielle dans l'odontologie, O Panahi, F Esmaili, S Kargarneshad - EDITION NOTRE SAVOIR Publishing ..., 2024.
6. Antibacterial activity of aqueous extract of eucalyptus camaldulensis against *Vibrio harveyi* (PTCC1755) and *Vibrio alginolyticus* (MK641453. 1) ...S Zarei, DO Panahi, D NimaBahador - Saarbrücken: LAP, 2019.
7. Omid Panahi., et al. "Robotics in Implant Dentistry: Current Status and Future Prospects". Scientific Archives Of Dental Sciences 7.9 (2025):55-60.
8. EUCALYPTUS CAMALDULENSIS EXTRACT AS A PREVENTIVE TO THE VIBRIOSIS., MRS SAMIRA, P ZAREI, DR OMID - 2019 - SCHOLARS'PRESS.
9. Omid P. Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes. JOJ Pub Health. 2024; 9(1): 555754. DOI: 10.19080/JOJPH.2024.09.555754.
10. Dr Omid Panahi.(2021). Система исследований в информационных системах управления здравоохранением, M Gholizadeh - SCIENTIA SCRIPTS Publishing.
11. Panahi O. (2025). Smart Implants: Integrating Sensors and Data Analytics for Enhanced Patient Care. Dental. 7(1):22.
12. Dr. Omid Panahi. Forging a Healthier Future Through Responsible AI in Families and Communities. Archives of Community and Family Medicine. 2025; 8(1): 21-30.
13. Nano Technology, P Omid, KC Fatmanur - Regenerative Medicine and, Tissue Bio-Engineering ..., 2023.
14. L'intelligence artificielle dans l'odontologie, EDITION NOTRE SAVOIR Publishing Publishing, DO Panahi, DF Esmaili, DS Kargarneshad - 2024 – ISBN.
15. Periodontium: Structure, O Panahi, SF Eslamlou - Function and Clinical Management.
16. Dr. Omid Panahi. Health in the Age of AI: A Family and Community Focus. Archives of Community and Family Medicine. 2025; 8(1): 11-20.
17. Omid Panahi* and Zahra Shahbazpour. Healthcare Reimagined: AI and the Future of Clinical Practice. Am J Biomed Sci & Res. 2025 27(6) AJBSR.MS.ID.003617, DOI: 10.34297/AJBSR.2025.27.003617.
18. AI in modern dentistry, O Panahi, S Dadkhah - 2025 – ISBN.
19. Panahi O (2025) Robotic Surgery Powered by AI: Precision and Automation in the Operating Room. SunText Rev Med Clin Res 6(2): 225.
20. Omid Panahi. Smart Materials and Sensors: Integrating Technology into Dental Restorations for Real-Time Monitoring. Journal of Dentistry and Oral Health. 2(1). <https://doi.org/10.61615/JDOH/2025/MAR027140331>.
21. Koyuncu, B., Uğur, B., & Panahi, P. (2013). Indoor location determination by using RFIDs. International Journal of Mobile and Adhoc Network (IJMAN), 3(1), 7–11.
22. Uras Panahi. Redes AD HOC: Aplicações, Desafios, Direções Futuras. Edições Nosso Conhecimento. 2025.
23. Panahi, P., & Dehghan, M. (2008, May). Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding And Video Caches. In *ICEE2008, 16th Iranian Conference On Electrical Engineering*, (May 2008) (pp. 50-55).
24. Panahi DU. HOC A Networks: Applications. Challenges, Future Directions. Scholars' Press. 2025.
25. Panahi O, Esmaili F, Kargarneshad S. (2024). Artificial Intelligence in Dentistry. Scholars Press Publishing. ISBN: 978-620-6772118.
26. Omid P. (2011). Relevance between gingival hyperplasia and leukemia. Int J Acad Res. 3:493-49.
27. Panahi O. (2025). Secure IoT for Healthcare. European Journal of Innovative Studies and Sustainability. 1(1):1-5.

28. Panahi O. (2025). Deep Learning in Diagnostics. *Journal of Medical Discoveries*. 2(1).
29. Omid P. Artificial Intelligence in Oral Implantology, Its Applications, Impact and Challenges. *Adv Dent & Oral Health*. 2024; 17(4): 555966. DOI: 10.19080/ADOH.2024.17.555966.
30. Omid Panahi (2024) Teledentistry: Expanding Access to Oral Healthcare. *Journal of Dental Science Research Reviews & Reports*. SRC/JDSR-203.
