# The AI-Enabled Dentist

## A Practical Guide to Artificial Intelligence, Clinical Judgment, and Patient Care

**Eugene L Antenucci, DDS**

# Author's Note

Over more than four decades in dentistry, I have watched technologies that once seemed extraordinary become part of an ordinary clinical day. Digital radiographs, CAD/CAM restorations, three-dimensional imaging, and intra-oral scanning have changed how we see, plan, and deliver care. I welcomed these developments into my practice because I wanted to understand what they could offer my patients. Learning to use them also taught me how much work lies between acquiring a technology and making it useful.

Artificial intelligence has brought me back to that same place of curiosity, with questions that reach further into the way we practice.

A tool that suggests a finding, drafts an explanation, or influences a treatment decision enters territory where experience, uncertainty, and responsibility meet. Using it well requires us to examine our own habits: what we notice, what we accept, and how carefully we question an answer that seems convincing.

I wrote this book because I wanted practicing dentists to have a clear place to begin that examination. My perspective comes from years spent caring for patients, managing a practice, introducing new technologies, and teaching the next generation

of dentists. Each setting has shaped the questions I ask. In private practice, a new system has to work amid a full schedule, staff concerns, financial commitments, and patients whose needs rarely fit a demonstration. In clinical education, students must learn enough to question what a screen presents while developing the judgment to decide what comes next. These are practical demands, and they deserve a central place in any discussion of AI.

Teaching has made this especially personal. I am helping prepare students for a professional life that will extend well beyond my own. Some of the tools they will use have yet to be developed. I cannot teach them every system they will encounter, but I can help them build habits of inquiry, careful observation, and accountability that will serve them as those systems change. Writing this book is an extension of that responsibility.

I remain enthusiastic about what technology can contribute to dentistry. I also know enthusiasm needs the discipline to ask whether a change actually helps. Does it improve the information available to us? Does it make the work more reliable? Does it give us more time to listen, explain, and care for the person in the chair? Those questions have guided me through earlier changes in our profession, and they guide these pages. After all these years, I am still learning. That is one of dentistry's pleasures, and one of its obligations. My hope is that this book gives you the confidence to explore AI thoughtfully, ask difficult questions, and make choices you can explain to your team and your patients.

The opportunity before us is substantial. How we bring it into the daily work of caring for people will determine its value.

Eugene Antenucci, DDS

# Introduction: Dentistry at the AI Inflection Point

### Why this moment feels different

Software has been part of a dental office for decades. Practice management systems maintain the chart. Digital sensors and scanners have changed the way many practices capture images and take impressions. Many familiar software tools help capture, manage, display, or transmit what you and your team enter. Some newer features behave differently. Imaging software may mark a region on a radiograph before you have looked at it. Scheduling tools may answer a patient's message and offer an appointment. Writing tools may draft a letter or a clinical note. Their outputs may shape what you notice or do next, and that change is worth taking seriously.

Suppose a radiograph is tagged before you open it. The software marks a region and suggests a possible carious lesion. The tag may draw your eye to something you would have caught anyway, or it may be wrong. Either way, someone still has to look at the image, examine the tooth, and decide what the finding means for this patient.

I have spent more than four decades in clinical dentistry, including private practice and clinical teaching. Over those decades, I have pioneered many advanced dental technologies, and I was among the first practitioners to clinically incorporate

computer management software, CAD/CAM and 3D technologies, digital radiography, dental lasers, and CBCT. I bring that practitioner's and educator's perspective to this question. The useful question is not whether the engineering is impressive. The consideration is what the tool actually does, what it needs to work, and which decisions still require my clinical judgment.

That understanding can be harder to reach with this generation of software tools, because a specification alone may not show how a tool performs. A new curing light has a wavelength and an intensity, and those figures describe much of what it does. Software that estimates bone density or tags possible caries returns an answer, and the honest question is what went into producing it: which images, which patients, which conditions, and how well it performed on cases it had not seen before. Product materials may not answer every one of those questions, and the output's confidence does not tell you whether the answer is right.

Meanwhile, the technology keeps moving. Some tools are updated or retrained, and the version you trialed may not be exactly the version running later. Requirements for patient data, consent, and device oversight vary by jurisdiction and can change, so dentists often have questions that no single rule settles for every practice. The parts on accountability and on evidence give you questions to put to your own regulator, indemnifier, or adviser.

**What this book does not claim**

This is not a buying guide, and I will not tell you which product to purchase. A product recommendation could be out of date by the time of publication, and it may not suit your practice in any case.
It is also not a promise that AI will make you a better diagnostician, or a warning that it will make you a worse one. You will not find invented numbers here: no manufactured accuracy percentages, no fabricated studies, no claims presented as

settled when the evidence behind them is still thin or contested. Where a chapter reaches the edge of what can be shown, it says so plainly and turns the remaining question into something you can look into yourself. When a claim about a system's performance appears, the point is to show you how to interrogate it rather than accept my word.

This is not legal or regulatory advice either. Patient data rules, consent requirements and device oversight depend on where you practice and may change over time. Instead, you will get a set of questions to ask your own regulator, indemnifier, or consultant so you can start the conversation in the right place.

Finally, this book does not treat artificial intelligence as a colleague with feelings, opinions, or accountability. AI is software that produces an output. AI does not replace the dentist's clinical judgment or professional responsibility, though specific accountability questions depend on use and jurisdiction, and the accountability section of this book addresses those. No chapter here softens that important clinical principle.

**How to use the six parts**

The book moves in six steps, each built around a question or decision you'll likely carry.

The first part asks what these systems are and what vocabulary you need to read the rest. It covers what AI means in a dental practice, how the main families differ, and where prediction ends, and diagnosis begins. Without that vocabulary, later arguments about bias and validation have nothing to attach to.

The second part asks how AI might change a clinical decision. It covers detection and decision support, digital work-flows and imaging, specialty applications, and risk prediction that draws on more than one image.

The third part asks where generative and business tools can save time, and what information should not be shared with these tools. It covers writing and summarizing tools, scheduling, claims, marketing, and patient messages.

The fourth part asks how you judge a tool when it errs, and who is accountable. It covers error, bias, automation bias, patient data, consent, professional accountability, and how to read an accuracy claim or regulatory status for yourself. This is the part I would ask you to read even if you skim elsewhere.

The fifth part explains how to get started. It gives a sequence for choosing one task and trialing a tool in your own practice, a list of uses you could try now, and the people side: roles, training, and what your team tells patients.

The last part asks what should be protected, and where a dentist should spend attention and money in the years ahead. It considers the aspects of patient care that remain beyond technology's capabilities and what they mean for the profession's future.

The parts build on one another, so reading in order is the most natural route. If a specific decision is pressing, read the first part for vocabulary, then jump to the part that matches your question.

Throughout this book, one question guides the evaluation of every software tool: what can it contribute, and which decisions remain your responsibility?