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A perspective on AI in dentistry

Across the global med-tech sector, artificial intelligence has moved rapidly from experimental concept to practical clinical support tool. In medical imaging, diagnostics, and workflow optimisation, AI is increasingly being used to augment clinician decision-making, improve consistency, and manage growing data complexity. These developments are being driven by advances in machine learning, greater availability of digital clinical data, and increasing pressure on healthcare systems to deliver higher-quality outcomes with constrained resources. Importantly, most successful AI applications in med-tech are not replacing clinicians, but supporting them with faster analysis, pattern recognition, and decision support.

The dental environment is following a similar trajectory, albeit at a different pace. Dentistry is particularly well suited to AI adoption because it is highly visual, data-rich, and increasingly digitised through radiographs, CBCT imaging, intra-oral scans, and electronic records. As a result, AI tools are now moving from novelty to meaningful clinical utility.

What is already available today

In diagnostics, AI-powered dental software is already being used to analyse 2D radiographs and 3D CBCT images to support the detection of caries, periodontal bone loss, periapical lesions, and other pathologies. These systems act as a consistent "second set of eyes," helping clinicians identify potential findings that may otherwise be overlooked, particularly in early-stage disease. AI is also being used to enhance patient communication by generating visual, easy-to-understand reports that support informed consent and case acceptance. Beyond diagnostics, workflow-focused AI tools are emerging to assist with charting, documentation, and practice efficiency, reducing administrative burden and freeing clinicians to focus more on patient care.

Future opportunities

Looking ahead, AI in dentistry has the potential to move beyond detection toward prediction and personalisation. Future applications may include risk-based diagnostics that incorporate imaging, clinical history, and behavioural data to predict disease progression and guide preventative care. AI-driven treatment planning, particularly in implantology, orthodontics, and restorative dentistry, could improve consistency and outcomes across clinicians and locations. At a system level, AI may help standardise care pathways, support training and education, and improve service logistics through smarter inventory and maintenance planning.

Risks and mitigation

Despite its promise, AI adoption is not without risk. Over-reliance on algorithmic output, data bias, lack of transparency, and variable data quality can undermine clinical trust and patient safety. These risks can be mitigated by positioning AI clearly as a **decision-support tool**, not a decision-maker; ensuring rigorous validation and regulatory oversight; investing in clinician training; and maintaining human accountability at every step. Data governance, cybersecurity, and explainability will be critical to long-term adoption and confidence.

In summary, AI represents a powerful enabler for dentistry when implemented thoughtfully. Used responsibly, it can enhance diagnostic confidence, improve efficiency, and support better patient outcomes—while preserving the clinician's central role in care delivery.