31. Omid P. Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes. *JOJ Pub Health*. 2024; 9(1): 555754. DOI: 10.19080/JOJPH.2024.09.555754.
32. Kevin Thamson, Omid Panahi (2025) Bridging the Gap: AI as a Collaborative Tool Between Clinicians and Researchers. *J. of Bio Adv Sci Research*, 1(2):1-08. WMJ/JBASR-112.
33. Panahi O. (2025). Algorithmic Medicine. *Journal of Medical Discoveries*. 2(1).
34. Panahi O. (2025). The Future of Healthcare: AI, Public Health and the Digital Revolution. *MediClin Case Rep J*. 3(1):763-766.
35. Kevin Thamson, Omid Panahi (2025) Challenges and Opportunities for Implementing AI in Clinical Trials. *J. of Bio Adv Sci Research*, 1(2):1-08. WMJ/JBASR-113.
36. Kevin Thamson, Omid Panahi (2025) Ethical Considerations and Future Directions of AI in Dental Healthcare. *J. of Bio Adv Sci Research*, 1(2):1-07. WMJ/JBASR-114.
37. Kevin Thamson, Omid Panahi (2025) Bridging the Gap: AI, Data Science, and Evidence-Based Dentistry. *J. of Bio Adv Sci Research*, 1(2):1-13. WMJ/JBASR-115.
38. Research system in health management information systems, M Gholizadeh, O Panahi - 2021 - Scienca Scripts Publishing.
39. L'intelligence artificielle dans l'odontologie, O Panahi, F Esmaili, S Kargamezhad - EDITION NOTRE SAVOIR Publishing. ISBN, 2024.
40. 66.(2024), Искусственный интеллект в стоматологии, DO Panahi, DF Esmaili, DS Kargamezhad - SCIENCIA SCRIPTS Publishing.
41. AI-Powered IoT: Transforming Diagnostics and Treatment Planning in Oral Implantology, UP Omid Panahi - J AdvArtifIntell Mach Learn, 2025.
42. Periodontium: Structure, O Panahi, SF Eslamlou - Function and Clinical Management.
43. AI in dental-medicine: Current applications & future directions. *Open Access Journal of Clinical Images*, 2 (1), 1-5, O Panahi, A Ezzati - 2025.
44. Mitigating aflatoxin contamination in grains: The importance of postharvest management practices. *Advances in Biotechnology & Microbiology*, 18 (5), O Panahi, S Dadkhah - 2025.
45. Empowering Dental Public Health: Leveraging Artificial Intelligence for Improved Oral Healthcare Access and Outcomes, O Panahi - JOJ Pub Health, 2024.
46. Nano Technology, P Omid, KC Fatmanur - Regenerative Medicine and, Tissue Bio-Engineering, 2023.
47. Chaturvedi, A. K., Mbulaiteye, S. M., & Engels, E. A. (2021). HPV-Associated Cancers in the United States Over the Last 15 Years: Has Screening or Vaccination Made Any Difference? *The Oncologist*, 26(7), e1130-e1135.
48. Lalla, R. V., Saunders, D. P., & Peterson, D. E. (2014). Chemotherapy or radiation-induced oral mucositis. *Dental Clinics*, 58(2), 341-349.
49. Vissink, A., Jansma, J., Spijkervet, F. K., et al. (2003). Oral sequelae of head and neck radiotherapy. *Critical Reviews in Oral Biology & Medicine*, 14(3), 199-212.
50. Peterson, D. E., Doerr, W., Hovan, A., et al. (2010). Osteoradionecrosis in cancer patients: the evidence base for treatment-dependent frequency, current management strategies, and future studies. *Supportive Care in Cancer*, 18(8), 1089-1103.
51. Buglione, M., Cavagnini, R., Di Rosario, F., et al. (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.
52. The American Academy of Oral Medicine. (2017). Dental Management of the Oral Complications of Cancer Treatment. AAOM Professional Resource.
53. Panahi O. The Algorithmic Healer: AI's Impact on Public Health Delivery. *Medi Clin Case Rep J* 2025;3(1):759-762. DOI: doi.org/10.51219/MCCRJ/Omid-Panahi/197.
54. Omid Panahi. "AI: A New Frontier in Oral and Maxillofacial Surgery". *Acta Scientific Dental Sciences* 8.6 (2024): 40-42.
55. Panahi O and Falkner S (2025) Telemedicine, AI, and the Future of Public Health. *Western J Med Sci & Res* 2(1): 102.
