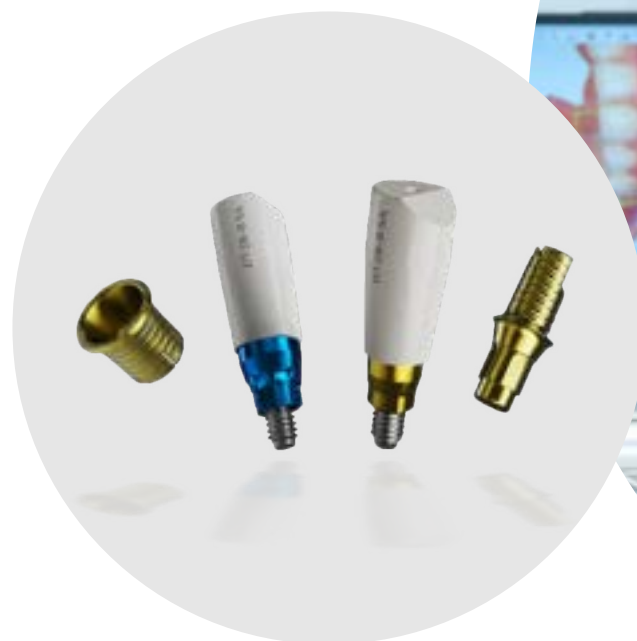ELOS
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7 Trends Shaping the Future of Digital Workflows in Implant Dentistry

CONNECTED INSIGHTS

Implant dentistry has reached a tipping point. Digitalization is taking precedence over conventional processes and will continue to accelerate unevenly but steadily and faster.

There's no doubt that the shift to digital workflows in implant dentistry is on the rise and will continue to accelerate with time. The adoption of digital methods is being driven by new opportunities in intraoral scanning, CAD/CAM, and 3D printing.

A 2021 survey by Lab Management Today (LMT) Communications revealed rapid growth in the use of technologies related to digital impressions, with the fastest growth rate occurring after the start of the COVID-19 pandemic. The data showed that among labs who accept digital impressions, 29% of impressions coming into those labs were digital, as compared to a mere 4% just a decade ago.[1]

As processes move from conventional workflows like wax models and impression coping towards CAD/CAM digital workflows, the benefits are clear: digital dentistry processes are faster, cheaper, and yield more consistent results. They also reduce the number of visits and chair time required to complete procedures. With all the benefits of today's digital solutions come some inherent challenges. Certain products and systems offer only one workflow tailored to the overall business model of the

provider (e.g., implant companies, scanner companies, and milling companies). Therefore, the often-large investment to acquire a particular solution may actually end up locking end-users into a closed system that takes additional time and effort to learn.

Clinics and labs want solutions that offer more flexibility and choice. Here's where open digital workflows excel: they integrate more broadly across already established systems and play well with the offerings of the future. Still, end users may have to work out which solutions and systems are compatible with each other and to what extent, and this is where trusted digital workflows bridge the gap.

In this article, Elos Medtech shares the benefits, challenges, and solutions within digital workflows in implant dentistry with the top 7 trends we see shaping the landscape today and into the future.

29% of lab workflows now start with a digital impression*
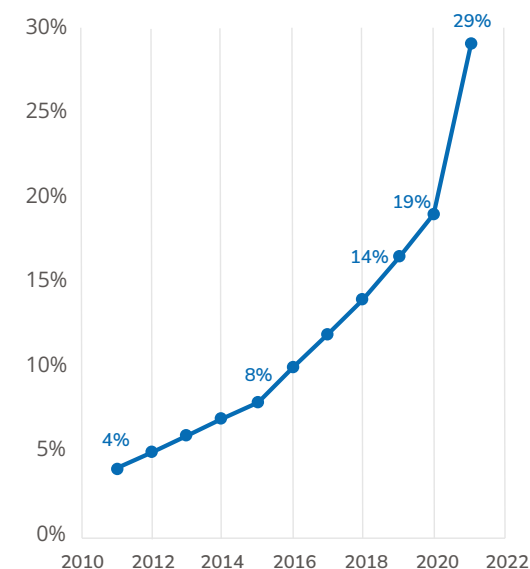
LMT's 2021 Impression Survey Report: Digital Impressions Gaining Traction
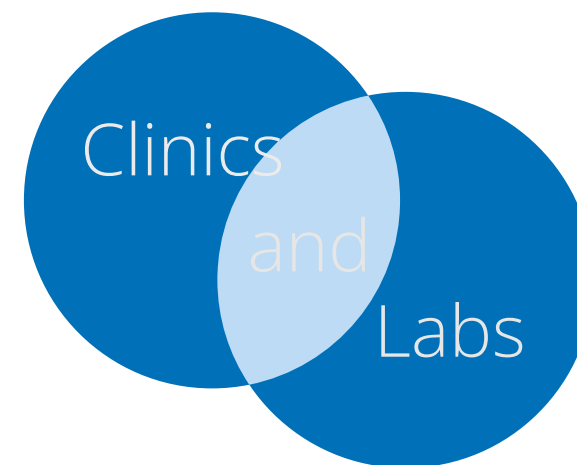
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The focus on good communication and collaboration between clinics and labs will grow.

