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### Accuracy with a dose of reality.



Dental technology continues to be perched between the worlds of analogue and digital and I make a business out of helping people transition. As part of this process, clinicians and dental technicians closely scrutinise new techniques and workflows against the ways of old. A question that often comes up is whether digital technology has changed our view on what is clinically and technically acceptable?

It is, in effect, a fleeting question raised by the experienced; the young will never even ask. In a recent consulting gig I had, there was great debate around the micron accuracy of laboratory scanners, camera MPa (mine is bigger than yours), the effect of temperature change and the resultant inaccurate scan data from laboratory scanners, especially when scanning full arches.

The comments came thick and fast that traditional impressions and the resultant gypsum models were more accurate by far.

I paused for a moment thinking, was this a Dorothy Dixier moment? Where were they going with this line of questioning? I thought about the response and then decided to introduce a dose of reality about the old ways.

I quizzed them on what exactly was so predictable with the analogue method, especially when pouring gypsum models? It was interesting as I'd been in their plaster room earlier that day and took some photos of their process (maybe a premonition).

Technically, depending on the impression being polyvinylsiloxane or alginate (did you store it in a 100% humidifier or just placed some wet tissues on the impression before pouring?) being correct, bubble-free, with every visible landmark identified and without drag marks - then you might be able to reproduce an accurate poured record.

Rarely in my travels does anybody weigh (to the gram) their gypsum, carefully and measure the water to the millilitre and vacuum mix, exactly following the manufacturer's instructions (though some people do) to ensure the gypsum is the same every time.

As the models were poured, they had decided to mount the models using the wax bite (that hasn't distorted?), remove the bubbles, drag marks or maybe even create a subgingival margin from nothing? So the question here is what is clinically and technically acceptable about doing this? I asked this group how much tooth structure or gingiva is removed in that process. We even reviewed a set of scanned models (upper, lower and bite) that showed all the flaws in the impression including the occlusal alignment (which was out). Not an answer, as they could not tell. It reminded me somewhat of the transition we made from vinyl records to CDs. Suddenly aficionados craved the inaccuracy of the old medium over the precision and purity of the new. Today, we just enjoy the music... And the young know no different.

When it comes to scanners, a common approach is to order the most accurate laboratory scanner available. For a moment, consider all things are equal with regard to price. Is the best accuracy the best choice? Not always - It depends on the application.

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Scanning manufacturers offer a wide range of options when it comes to camera resolution (1.3, 2 or 5MPa), how many axes can be scanned (two, three, four, four + one?), colour, texture, black and white, reported ISO accuracy (generally to ISO 12836), scan speed (arch, die or impression) and the associated processing time. All of these factors will have an influence on what can be scanned, how the object is scanned and the size of your STL file (data set or MESH file). So when reviewing your selection of scanners, you must consider the type of work you're doing.

For those of us that remember we were happy with a lower resolution single scanning camera (not like the multiple cameras now), powdering models or the mouth and the limited scan axes (multiple scan axes now) available only a couple of years ago, we survived and the restorations are in peoples' mouths. These restorations were considered accurate and acceptable at the time and remain in place and are considered aesthetically and functionally successful in the long term today.

The take home message is you need to consider data presented with a dose of reality. Do you need that interproximal detail and are you 3D printing a model and if so what detail is truly needed? Will the scanned output far exceed the required input for the next device? Is there a need for a 5MPa camera or will a 2MPa camera scanning system for simple crown and bridge models suffice? With multiple cameras and multiple axes come larger data files, a requirement for powerful graphics cards and larger data storage capacity. Or maybe you actually need two different scanners?

After discussing perceived outcomes of accuracy and what was missing with the group (clinicians and technicians), the minor detail does not take away from the predictable and repeatable outcomes digital offers. This is regular dentistry with all of the time constraints and faults. This is the reality of what we do. When reviewing accuracy and your technique, start with the fundamentals of good dentistry with an outcome that will be acceptable to you. Rather than what is accurate, maybe the question should revolve around what is clinically acceptable and what information is truly required. There is a mindset change as less data is needed to be accurate with digital data and it all depends on the application.

Experienced digital laboratories and clinics already get it; for those in the transition, it's still hard to let go. That is why Digital Dentistry Consultancy (DDC) is here to help you with your big picture plan. DDC can engage with you at the level matching your needs when and where you require specific advice or support. I look forward to hearing from you or where possible meeting with you to form that long-term relationship.

Cheers  
Geoff

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