56. Искусственный интеллект в стоматологии. DO Panahi, DF Esmaili, DS Kargamezhad - 2024 - SCIENCIA SCRIPTS Publishing ...
57. Application of Clay's in Drug Delivery in Dental Medicine. DS Esmailzadeh, DO Panahi, DFK Çay - 2020 - Scholars' Press.
58. NanoTechnology, Regenerative Medicine and Tissue Bio-Engineering. DO Panahi - 2019 - Scholars' Press.
59. La IA en la odontología moderna. DO Panahi, DS Dadkhah - 2025 - ISBN.
60. Inteligencia artificial en odontología, NUESTRO CONOC. DO Panahi, DF Esmaili, DS Kargamezhad - 2024 - Mento Publishing. ISBN.
61. Intelligenza artificiale in odontoiatria. O Panahi, DF Esmaili, DS Kargamezhad - 2024 - SAPIENZA Publishing. ISBN.
62. L'IA dans la dentisterie moderne. DO Panahi, DS Dadkhah - 2025 - ISBN
63. Panahi, O., & Eslamlou, S. F. (2025). Artificial Intelligence in Oral Surgery: Enhancing Diagnostics, Treatment, and Patient Care. *J Clin Den & Oral Care*, 3(1), 01-05.
64. Omid P, Soren F. (2025). The Digital Double: Data Privacy, Security, and Consent in AI Implants. *Digit J Eng Sci Technol*. 2(1):105.
65. Le périodontium: Structure, fonction et gestion clinique. DO Panahi, DSF Eslamlou - 2025 - ISBN.
66. Sztuczna inteligencja w nowoczesnej stomatologii. DO Panahi, DS Dadkhah - 2025 - ISBN.
67. Panahi, O. (2025). The Role of Artificial Intelligence in Shaping Future Health Planning. *Int J Health Policy Plann*, 4(1), 01-05.
68. AI-enabled IT systems for improved dental practice management. O Panahi, A Amirloo - On J Dent & Oral Health, 2025.
69. A IA na medicina dentária moderna. DO Panahi, DS Dadkhah - 2025 - ISBN.

70. L'intelligenza artificiale nell'odontoiatria moderna. DO Panahi, DS Dadkhah – ISBN.
71. Medicina dentária digital e inteligência artificial. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 – ISBN.
72. Cellule staminali della polpa dentaria. DO Panahi - 2021 – ISBN.
73. Células madre de la pulpa dental. O Panahi - 2021 - Ediciones Nuestro Conocimiento.
74. Panahi O. AI-Enhanced Case Reports: Integrating Medical Imaging for Diagnostic Insights. J Case Rep Clin Images. 2025; 8(1): 1161.
75. Panahi O. (2025). Navigating the AI Landscape in Healthcare and Public Health. Mathews J Nurs. 7(1):56.
76. Panahi O. Innovative Biomaterials for Sustainable Medical Implants: A Circular Economy Approach. European Journal of Innovative Studies and Sustainability. 2025;1(2):1–5.
77. Стволовые клетки пульпы зуба. DO Panahi.
78. Omid Panahi, Alireza Azarfardin. Computer-Aided Implant Planning: Utilizing AI for Precise Placement and Predictable Outcomes. Journal of Dentistry and Oral Health. 2(1). <https://doi.org/10.61615/JDOH/2025/MAR027140329>.
79. Panahi O. The Rising Tide: Artificial Intelligence Reshaping Healthcare Management. S J Public Hlth. 2024 ;1(1) :1-3. DOI : 10.51626/sjph.2024.01.00002.
80. Panahi, O. (2025). AI in Health Policy: Navigating Implementation and Ethical Considerations. Int J Health Policy Plann, 4(1), 01-05.
81. Panahi O. Bridging the Gap: AI-Driven Solutions for Dental Tissue Regeneration. Austin J Dent. 2024; 11(2): 1185.
82. Panahi O, Zeinalddin M. The Convergence of Precision Medicine and Dentistry: An AI and Robotics Perspective. Austin J Dent. 2024; 11(2): 1186.
83. Omid P. Modern Sinus Lift Techniques: Aided by AI. Glob J Oto, 2024; 26 (4): 556198. DOI:10.19080/GJO.2024.26.556198.
84. The remote monitoring toothbrush for early cavity detection using artificial intelligence (AI). O Panahi, M Zeinalddin - IJDSIR, 2024.
