



Top tips in digital dentistry for primary care

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As digital dentistry becomes increasingly commonly used in primary care,¹ we share some tips that we feel will save time and improve efficiency across primary care. The tips will also facilitate those considering incorporating digital dentistry into their clinical workflow.

Getting started

When integrating digital processes into your practice, it is essential to plan what outcomes you want to achieve from the outset. A digital intraoral scanner (DIOS), if purchased and used appropriately, enables the delivery of dentistry successfully and more consistently. For example, if you envisage having a scanner as part of an in-house integrated manufacturing process to deliver crowns and bridges, very different workflows and equipment are required when compared to a workflow that is for the construction of orthodontic aligners or externally contracted laboratory work.

Once you have decided on your workflow or digital care pathway, research which scanners are best suited to meet this requirement.

This, of course, must be balanced against costs and both hardware and software ease of use. Given the cost of DIOS, practice collaborations to split the cost of the hardware may improve the business case justification for purchase. The user should also consider some of the hidden costs such

as consumables (replacement scanner tips), servicing and software updates. Dependent on what you need a scanner for, your budget and how much time you will give to undertaking training for yourself and your team will necessarily help inform your decision. Similarly, so will talking to other clinicians already using digital workflows to find out their personal experience. If possible, attend trade shows and try before you buy. The technique of intra-oral scanning is not an innate skill, it's a learned habit, so familiarise yourself by *in vivo* scanning in your clinic. Involve all members of your team as they are stakeholders in the adoption of disruptive technology. This is a capital purchase and, whilst it can be offset against your tax bill, the investment must pay for itself in due course.

Deciding on a DIOS system

Closed platform versus open platform system

Open platform saves images as an .stl file dataset (in greyscale) or as a .ply file dataset (which is in colour) for viewing and manipulation and can be transferred and utilised between any manufacturer/laboratory or system operator that employs open platform software.

Closed platform, in contrast, limits the user to a single manufacturer/

provider. Most platforms have now moved to be able to share openly and this is a trend that is set to continue.

Each scanner has its own specific 'best' scanning strategy that will optimise capture and stitching of the data to achieve trueness and accuracy. The size of the camera head does equate to ability to capture a larger field of view and full arch scanning is easier for the user with some DIOS than others. Again, this emphasises the need to try *in vivo* scanning before committing to purchase.

The depth of field, the size of the camera, the bulk of the scanning wand and ease of handling, are different and can affect the outcomes of the digital capture accuracy.^{2,3,4,5}

Full arch implant prosthesis manufacture versus a single crown on a prepared tooth may require differing parameters for delivery of successful outcome so again understanding what you want to be able to achieve is paramount to successfully integrating scanning into your practice. For implant scanning, for example, it is important to discuss with your laboratory that their CAD software can read the intraoral scan bodies provided by your chosen implant manufacturer. After all, scanning is one

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part of the workflow, and your laboratory must be able to import, read, and design, from your scans/scan bodies. Listen to clinicians about why they have the scanner they use and what they can do with it.

Scanning tips

Treatment planning

A DIOS dataset can be an excellent tool for planning both restorative and orthodontic procedures.⁶

Proposed treatments can be digitally 'waxed-up' more simply and cost-efficiently than conventional waxed stone models, with multiple approaches being feasible. This can be especially useful in cases which involve smile aesthetics or changes to the vertical dimension. Time spent with the technician team, to ensure harmony of the interface between the DIOS dataset and subsequent CAD/CAM outputs will reduce error and improve the clinical outcome. Another benefit is that proposed treatment plan/s can be easily translated to the patient and, if employed appropriately, can greatly aid the consent process. The ability for patients to visualise 3D images of their teeth and proposed treatment/s is probably the most under rated but powerful tool offered by digital workflows. It builds trust by enhancing understanding. ▶▶

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« Treatment delivery

The dataset images also allow the clinician to plan key clinical steps either by improving pre-operative visualisation, such as tooth preparation for crowns, or by the construction of precision guided stents, such as 3D printed implant guides. Subsequently, patient facing time can be reduced, improving the efficient use of clinical time.

Many of the principles of restorative dentistry (maintaining a dry field, retraction of soft tissues, good preparations, analysis of occlusion), are as applicable to digital workflow as conventional treatment. Practise with your new system is crucial as it takes time to learn both an efficient scanning technique and to become proficient with software. Subsequently, it is important to plan this learning curve into your diary, to afford the necessary time for both you, and your team, to become proficient users.