Clinics

and

Labs

Communication between dental practices and labs has been dramatically improved by digital information sharing, for example, sharing 3D design suggestions during the design of the restoration. It's a whole new world of enhanced communication, where labs can share designs with clinics so dentists can see exactly what to expect in 3D before it's made. Digital sharing between clinics and labs results in faster turnaround times and less risk of miscommunication since any mismatch between expectations versus results can be corrected easily and quickly.

The increased speed and efficiency that digital end-users enjoy is also telling. Clinics and labs we work with report their output to be 5-6 times greater with digital workflows than their analog counterparts.

While digital dentistry certainly minimizes the risk of errors, technology in itself is not the answer to everything. Working digitally makes it crucial to choose an open system that both the clinic and lab can use for a seamless workflow that is functionally compatible across all solutions.

Digital clinic and lab collaboration benefits greatly from 3D printers, CAD software, and computer-aided manufacturing being able to import and export files in an interchangeable format — the alternative can lead to frustration and decreased efficiency.

Improving on the already superior digital workflow is the "trusted" digital workflow. Trusted workflows remove barriers and the frustrations that come with them since they are already verified to be compatible with various configurations. The result is

more efficient workflows for clinics and labs, but even more importantly, better patient outcomes.

Opening workflows to as many solutions as possible gives end users a significant advantage. It can play a crucial role in those who produce best-in-class results — and everyone else.

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Integrated, trusted workflows will bridge the open source/proprietary gap.

Trusted workflow

Given the maturity of the digital dentistry industry, it's to be expected that there is no universal or even widespread agreement on what comprises the optimal digital implant workflow.

On the one hand, companies that have developed workflows around their own hardware and software naturally show little motivation to share them freely. On the other hand, open-source workflows would likely increase overall efficiency, drive down costs, and fuel new development and

sharing of industry best practices. The shift to digital-based workflows based on open-source technology has undoubtedly positively stirred the prosthetics industry. However, complexity, lack of know-how, and incompatibility between third-party solutions can make it feel like a risk-laden choice.

Today's dentistry professionals want simple, open workflows that allow the widest variety of outcomes and solutions. They want to avoid getting stuck at dead-ends with

products and solutions that lack compatibility. Market forces will continue to wean out inefficient offerings. At the same time, regulatory oversight that puts consumer interests above company profits might someday reduce the wide gap between proprietary and open-source workflows. Until then, we believe trusted workflows will fill the void.

Trusted workflows offer seamless and fully compatible end-to-end integration between major dental implant systems

based on extensive R&D and free open libraries. These workflows are verified to be compatible in various configurations, with no frustration to the dentist and a better patient outcome. That's why trusted workflows offer a validated system with dentists, labs—and ultimately patients'—best interests at heart.

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3D printing will become more mainstream.
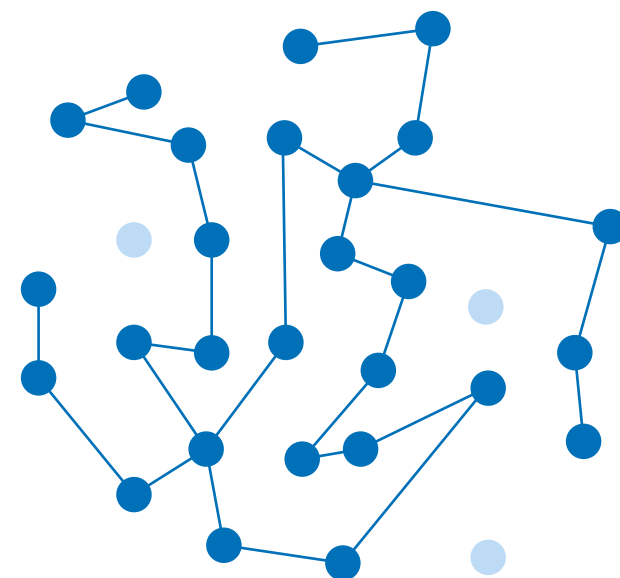
3D printing, or additive manufacturing, is ideal for the mass customization of everything from temporary teeth to final restorations, bite splints, dentures, and accessories.