85. Stammzellen aus dem Zahnmark. O Panahi - 2021 - Verlag Unser Wissen.
86. Stomatologia cyfrowa i sztuczna inteligencja. O Panahi, SF Eslamlou, M Jabbarzadeh - ISBN.
87. Odontoiatria digitale e intelligenza artificiale. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
88. Dentisterie numérique et intelligence artificielle. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
89. Odontología digital e inteligencia artificial. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
90. Digitale Zahnmedizin und künstliche Intelligenz. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
91. Panahi O. Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care. 2025; 3(1): 1027.
92. The remote monitoring toothbrush for early cavity detection using artificial intelligence (AI). O Panahi, M Zeinalddin - IJDSIR, 2024.
93. Stammzellen aus dem Zahnmark. O Panahi - 2021 - Verlag Unser Wissen.
94. Stomatologia cyfrowa i sztuczna inteligencja. O Panahi, SF Eslamlou, M Jabbarzadeh - ISBN.
95. Odontoiatria digitale e intelligenza artificiale. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
96. Dentisterie numérique et intelligence artificielle. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
97. Odontología digital e inteligencia artificial. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
98. Digitale Zahnmedizin und künstliche Intelligenz. O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 - ISBN.
99. Panahi O. Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. Ann Community Med Prim Health Care. 2025; 3(1): 1027.
100. Panahi, P., Bayılmış, C., Çavuşoğlu, U., & Kaçar, S. (2021). Performance evaluation of lightweight encryption algorithms for IoT-based applications. Arabian Journal for Science and Engineering, 46(4), 4015-4037.
101. Panahi, U., & Bayılmış, C. (2023). Enabling secure data transmission for wireless sensor networks based IoT applications. Ain Shams Engineering Journal, 14(2), 101866.
102. Omid Panahi, and Uras Panahi. AI-Powered IoT: Transforming Diagnostics and Treatment Planning in Oral Implantology. J AdvArtifIntell Mach Learn. 2025; 1(1): 1-4.
103. Panahi U. (2025). AD HOC Networks: Applications, Challenges, Future Directions, Scholars' Press. ISBN: 978-3-639-76170-2.
104. Panahi, P., & Dehghan, M. (2008, May). Multipath Video Transmission Over Ad Hoc Networks Using Layer Coding And Video Caches. In ICEE2008, 16th Iranian Conference On Electrical Engineering, (May 2008) (pp. 50-55).
105. Omid Panahi. (2021) Система исследований в информационных системах управления здравоохранением, M Gholizadeh - Sciencia Scripts Publishing.
106. Uras Panahi. AI-Powered IoT: 54, O Panahi - Transforming Diagnostics and Treatment Planning in, 2025.
107. Dr Mansoureh Zeynali. Will AI Replace Your Dentist? The Future of Dental Practice. OnJ Dent & Oral Health. 8 (3): 2025, DO Panahi, DA Ezzati - OJDOH. MS. ID.
108. A New Frontier in 60, O Panahi, A Intelligence - Periodontology. Mod Res Dent.
109. AI in der modernen 48, DO Panahi, DS Dadkhah - Zahnmedizin.
110. Panahi, U. (2025). Redes AD HOC: Aplicações, Desafios, Direções Futuras. Edições Nosso Conhecimento. ISBN 978-620-8-72962-2.
111. Panahi, U. (2025). AD HOC networks: Applications. Challenges, Future Paths. Our Knowledge.
112. Panahi, 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.
113. 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.
114. Koyuncu, B., Gökçe, A., & Panahi, P. (2015). Archaeological site bir arkeolojik sit alanının rekonstrüksiyonundaki bütünleştirici oyun motoru tanıtımı. In SOMA 2015.
115. Panahi O, Eslamlou SF. Peridonio: Struttura, funzione e gestione clinica. ISBN: 978-620-8-74559-2.

116. Panahi O, Dadkhah S. AI in der modernen Zahnmedizin. ISBN:978-620-8-74877-7.
117. Panahi O. Cellules souches de la pulpe dentaire. ISBN: 978-620-4-05358-5.
118. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. Искусственный интеллект в стоматологии. SCIENCIA SCRIPTS Publishing. 2024.
119. Panahi O, Melody FR. (2011). A Novel Scheme About Extraction Orthodontic and Orthotherapy. International Journal of Academic Research. 3(2).
120. Panahi O. The evolving partnership: surgeons and robots in the maxillofacial operating room of the future. J Dent Sci Oral Care. 2025; 1: 1-7.
121. Panahi O, Dadkhah S, Sztuczna inteligencja w nowoczesnej stomatologii. ISBN:978-620-8-74884-5.
122. Panahi O. The Future of Medicine: Converging Technologies and Human Health. Journal of Bio-Med and Clinical Research. RPC Publishers. 2025; 2.
