

EDITORIAL

"Artificial intelligence is no match for natural stupidity."

Albert Einstein

Mathematician, Physicist, Scientist (1879 - 1955).

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WHAT ABOUT THE FIELD OF MODERN DENTISTRY?

While successive technological advances since the 1980s have revolutionized dental practice in our institutions and practices, AI fingerprints have also marked it in several areas: maxillofacial radiology, the materials used, implantology, regenerative and reconstructive surgeries, clinical and laboratory diagnostic methodology, prosthetics and aesthetics, orthopedics and pedodontics without forgetting the central place of photography, the means and techniques of image processing have considerably improved.

Over the past two decades, the world has made tremendous technological advancements and influenced many aspects of human life. Dental health has undoubtedly benefited from advances in technology. Even more exciting has been the revolution in the field of mechanical and industrial engineering or the ever-evolving field of bioengineering, microengineering and nanoengineering. Smart toothbrushes, virtual reality, laser technology and 3D printing have radically changed the dental landscape. New technologies have revolutionized the world of imagery for over 30 years. Some recent achievements:

- Digital X-rays in dentistry which facilitated and made more precise our diagnosis and subsequently our care.
- Dentscan quickly relayed by conical beam computed tomography or Cone Beam (CBCT), increasingly used in medical imaging. It made it possible to perform a three-dimensional analysis of bone volume, precise anatomical identification of nerves, and modeling of sensitive anatomical structures (ENT). It has greatly simplified and improved implant-prosthetic practice by allowing better pre-implant diagnosis and better anatomical and biomechanical precision.
- The intra-oral or intra-oral camera which allows you to take very precise photographs of the inside of a patient's mouth. Also reliable for exploring the oral cavity for spotting and screening purposes.
- Intra-oral dental optical scanners which allow dental impressions to be made.
- The dental CAD / CAM (Computer Assisted Design and Manufacturing) or CAD / CAM (Computer Assisted Design / Computer Assisted Manufacturing) chain which is "a set of coordinated technological means (CAD, CAM) allowing recording (Acquisition) in digital form analog clinical data and virtual modeling (CAD) then the material production (CAM) of a tailor-made medical device, in this case fixed and removable dental prostheses".
- Dental lasers for their desensitizing, analgesic, anti-inflammatory, healing, and surgical effects under certain conditions. Bioactivation allows other types of lasers to activate and accelerate the processes of osteogenesis and dentinogenesis (or dentinification).

1- "Larousse online encyclopedia - artificial intelligence" [archive], on Larousse.

HOW IS AI CURRENTLY USED IN DENTISTRY?

It is already in dental practice across a wide range of applications such as voice commands (DEXvoice, manufactured by Simplifeye - Alexa for dentists) that simplify the tasks to technicians and assistants with hands-free operation, contactless with the computer, looking for a document, an X-ray, a file ... not to mention the impact on safety, cleanliness, and hygiene of workspaces in addition to saving time and consumable products (gloves, disinfectants).

The proven performance of AI is best demonstrated by the ability that goes beyond human intelligence to gather and analyze information with extreme precision, to find interconnections and to provide diagnostics. Introduced today through tools and algorithms, AI coupled with robotization is revolutionizing the medical world, our methodology and our pre-diagnostic assessments, our implant-bone surgical procedures, our instruments. Our computers with deep intelligence can analyze and build for us the surgical and laboratory steps or even the management of peri-implant complications such as the decision to extract or keep the implant, based on biological, prosthetic, anatomical, periodontal, mechanical, and human considerations.

Another spectacular technological advance in terms of dental hygiene, the advent of intelligent toothbrushes equipped for example with "a pressure sensor that sends data, up to 100 times per second, on the pressure exerted, the movement performed, and areas covered by the user. This data is analyzed in real time by the AI-powered application to help the user improve their brushing. "

By AI, imaging diagnosis relies on analysis of images, the origin of which may be x-rays or sections, CBCT data, fluorescence sources, frontal photographs or optical impressions. "The areas studied mainly concern the tooth (anatomical peculiarity or presence of caries), periodontium, dental arch, osteoporosis of the jawbones or even the research and identification of specific anatomical elements. "

This reasoning sends AI back to the heart of this human intelligence without discrediting it. I will tend to make the analogy with the habits acquired during the Covid-19 pandemic concerning tele-education. Without wishing to list the facts and misdeeds, strengths, and weaknesses, I will focus on the fundamental element that makes face-to-face learning a complex mission whose key words are interactivity with the learner, emotions, instantaneous, real-time interoceptive observation and evaluation of a group of people with different levels of intelligence and assimilation potential.

From the learner's perspective, a performant teacher is a reliable professional, eloquent, verbose learn, attentive, generous heart, able to argue and convince. In a word, a high -qualified professional teacher optimizes actions and performances through the tool, but the exclusive responsibility for ordering and mastering actions falls to him and always imposes mentally and physically presence and a permanent sensorial vigilance. Human creative genius has shaped matter and achieved spectacular inventions throughout the centuries. He mainly transmitted knowledge and expertise without intermediaries. Tools are the product of men and their genius and must be auxiliary and supportive forces.

In addition, state and international control and ethics bodies are tasked with protecting communities from disinformation and abuses. Behind the natural physical laws of general gravitation, relativity, those of quantum mechanics, there are theories which bear names: the universal law of gravitation and creation (Isaac Newton, 1642-1727), the theory general relativity (Albert Einstein- 1879-1955) and great

2- "Synthesis report - France Artificial Intelligence" [archive] [PDF], on the Ministry of Higher Education and Research, 2017.

inventions and patents, among others, the telescope for Newton, the ultrasensitive voltmeter, and a hearing aid for Einstein. Behind these laws and these inventions sits the brain of a researcher, his knowledge, and his infinite curiosity. In the beginning, there was always human intelligence.

In the concert of major industrial and professional technological revolutions, the next big challenge for our profession will be the place occupied by Artificial Intelligence in our dental practices and its impact in terms of management, of adaptation to new technologies, health, and cost of care; without forgetting the potential for bias and other drifts in terms of diagnosis, prognosis and treatment which would a priori appeal to the most enthusiastic among us.

This will not prevent dental practice in the same direction of the technological evolution of the present century and to accompany it with vigilance, always armed with this scientific rigor which is our credo and our compass.

Yes, to innovative technological revolutions, to competent control / quality organisms, yes to legal and ethical safeguards that authorize, regulate and censor.

No to haste, anarchy, and amateurism in public health.

Have a good trip in the Intelligent Machine (IM), the UFO of the future.