The high demand for the technology is apparent: growth is forecast to reach a market size of 12.46 billion US dollars by 2028—up from just 1.87 billion US dollars in 2022.[2]

The advantages of 3D printing for building prosthetic components are unparalleled and a leap ahead of the traditional plaster model method. 3D printing offers complex, detailed structures and comprehensive surgical drill guides, enhancing safety, cost-effectiveness, time savings, and a substantial improvement of work conditions for technicians.

Good printers and materials already exist and with low cost, it's an appealing choice for labs to integrate. Looking ahead, materials and resins for crowns and implants are likely to improve even more.

[2] Dental 3D Printing Market By Component (Materials, Equipment, Services), By Technology (Selective Laser Sintering, Vat Photopolymerization, PolyJet Printing, Fused Deposition Modelling), By Application (Orthodontics, Prosthodontics, Implantology), By End-Use (Hospitals & Clinics, Laboratories, Research Institutes), and By Region Forecast to 2028, Emergen Research, May 2021

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AI will enhance digital dentistry processes and outcomes.
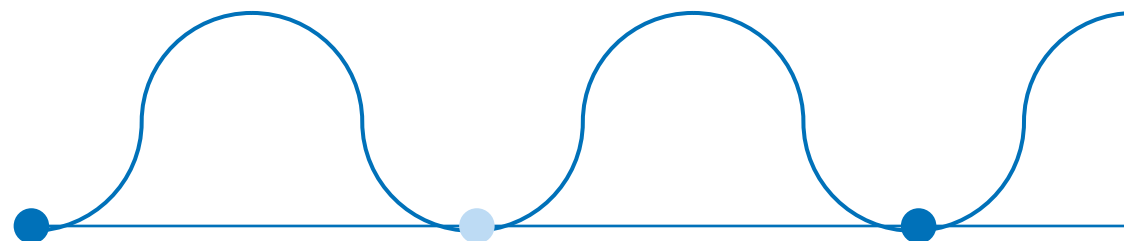
AI is everywhere, and it's no different in the dental prosthetics industry. And every time digital dentistry software is used anywhere in the world, it's getting smarter.

Clinics and labs are starting to rely on AI to do some heavy lifting and then simply make a few minor adjustments afterward. And with user input working in tandem with AI to refine outcomes, the future of AI means improvements in consistency, speed, and quality of diagnostics.

One common application of AI in dentistry is pattern detection in dental cone beam computed tomography (CT) scan images. Real-time AI-powered radiologic platforms can automatically detect dozens of conditions in dental x-rays, helping clinicians to instantly validate radiologic findings.

In theory, caries detection models could be run every time an x-ray is performed.

Scanner manufacturers are starting to embed guidance with real-time feedback on next steps to provide to the user during intraoral scanning. If there are gaps in the scan or areas that haven't been captured adequately, the software can give feedback directing the user to correct the scan. This helps move the process forward much more quickly and can increase lab output. And if a scan does make it to the lab with a problem in it, that's something AI can assist with in lieu of a trained lab technician spending manual time and effort looking for defects.

In the planning stages of dental surgery, AI models can help improve implant placement and design. AI models help surgeons make optimal placement decisions by considering bone quality and where the nerves and bone bodies are located.

AI-driven software can then build a design proposal for the replacement tooth with efficiency and predictability that far surpasses old methods. Before AI technology, the dental technician had to take part in all of the manual processes to arrive at the final designs, while today, a simple scan of the remaining teeth kicks off the process. The software can produce a proposal for what would provide the most natural look and feel.

The timing of AI in the dental industry couldn't be better. The General Dental Council (GDC) in the UK is reporting a crisis due to a shortage in enrollment of new lab technicians. The average age of lab technicians in the UK today is around 56, while industry growth is approximately 5% annually. What this will mean is a staffing shortage within the next ten years if lab owners rely on lab technicians alone to fill the void.[3] The shortage is not just a regional issue but a global issue.

AI will be a piece of the puzzle to help fill this crucial void, since it will allow labs to utilize AI technologies in software and tools to keep pace with demand, despite the lab technician staffing shortage.