123. Panahi O, Raouf MF, Patrik K. (2011) The Evaluation Between Pregnancy and Periodontal Therapy. Int J Acad Res. 3: 1057-1058.
124. Panahi O, Nunag GM, Nourinezhad Siyahtan A. (2011). Molecular Pathology: P-115: Correlation of Helicobacter Pylori and Prevalent Infections in Oral Cavity. Cell Journal (Yakhteh), 12(Supplement 1 (The 1st International Student Congress On Cell and Molecular Medicine). pp. 91-92. SID.
125. Panahi O. The Age of Longevity: Medical Advances and The Extension of Human Life. Journal of Bio-Med and Clinical Research. RPC Publishers. 2025; 2.
126. Panahi O, Eslamlou SF. Peridontio: Estructura, función y manejo clínico. ISBN: 978-620-8-74557-8.
127. Omid Panahi, Sevil Farrokh. Building Healthier Communities: The Intersection of AI, IT, and Community Medicine. Int J Nurs Health Care. 2025; 1(1):1-4.
128. Dr Omid Panahi, Стволовые клетки пульпы зуба, ISBN: 978-620-4-05357-8.
129. Panahi O. Nanomedicine: Tiny Technologies, Big Impact on Health. Journal of Bio-Med and Clinical Research. RPC Publishers. 2025; 2.
130. Dr Omid Panahi* and Dr Amirreza Amirloo. AI-Enabled IT Systems for Improved Dental Practice Management. On J Dent & Oral Health. 8(4): 2025. OJDOH.MS.ID.000691. DOI: 10.33552/OJDOH.2025.08.000691.
131. Panahi O. (2013). Comparison between unripe Makopa fruit extract on bleeding and clotting time. International Journal of Paediatric Dentistry. 23:205.
132. Panahi O, Eslamlou SF. Peridontium: Struktura, funkcja I postępowanie kliniczne. ISBN: 978-620-8-74560-8.
133. Panahi, O., & Eslamlou, S. F. (2025). Artificial Intelligence in Oral Surgery: Enhancing Diagnostics, Treatment, and Patient Care. J Clin Den & Oral Care, 3(1), 01-05.
134. Panahi O, Eslamlou SF, Jabbarzadeh M. Odontoiatria digitale e intelligenza artificiale. ISBN: 978-620-8-73913-3.
135. Omid P, Soren F. (2025). The Digital Double: Data Privacy, Security, and Consent in AI Implants. Digit J Eng Sci Technol. 2(1):105.
136. Panahi O, Eslamlou SF, Jabbarzadeh M. Medicina dentária digital e inteligência artificial. ISBN: 978-620-8-73915-7.
137. Panahi O. Stammzellen aus dem Zahnmark. ISBN: 978-620-4-05355-4.
138. Panahi O. (2025). AI-Enhanced Case Reports: Integrating Medical Imaging for Diagnostic Insights. J Case Rep Clin Images. 8(1):1161.
139. Panahi O. (2025). Navigating the AI Landscape in Healthcare and Public Health. Mathews J Nurs. 7(1):5.
140. Dr Omid Panahi* and Dr Masoumeh Jabbarzadeh. The Expanding Role of Artificial Intelligence in Modern Dentistry. On J Dent & Oral Health. 8(3): 2025. OJDOH.MS.ID.000690. DOI: 10.33552/OJDOH.2025.08.000690.
141. Panahi, O. (2025). Wearable Sensors and Personalized Sustainability: Monitoring Health and Environmental Exposures in Real-Time. European Journal of Innovative Studies and Sustainability, 1(2), 1-19. [https://doi.org/10.59324/ejiss.2025.1\(2\).02](https://doi.org/10.59324/ejiss.2025.1(2).02)
142. Dr Leila Ostovar, Dr Kamal Khadem Vatan, Dr Omid Panahi, (2020). Clinical Outcome of Thrombolytic Therapy, Scholars Press Academic Publishing. ISBN: 978-613-8-92417-3.
143. Omid P, Sevil Farrokh E. Bioengineering Innovations in Dental Implantology. Curr Trends Biomedical Eng&Biosci. 2025; 23(3): 556111. DOI: 10.19080/CTBEB.2025.23.5560111
144. Omid Panahi. Artificial Intelligence: A New Frontier in Periodontology. Mod Res Dent. 8(1). MRD. 000680. 2024. DOI: 10.31031/MRD.2024.08.000680.
