Preface

Artificial Intelligence 2019: Surprise-Free Dental Implant Dentistry

Could the artificial-intelligence (AI) revolution be as significant as the industrial revolution or the electric revolution? The answer is likely no; it will likely be more significant. No other revolution’s technology has had the potential to replicate itself and outthink humans. Its significance will likely be even greater to those currently living, since the AI revolution has awoken in our time, never to sleep again.

This revolution has been on hold awaiting essential algorithms to inform this work, like, deep learning, which now exists and will evolve. This revolution has waited for the incomprehensible power necessary to enable graphical/computational systems to perform high-level pattern recognition, which now abounds and will evolve. The last crucial component to this revolution was data, and though data exist en masse now on the Internet, which is currently changing other industries with AI, the critical data that will revolutionize dentistry currently exist in decentralized and nonintegrated locations. Until dentistry organizes to pipeline its data, oral health will abide the status quo while a revolution grows around it.

One might ask: Haven’t we done well enough in dentistry with the present computer guidance or navigation strategies? Certainly, this is true, but one might also ask: Is the present technology and prescribed treatment optimized, that is, not under, not over, treatment? Moreover, dental implant diagnostics based on the present cone beam software programs do not ask the right questions. And what might those questions be, and why ask them?

Here then are 8 questions to ask, which AI could address in real-time treatment planning, including intraoperative decision making:

- What osseous site angulation will maximize cortical bone contact?
- What is the minimum size implant required based on the osseous data?
- What is the expected insertion torque for a given location?
- What are the prospects for immediate function for a given implant site?
- What are the expected long-term sequelae, including implant bone loss for a given site?
- What are the number of implants required and location for complete arch immediate function?
- What is the minimum total insertion torque required for complete arch treatment for the patient?
- What is the expected implant success rate for a given site or treatment plan?

Obviously, dental science has literature and statistical data, but what if we had much more data derived from patient scans, and began to centralize and pipeline this into AI systems? And imagine other biological indices shared with AI to better specify to the practitioner what exactly to do? Instead of a single practitioner’s surgical judgment and experience being their solitary guide,
deep learning from a massive database of thousands of other practitioners’ judgments and experiences could be used to diagnose and treat in unthinkably intelligent ways. AI then could presumably specify optimal treatment, customized to the patient at hand. Surprise-free implant dentistry! Except...what if the computer suffers from the anthropic principle? There is no medicine for that.

The AI revolution has begun, and here is the proof. Autonomous cars have created new possibilities in the transportation industry. Militaries have vested interest in AI, and with massive financial investments, they have built autonomous submarines, planes, and soldiers. AI has created tech to beat the very smartest chess players, Go players, and Texas Hold ‘Em players. AI has begun to be a cognitive assistant for dermatologists, geneticists, pharmacologists, and oncologists. Surprise-free implant dentistry has the algorithms and the computational resources it needs; the revolution just awaits the pipelining of dentistry’s collective data.

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