[3] The dental lab expert – crisis and possible solutions to the lack of dental technicians, Ashley Burne, Lab Expert, May 31, 2021

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Demands for higher quality in dental implant libraries will lead to change
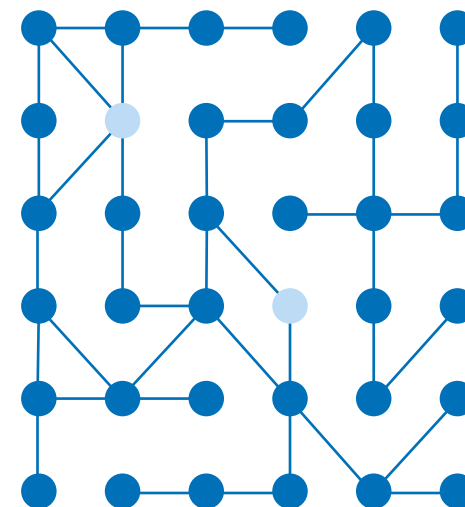
Good libraries are critical to digital dentistry, because they define so many aspects of the consumer experience. In order to be most effective, libraries need to be simple and easy to use and understand—only then can libraries improve accuracy and precision in the final result and offer faster turnaround times in the lab.

Unfortunately, the industry is still waiting for its answer to the Dewey Decimal System, and digital dental libraries have yet to evolve from the Wild West of non-standardization. A wide variety of stakeholders with conflicting interests have failed to come together for a common cause to agree on the best way to organize files. Non-standardization creates easily preventable quality problems. It also dampers efficiency and innovation and adds extra costs that consumers have to pay for. We're sure that this will change over time. The current environment is in no one's best interest.

This is clearly something that the new EU Strategy on Standardization will be able to influence. We hope digital dental libraries aren't too far down the priority list.

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The Chinese dental implant market is becoming increasingly interesting, but regulatory challenges loom.
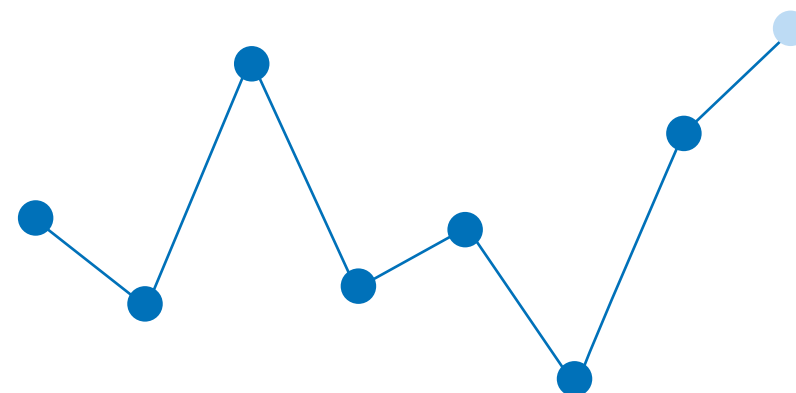
Of the big 3 regulators, FDA (US), EMA (EU), and NMPA (PRC), only the FDA currently regulates software. The FDA distinguishes between two "device software functions": "Software as a Medical Device (SaMD)" and "Software in a Medical Device (SiMD)."

However, software regulations are likely to change over time. As the importance of software's role in medicine and dentistry grows, the EU and China may unify their approaches to its regulation. At the same time, the three regulators will continue to see the benefits of alignment. We expect that trade tensions and tariff risks will lead many international device companies to consider reorienting their Chinese manufacturing, sales, and marketing activities. Instead of using China as an export-led manufacturing base primarily intended to serve international buyers, they will focus more on serving Chinese consumers.

The results of this reorientation are often referred to as "In China, for China." Firms pursuing "In China, for China" strategies will be better placed to withstand geopolitically driven trade disruptions and will also be able to capture market share as more Chinese get better dental care.

Growth in the Chinese dental implant market is expected to exceed growth in Europe and the US, making it even more attractive for foreign brands. Millions of China's aging and growing affluent population are likely to reap the benefits of digital dentistry's cost and convenience benefits.

However, international companies wanting to gain market share in China's attractive growing marketplace must reconsider their business strategies in the PRC due to new regulations set by the National Medical Products Administration (NMPA). Foreign brands need to have a "domestic" manufacturing license to get access to the attractive government hospital sector's business, either on their own or through partnerships.

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CAD systems will offer more intuitive and flexible solutions.

Globel Dental Cad/Cam market, by end-use, 2020 & 2027 (USD Million)

As digital dentistry becomes more widespread in many clinics and dental laboratories, so will the use of CAD/CAM software. It's ideal for designing prosthetics since it allows the flexibility of a wide range of compatible hardware.