145. Panahi O, Melody FR, Kennet P, Tamson MK. Drug induced (calcium channel blockers) gingival hyperplasia. JMBS 2011;2(1):10-2.
146. Dr Omid Panahi* and Dr Amirreza Amirloo. AI-Enabled IT Systems for Improved Dental Practice Management. On J Dent & Oral Health. 8(4): 2025. OJDOH.MS.ID.000691. DOI: 10.33552/OJDOH.2025.08.000691.
147. Omid P, Reza S. How Artificial Intelligence and Biotechnology are Transforming Dentistry. Adv Biotech & Micro. 2024; 18(2): 555981. DOI: 10.19080/AIBM.2024.17.555981.
148. Panahi, O., & Zeinaldin, M. (2024). AI-Assisted Detection of Oral Cancer: A Comparative Analysis. *Austin J Pathol Lab Med*, 10(1), 1037.
149. Omid Panahi, Sevil Farrokh. USAG-1-Based Therapies: A Paradigm Shift in Dental Medicine. Int J Nurs Health Care. 2024;1(1):1-4.
150. Omid Panahi, Sevil Farrokh. Can AI Heal Us? The Promise of AI-Driven Tissue Engineering. Int J Nurs Health Care. 2024; 1(1):1-4.
151. Maryam Gholizadeh, Dr Omid Panahi, (2021), Investigating System in Health Management Information Systems, Scholars Press Academic Publishing. ISBN: 978-613-8-95240-4.
152. Omid Panahi. "AI Ushering in a New Era of Digital Dental-Medicine". Acta Scientific Medical Sciences 8.8 (2024): 131-134.
153. Panahi, O., & Farrokh, S. (2025a). The use of machine learning for personalized dental-medicine treatment. Global Journal of Medical and Biomedical Case Reports, 1, 001.
154. Maryam Gholizadeh, Dr Omid Panahi, (2021), Sistema de investigación en sistemas de información de gestión sanitaria, NUESTRO CONOC, MENTO Publishing. ISBN: 978-620-3-67047-9.
155. Maryam Gholizadeh, Dr Omid Panahi, (2021), Untersuchungssystem im Gesundheitsmanagement Informations systeme, Unser wissen Publishing. ISBN: 978-620-3-67046-2.

156. Panahi O, Zeinaldin M. Digital Dentistry: Revolutionizing Dental Care. *J Dent App*. 2024; 10 (1):1121.
157. Omid P, Evil Farrokh E. Beyond the Scalpel: AI, Alternative Medicine, and the Future of Personalized Dental Care. *J Complement Med Alt Healthcare*. 2024; 13(2): 555860. DOI: 10.19080/JCMAH.2024.12.555860.
158. Panahi, O. (2024). Dental Implants & the Rise of AI. *On J Dent & Oral Health*, 8(1), 2024.
159. Maryam Gholizadeh, Dr Omid Panahi, (2021), Indagare il sistema nei sistemi informativi di gestione della salute, SAPIENZA Publishing. ISBN: 978-620-3-67049-3.
160. Panahi O, et al. (2025). Smart Robotics for Personalized Dental Implant Solutions. *Dental*. 7(1):21.
161. Dr Omid Panahi, Dr Sevil Farrokh Eslamlou, Dr Masoumeh Jabbarzadeh, *Medicina dentária digital e inteligência artificial*, ISBN: 978-620-8-73915-7.
162. Panahi O. AI in Surgical Robotics: Case Studies. *Austin J Clin Case Rep*. 2024; 11(7): 1342.
163. Omid Panahi*and Reza Safaralizadeh. AI and Dental Tissue Engineering: A Potential Powerhouse for Regeneration. *Mod Res Dent*. 8(2). MRD. 000682. 2024. DOI:10.31031/MRD.2024.08.000682.
164. Maryam Gholizadeh, Dr Omid Panahi, (2021), Systeemonderzoek in Informatiesystemen voor Gezondheidsbeheer, ONZE KENNIS Publishing. ISBN: 978-620-3-67050-9.
165. Maryam Gholizadeh, Dr Omid Panahi, (2021), Sistema de Investigação em Sistemas de Informação de Gestão de Saúde, NOSSO CONHECIMENTO Publishing. ISBN: 978-620-3-67052-3.
166. Maryam Gholizadeh, Dr Omid Panahi, (2021), System badawczy w systemach informacyjnych zarządzania zdrowiem, NAZSA WIEDZA Publishing. ISBN: 978-620-3-67051-6.
