

# What's next after the digital revolution?



**Dr Marcos White** discusses the development of digital dentistry and beyond

I was posed an interesting question after delivering my keynote lecture at the Align Growth Summit in Croatia where I showcased the extraordinary potential and scope of using intra oral scanners in dentistry. That question was 'what comes after digital?'

My lecture aimed to highlight that an intra oral scanner's applications are almost limitless and go far beyond the replacement of impression material and far beyond greater accuracy. It is through my 100% commitment to the technology over the last eight years that I have discovered the many and varied ways it is elevating me as a clinician and the care and treatment I can give to my patients.

In order to add context to what I mean by 100% commitment, back in 2014, a few weeks after taking delivery of my first intra oral scanner I stopped ordering impression material for the entire practice to force me and my associates to embrace the new technology. With no other option we learnt fast.

The lecture I delivered centred around a key visual of a single blade pen knife and a multi tooled Swiss army knife with the metaphor being that the intra oral scanner has a multitude of tools if only you know how to use them.

The answer to the question; what's next after the digital revolution, is simple. Human evolution or rather evolution of the dentist.

## Evolution

The simplified concept of evolution of the countless species on earth is understood as being an adaptive change over time to a changing environment such that those that adapt quickest are able to develop a marked advantage that proliferates the species. As

such this advantage becomes embedded and the species thrives.

In the more recent history of mankind, our evolution has been defined not through any physical changes, but through the development of industrial change and technological advancement. We have conceived and created tools that have elevated our ability to accelerate transportation, global mobilisation, and compounded our creativity through computer power.

The irony though is an observation I have made called tech lag. It references 'jet lag' and describes the following common failing. Technology evolves, but our ability to develop uses for the technology evolve slower. Our existing habits and workflows are hard to break. We remain entrenched in old systems, old materials, old beliefs, while the tech is underused. Sound familiar?

To take the metaphor through to its ultimate conclusion we see the possibility and potential of the evolution of the dentist (*homo dentatus*) to a higher level. To become something more, something never before imagined. An enhanced clinician with more powerful diagnostic potential and advanced clinical competency. All the dentist needs to do is understand the difference between adoption and application. To commit to both implementation and integration.

## Will this evolution create a better dentist?

Once this next phase of dentist evolution is complete. The question is will we have better dentists, or better operators of technology? It is the true understanding of what that dentist looks and behaves like that will best answer that question. But first let's explore

another digitally augmented process.

Having recently bought a *Tesla* I can tell you it's more than just an electric car. An electric car would be made by a company that took a regular car and replaced the internal combustion engine with an electric motor. That's not what *Tesla* did. They recreated the notion of a car from the ground up based on today's needs and today's available tech.

My *Tesla* has navigation as its central screen. It is easy to input and save my favourites. It knows that humans typically go to the same places over and over again. Once it knows my destination it can calculate if it has enough charge to reach it. If it does not have enough charge, it reroutes me to a charger. When I get out I don't have to lock it or wind the windows up. It does that for me when I'm the right distance away. And it drives itself. It keeps me in lane. It stops me speeding.

Does all that make me a better driver? Of course. Because so many of the functions and needs are automated or assisted, my residual focus is therefore heightened on whatever parts of the driving experience are left.

Back to scanners and their limitless capabilities, and how they will elevate the dentists' skills at all levels: diagnostic, planning and clinical intervention.

First let's dispel the first fallacy which is that scanners biggest 'gift' is that of replacing impression material. Yes, that was how and why they were invented. But their biggest 'gift' is that of visualisation. For a dentist and a patient to be able to visualise the entire dental complex in colour 3D in real time changes the way we think about consultation. Forever.

From here a number of pre-clinical and treatment planning processes are also

transformed through visualisation and through digital design software: digital record keeping, digital design, digitally guided dentistry. These are outside of the remit of this article but may be a welcome series to expand upon.

If we now consider a traditional veneer preparation, in an analogue world and how its digital version compares maybe we can begin to see the myriad ways that the digital dentist is an evolution over her 20<sup>th</sup> century analogue predecessor.

Once the scans are taken '*homo dentatus digitalis*' is able to visualise the preps on screen and assess for any undercut. They can assess the clarity of the margin and should they choose to, define and draw it onscreen themselves.

In the protocol that we teach on my Digital Growth Program, the scanner records the temps *in situ* once adjusted as per the patient's bite and lateral excursions. We call this *in vivo* occlusion. The digital lab receives these 3D records together with the preps and merges them to form a template to be replicated. This replication was never truly possible in the analogue world.

The ability to test a design *in vivo* and then replicate it to the micron is a technical elevation. The fact that every aspect of this process is effectively 'filmed' by the scanner and recorded in the cloud forever evidences the care and competency of the clinician and elevates the record keeping.

Every scan taken creates a timeline in the patient's treatment history that can be called upon at any point in the future.

Recently a patient attended with a coronal fracture of his upper left lateral incisor that we had crowned as part of a cosmetic overhaul some 18 months earlier. It would be normal for him to feel that we may be in some part connected with the fracture. I pulled up his scan timeline on a number of windows on my practice desktop. I had his presenting scan. His preps and the temps. His final outcome. A scan of his coronal fracture.

They demonstrated in technicolour glory that the treatment had been justified (his presenting crowns were suboptimal). They demonstrated that the existing core under the crown was compromised and dark, in essence that the tooth had had a hard life. The coronal fracture scan showed clearly that there was no tooth structure to restore and that a post and core would offer a guarded prognosis.

Every image conveyed a fact or observation in a manner that was so much more impactful than black and white words



in my clinical records could ever do. Every image recollected aspects of the case in a manner more clearly than my memory could ever recall.

### Visualisation cannot be understated

Put simply it is like the difference between radio and the advent of the colour television.

Imagine listening to a news report or sports event on the radio compared with the images on a television. That is the difference between describing a problem to a patient and them seeing the problem for themselves on screen.

Back to record keeping. You could write the most detailed clinical notes but they could never equal the detail of an image of a subgingival fracture or the recession and inflammation in a perio case seen on a 16 inch screen that you can manipulate and zoom in on.

Add to that the fact that *iTero's* Timelapse feature facilitates comparative analysis of any two scans to show volumetric change so you can categorically assess and demonstrate changes in tooth position, wear, recession, inflammation, and you can see why the digitally augmented dentist is a superior being.

### Conclusion

The conclusion to the question of what happens after the digital evolution is that of a dentist who considers digital scanning and its analytics as an extension of herself. We would not be able to drill teeth without a

high speed. We would not be able to remove teeth without forceps. We would not be able to diagnose caries without radiographs.

Digital scanning is a tool that will eclipse these as a transformative force for patients and the profession. It was a watershed moment when I was on a panel discussion with other digital dentists and it occurred to me that I could not do what I do now without digital.

It is in the continual application and integration of the tool itself that will yield more benefits and discoveries and opportunities for software upgrades that bring immediate benefits to patients and clinicians. Imagine an overnight software upgrade that instantly elevated your diagnostic capabilities for your entire scanned patient database.

The scanner is our record keeping hard drive, augmenting our memory and clinical records. It is an unparalleled communication tool for patients. It enables a dentist to adopt real time 360 degree evaluation habits of their restorative and implant dentistry.

When the digitally evolved dentist has 60 years of scans of any patient she or he can reflect on choices made and treatments provided and the longevity that was delivered. Where a few minutes can allow a retrospective case study of any patient. We will have the power to make better choices and allow the evolution of our profession to continue. ♦

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