The benefits of designing bridges, crowns, and implants with a precise outcome and faster turnaround time are becoming more apparent in the industry. In fact, the global dental CAD/CAM market is projected to grow more than 80 percent over the next seven years, from 2.72 billion US dollars in 2022 to 4.94 billion US dollars by 2029.[4]

Many clinics want faster turnaround times and more customization at lower rates. They're looking for alternatives to outsourcing jobs to large milling machine providers. The trend is to purchase equipment for in-clinic manufacturing and utilize it with flexible CAD/CAM software.

CAD/CAM software publishers will continue developing new features to help remove some of the barriers to new user adoption, including time for training and compatibility limitations between CAD software and equipment. Some CAD/CAM software publishers

have started developing software add-ons that offer friendlier and more efficient user interfaces.

The move towards better user experiences in software will continue to grow in the future, which will make it increasingly easier for dental clinics and labs to replace their familiar methods with digital workflows. Training costs will be reduced, while product output and profits will increase.

And the most cutting-edge CAD software programs will not have limited workflows. Instead, they will offer dental lab technicians an open model with more options to make their work faster, better, and more cost-effective.

[4] Global Market Insights, March 2021: 'Dental CAD/CAM Market Size By Type (In-lab Systems, In-office Systems), By Component (Hardware {Milling Machine, Dental 3D Printer, Dental Scanner}, Software {Cloud/Web-based, On Premise}), By End-use (Dental Clinics, Dental Laboratories, Dental Milling Centers), Industry Analysis Report, Regional Outlook, Growth Potential, Price Trends, Competitive Market Share & Forecast, 2021 – 2027'

Dental clinics   Dental laboratories   Dental milling centers

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Conclusion

New way to work
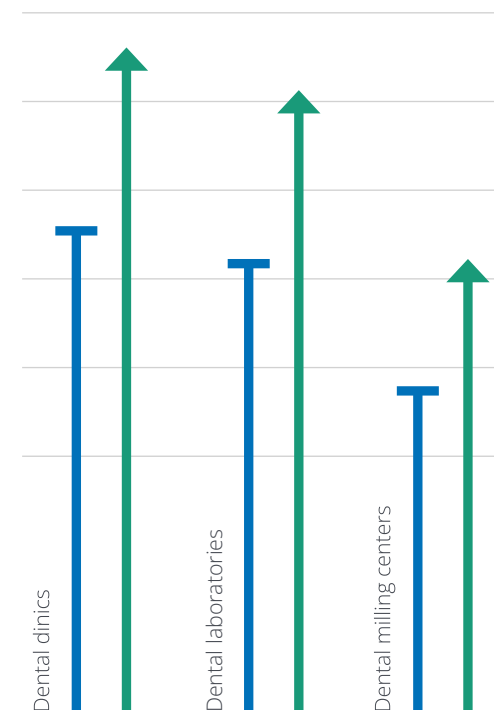
Just a few years ago, the dental implant process was time-consuming and lengthy. Working with many third-party manufacturing facilities and labs created long waiting times between the initial temporary prosthetics and the final ones.

Digital processes in dental implant dentistry are clearly a game-changer. Digitizing processes means huge gains, and those not adapting to the newer and better digital workflows are in for a wake-up call when they cannot compete with their peers on parameters like quality, cost, and efficiency.

Despite all the clear advantages of digitalization, there are challenges to address. Elos Medtech advocates a new way forward with trusted, open digital workflows that allow end-users more individual tailoring and customization.

Our solutions allow clinics and labs to work partly or entirely digitally. All our dental components, such as scan bodies, model analogs, and hybrid bases, can be used with all of the major dental implant systems. And when designing dental restorations, users can upload our libraries to any major CAD software.

Elos Medtech is working to bridge the gap between established proprietary systems and open digital workflows to meet the needs and demands of the marketplace today and in the future.

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About Elos Medtech

Working with the right partner can make all the difference. Elos Medtech, founded in 1923 in Sweden, is a leading innovation and product development company specializing in manufacturing dental and orthopedic implants and medical devices. We have created a portfolio that has allowed us to partner with top implant companies around the world. We are a trusted partner because of the precision and quality of the parts we manufacture.

Elos Medtech is working to create cross-system compatibility between the open and closed workflows offered today. Our solutions unlock systems and offer simplified cross-system workflows that allow the end-user to experience the true value of their digital investments. Lowering the risk of "lock-ins" will incentivize users to base their workflows on your solutions (whether implants, digital components, 3D printers, etc.).

Some of our current projects include opening for 3rd party implant systems, seamless workflow for bars/bridges, open library with original components, and seamless fitting across 3D printers.

Our 500 employees across Europe, China, and the US guarantee the expertise, quality, and capacity to meet and exceed our customers' expectations.

Visit us at www.elosdental.com

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