167. Panahi O. (2025). The Role of Artificial Intelligence in Shaping Future Health Planning. *Int J Health Policy Plann*. 4(1):01-05.
168. Panahi O, Falkner S. (2025). Telemedicine, AI, and the Future of Public Health. *Western J Med Sci & Res*. 2(1):10.
169. Panahi O, Azarfardin A. Computer-Aided Implant Planning: Utilizing AI for Precise Placement and Predictable Outcomes. *Journal of Dentistry and Oral Health*. 2(1).
170. Panahi O. (2025). AI in Health Policy: Navigating Implementation and Ethical Considerations. *Int J Health Policy Plann*. 4(1):01-05.
171. Panahi O, Eslamlou SF, Jabbarzadeh M. *Stomatologia cyfrowa i sztuczna inteligencja*. ISBN: 978-620-8-73914-0.
172. Panahi O. (2025). Innovative Biomaterials for Sustainable Medical Implants: A Circular Economy Approach. *European Journal of Innovative Studies and Sustainability*. 1(2):1-5.
173. Panahi O (2024) Bridging the Gap: AI-Driven Solutions for Dental Tissue Regeneration. *Austin J Dent* 11(2): 1185.
174. Panahi O, Eslamlou SF, Jabbarzadeh M. *Dentisterie numérique et intelligence artificielle*. ISBN: 978-620-8-73912-6.
175. Panahi O, Zeinalddin M (2024) The Convergence of Precision Medicine and Dentistry: An AI and Robotics Perspective. *Austin J Dent* 11(2): 1186.
176. Omid P, Mohammad Z (2024) "The Remote Monitoring Toothbrush for Early Cavity Detection using Artificial Intelligence (AI)", *IJDSIR* 7(4): 173-178.
177. Omid P (2024) Modern Sinus Lift Techniques: Aided by AI. *Glob J Oto* 26(4): 556198.
178. Panahi O (2024) The Rising Tide: Artificial Intelligence Reshaping Healthcare Management. *S J Public Hlth* 1(1): 1-3.
179. 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 pp187-194.
180. Panahi O, Eslamlou SF, Jabbarzadeh M. *Digitale Zahnmedizin und künstliche Intelligenz*. ISBN: 978-620-8-73910-2.
181. Panahi U. (2025). AD HOC Networks: Applications, Challenges, Future Directions, Scholars' Press. ISBN: 978-3-639-76170-2.
182. Panahi U. AD HOC-Netze: Anwendungen, Herausforderungen, zukünftige Wege, Verlag Unser Wissen. ISBN: 978-620-8-72963-9.
183. Panahi O, Eslamlou SF, Jabbarzadeh M. *Odontología digital e inteligencia artificial*. ISBN: 978-620-8-73911-9.
184. Koyuncu, B., Gokce, A., & Panahi, P. (2015, November). The use of the Unity game engine in the reconstruction of an archeological site. In 19th Symposium on Mediterranean Archaeology (SOMA 2015) (pp. 95–103).
185. 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 (IJECS)*, 4(2), 148–150.
186. Panahi O. Smart Materials and Sensors: Integrating Technology into Dental Restorations for Real-Time Monitoring. *J Dent Oral Health*. 2025 Mar;2(1). doi:10.61415/JD004/2025/NAR0271-0833.
187. Omid Panahi, Mohammad Zeinalddin. The remote monitoring toothbrush for early cavity detection using artificial intelligence (AI). *IJDSIR*. 2024;7(4):173-178.
188. Artificial Intelligence in Dentistry, Unser wissen Publishing [https://www.blackwells.co.uk/bookshop/product/Knstliche ...](https://www.blackwells.co.uk/bookshop/product/Knstliche...), 2024.
189. Panahi O. (2025). Deep Learning in Diagnostics. *Journal of Medical Discoveries*. 2(1).
190. Panahi O. (2025). Algorithmic Medicine. *Journal of Medical Discoveries*. 2(1).
191. Panahi O. (2025). The Future of Healthcare: AI, Public Health and the Digital Revolution. *MediClin Case Rep J*. 3(1):763-766.
192. Omid P. Artificial Intelligence in Oral Implantology, Its Applications, Impact and Challenges. *Adv Dent & Oral Health*. 2024; 17: 555966.
193. Omid P. (2011). Relevance between gingival hyperplasia and leukemia. *Int J Acad Res*. 3:493-494.
194. Panahi O. Teledentistry: Expanding Access to Oral Healthcare. *Journal of Dental Science Research Reviews & Reports*. *J Dental Sci Res Rep*. 2024; 6: 2-3.