A good starting case would involve planning and delivery of a single unit tooth supported implant crown and progressing from there may be a good option. Prior to this first case, practise scanning with colleagues so that a level of proficiency is already gained, rather than learning with a patient, and the potential added stress this may cause.

Care pathways

DIOS datasets can be easily archived and retrieved for future viewing. This can enable novel means of precisely monitoring chronic conditions such as tooth substance loss. Used appropriately, DIOS scans can be integrated into at-risk patients' periodic dental inspections to allow both the clinician and patient to accurately visualise dental changes.

Through investment in more equipment and training of the whole team, clinicians can carry out full mouth comprehensive functional and aesthetic dentistry. We use photography, CBCT, intraoral scanning, and in-house production when necessary and desirable to plan outcomes with our technicians, our team and the patient. Communication with your team, your patient and your laboratory are so much better with digital workflows,⁷ whether they be digital impressions or a full, in-house workflow ending with an in-house restoration made in one visit.

Before starting a procedure, know the desired outcome and how you are going to achieve that using restorative dentistry, orthodontics or implant dentistry. Guides can be made to help deliver outcomes more predictably. Making sure the hardware and software are set up to work together accurately so that no inadvertent errors are introduced during planning is very important.

The most exciting and rewarding part of the journey is better communication with your in-house team, your laboratory team and with the patients. Your scans can be in your laboratory, wherever it is located, in a couple of minutes. This benefit delivers the opportunity of almost immediate communication, whilst the patient is still in the chair. In fact, your laboratory can dial in remotely and watch you scanning in real time, if required. The laboratory can 'sign off' that they have everything they need for that case. This doesn't just mean the scans. Several DIOS offer shade taking; margin marking; undercut checking tools; occlusal clearance measuring; colour HD photos; multiple bite registrations; extra scans for the case; and lateral excursions captured in video etc.

Patients who can understand what we can deliver and how we can help them in a very efficient and pain-free way are more likely to choose treatment. Patients are actively seeking digital dentistry. The perception is that it is less intrusive, and an overall more pleasant experience is

a powerful motivator. Additionally, seeing a 3D image of your crown preparations is a very effective way of ensuring these are optimal.

Don't forget the potential environmental benefits with digital dentistry. No impression materials, no models, no courier or postal service as required for impressions, fewer patient visits; all important when considering the environmental impact we have as clinicians.

Dentistry becomes desirable to achieve health and the patient can see the outcomes. What we do in dentistry is seen as a black art to most people and this lack of understanding devalues what we do. Digital tools increase trust between patients and clinical teams and never has that been in shorter supply so investing in digital integration will enhance your work in ways you never imagined! ■

References

1. GFDI. Atlas Dental: European Markets. Structures, Challenges and Scenarios. 2018. Available at https://www.gfdi.de/ids-2019/Atlas_Dentalstudie_2018_EN.pdf (accessed September 2022).
2. Scherer M D. The Invention of 3D Printing and Its Impact on Dentistry: An Interview with Check Hull. *Compend Contin Educ Dent* 2020; **41**: 504–507.
3. Diker B, Tak Ö. Comparing the accuracy of six intra-oral scanners on prepared teeth and effect of scanning sequence. *J Adv Prosthodont* 2020; **12**: 299–306.
4. Ender A, Zimmermann M, Mehl A. Accuracy of complete and partial arch impressions of actual intraoral scanning systems in vitro. *Int J Comput Dent* 2019; **22**: 11–19.
5. Nedelcu R, Olsson P, Nyström I *et al*. Accuracy and precision of three intraoral scanners and accuracy of conventional impressions: A novel in vivo analysis method. *J Dent* 2018; **69**: 110–118.
6. Sfondrini M. F, Gandini P, Malfatto M *et al*. Computerised casts for orthodontic purposes using powder free intraoral scanners: accuracy, execution time and patient feedback. *Biomed Res Int* 2018; DOI: 10.1155/2018/4103232.
7. Jahangiri L, Akiva G, Lakhia S, Turkyilmaz I. Understanding the complexities of digital dentistry integration in high-volume dental institutions. *Br Dent J* 2020; **229**: 166–168.

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