

Position Summary

Applications of Artificial Intelligence in dentistry should prioritise patient safety, quality of care, continuity of care, and data privacy and security.

1. Background

- 1.1. Artificial Intelligence (AI) concepts and Machine Learning (ML) methods are being increasingly applied to optimise dental service delivery.
- 1.2. The introduction of AI and ML systems in dentistry will have significant impacts on patient care. AI and ML have the potential to lower barriers for timely and equitable access to oral healthcare, increase oral health awareness, and increase treatment compliance. Properly trained and deployed, AI systems can improve health outcomes in the community at the patient, practice, and public health level.
- 1.3. AI and ML have the potential to be applied, and in some cases have already been developed, for use in the following areas:
 - Intelligent diagnosis of radiographs and photographs
 - Intelligent charting and treatment planning
 - Treatment assistance, such as restorative margin prediction
 - Progress tracking, such as remote patient monitoring
 - Increasing practice efficiency and business analytics
 - Insurance claim analysis; and
 - Health outcome prediction, such as for public health analysis.
- 1.4. The application of AI and ML carries distinct safety considerations depending on stakeholder groups, such as the following:
 - Patients using dental AI, especially without support of a dental practitioner
 - Dental practitioners using dental AI at the patient or practice level
 - Other stakeholders such as software vendors, insurance companies, and the public health sector using dental AI.
- 1.5. Without appropriate transparency and governance, potential consequences of AI and ML misuse include adverse clinical, financial, and/or reputational outcomes, data privacy and security breaches, misuse of time and resources, unintended discrimination, and loss of trust in healthcare professionals and organisations.

Definitions

- 1.6. ARTIFICIAL INTELLIGENCE (AI) is the concept of computer systems being able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- 1.7. MACHINE LEARNING (ML) is a data science technique used to extract patterns from data, allowing computers to identify related data and forecast future outcomes, behaviours, and trends. ML is

This Policy Statement is linked to other Policy Statements: 3.2 Dentists, 3.3 Allied Dental Personnel, 5.15 Consent to Treatment, 5.16 Informed financial consent, 5.17 Dental Records and 6.15 Dental Informatics and Digital Health

considered a subset of AI, which gives computers the ability to learn from and improve with experience, without being explicitly programmed.

- 1.8. AI SYSTEM is the use of information technology using AI concepts and/or ML methods for the provision of dental services such as consultations, treatment, education, practice management, health data analysis and public health.
- 1.9. BOARD is the Dental Board of Australia.
- 1.10. DENTAL PRACTITIONER is a person registered by the Board to provide dental care.

2. Position

- 2.1. Patient safety should be the primary consideration for any dental AI system.
- 2.2. Any application of an AI system in dental clinical care should be supervised by a Dental Practitioner and not be actioned autonomously by patients.
- 2.3. The extent of the contribution of an AI system in dental clinical decision making should be clearly recognised and understood by Dental Practitioners and patients.
- 2.4. A decision to action an AI system's result should only be made by a Dental Practitioner taking into account a patient's clinical presentation, including history, examination and relevant tests.
- 2.5. Any dental AI system use should be beneficial and yield outcomes match or exceed the currently accepted clinical standard of care.
- 2.6. The AI system's efficacy should be demonstrated by reliable data obtained from the relevant clinical domain.
- 2.7. Development of, and use of AI in dentistry should adhere to the concept of responsible AI. Model training and interpretation of data from dental AI should involve input from dentists, with ongoing emphasis on risk management and accountability.
- 2.8. Any data should be obtained with appropriate permissions, privacy controls, checked for accuracy and relevance, only used for the stated purpose, and stored securely as per the OAIC guidelines.¹
- 2.9. Data should be collected, interpreted and used in AI systems in a way which minimises bias, to fit community and healthcare expectations, taking into account established and accepted ethical norms, and patient circumstances.
- 2.10. An AI system should not be used by a Dental Practitioner as a substitute for collaboration with clinical colleagues where appropriate.
- 2.11. The known limitations of an AI system in clinical decision making should be clearly recognised and understood by Dental Practitioners and patients.
- 2.12. A clinical practice or company using or developing an AI system for patient care applications must have accountable independent governance to oversee implementation and monitoring of the system's performance such that it matches or exceeds currently accepted ethical and healthcare standards.
- 2.13. The field of AI and ML in dentistry is rapidly developing and will require ongoing assessment and independent governance.

¹ OAIC Guidelines which can be found at www.oaic.gov.au

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