195. Panahi O, Ezzati A. (2025). AI in Dental-Medicine: Current Applications & Future Directions. *Open Access J Clin Images*. 2(1):1-5.
196. Panahi, O., & Borhani, S. (2026). *Odontoiatria intelligente: Una guida completa all'intelligenza artificiale e alla robotica*.
197. Panahi, O., & Borhani, S. (2026). *Inteligentna stomatologia: Kompleksowy przewodnik po sztucznej inteligencji i robotyce*.

198. Panahi, O., & Borhani, S. (2026). *Medicina dentária inteligente: Um guia abrangente de IA e robótica* (1st ed.). OmniScriptum Publishing Group.
199. Panahi, O., & Borhani, S. (2026). *La dentisterie intelligente : Un guide complet de l'IA et de la robotique*. OmniScriptum Publishing Group.
200. Panahi, O., & Borhani, S. (2026). *Odontología inteligente: Una guía completa sobre IA y robótica*. OmniScriptum Publishing Group.
201. Panahi, O., & Borhani, S. (2026). *Intelligente Zahnmedizin: Ein umfassender Leitfaden zu KI und Robotik*. OmniScriptum Publishing Group.
202. Panahi, O., & Borhani, S. (2026). *Intelligent Dentistry: A Comprehensive Guide to AI and Robotics*.
203. Panahi O (2025) Predictive Health in Communities: Leveraging AI for Early Intervention and Prevention. *Ann Community Med Prim Health Care* 3: 1027.
204. *Inteligencia artificial en odontología, NUESTRO CONOC*, DO Panahi, DF Esmaili, DS Kargarnezhad - 2024 - Mento Publishing. ISBN
205. *Künstliche Intelligenz in der Zahnmedizin*, O Panahi, DF Esmaili, DS Kargarnezhad - 2024 - Unser wissen Publishing. ISBN.
206. *Стволовые клетки пульпы зуба*, DO Panahi.
207. *Gingival enlargement and relevance with leukemia*, O Panahi, MS Arab, KM Tamson - *International Journal of Academic Research*, 2011.
208. *Odontología digital e inteligencia artificial*, O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 – ISBN.
209. *Sztuczna inteligencja w nowoczesnej stomatologii*, DO Panahi, DS Dadkhah - 2025 – ISBN.
210. *La IA en la odontología moderna*, DO Panahi, DS Dadkhah - 2025 – ISBN.
211. *Digitale Zahnmedizin und künstliche Intelligenz*, O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 – ISBN.
212. *Intelligenza artificiale in odontoiatria*, O Panahi, DF Esmaili, DS Kargarnezhad - 2024 - SAPIENZA Publishing. ISBN.
213. *L'IA dans la dentisterie modern*, DO Panahi, DS Dadkhah - 2025 – ISBN.
214. *Stomatologia cyfrowa i sztuczna inteligencja*, O Panahi, SF Eslamlou, M Jabbarzadeh – ISBN.
215. *Odontoiatria digitale e intelligenza artificiale*, O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 – ISBN.
216. *Dentisterie numérique et intelligence artificielle*, O Panahi, SF Eslamlou, M Jabbarzadeh - 2025 – ISBN.
217. *Le périodontium: Structure, fonction et gestion Clinique*, DO Panahi, DS Eslamlou - 2025 – ISBN.
218. *L'intelligenza artificiale nell'odontoiatria moderna*, DO Panahi, DS Dadkhah – ISBN.
219. *Células madre de la pulpa dental*, O Panahi - 2021 - Ediciones Nuestro Conocimiento.
220. *A IA na medicina dentária moderna*, DO Panahi, DS Dadkhah - 2025 – ISBN.
221. *Cellule staminali della polpa dentaria*, DO Panahi - 2021 – ISBN.
222. Kevin Thamson, Omid Panahi (2025) Challenges and Opportunities for Implementing AI in Clinical Trials. *J. of Bio Adv Sci Research*, 1(2):1-08. WMJ/JBASR-113.
223. *Ethical Considerations and Future Directions of AI in Dental Health care*, K Thamson, O Panahi - *J. of Bio Adv Sci Research*, 2025.
224. *Bridging the gap: AI, data science, and evidence-based dentistry*, K Thamson, O Panahi - *J. of Bio Adv Sci Research*, 2025.
225. *Bridging the gap: AI as a collaborative tool between clinicians and researchers*, K Thamson, O Panahi - *J. of Bio Adv Sci Research*, 2025.