CAD/CAM Dentistry - Perceptions and Misconceptions –

Considerations in choosing your solution?

Leadership in CAD/CAM and digital technology

In the past, we relied on Academic protocols as the fall back with regards to clinical or technical solutions provided by manufacturing and supply companies. There is normally a passing of the baton within Speciality groups such as Prosthodontist, Endodontist, Periodontist, Orthodontist, Dental Prosthetist, Dental Technician, etc.

Now we rely more on the advice provided by your favourite www search engine and/or manufacturing and supply companies on what works and why they might be the best solution.

This is a broad statement but there are very few leaders within the Dental Profession with the application/workflow experience and knowledge of all of the CAD/CAM and digital technology available in Australia.

Today the knowledge and expertise of CAD/CAM technology resides within the industry. This can be seen as driving new business and new players (industry) all coming from different industries with no dental background. Just thinking CAD/CAM or 3D printing from the engineering, jewellery or architectural industries, dentistry is the miniature version of engineering solutions with materials and techniques matching clinical applications.

Perceptions to note:

"CAD/CAM and Digital Technology"…

Perceptions are different for everybody. We all absorb knowledge and experience differently whether it be oral, visual or written. Even then our perception to this information is different.

There is a perception that dental CAD/CAM technology can make the decisions for the dental professional by pushing the button. You *"just push a button*" without understanding the fundamentals of materials, clinical techniques and the dentistry. Generally chairside systems are focused on crown and bridge and not full arch reconstruction. Perception is the chairside scanner can do it all – I/O scanners can do full arch for Orthodontics, full mouth Implant cases or removable prosthetics.

… **Is revolutionising Dentistry**
- Technology should be seen as another tool available to enhance what is currently available. An important aspect is that manufacturers marketing is Pushing information on to you without you potentially knowing what the question is. Pulling information and asking the questions relevant to your particular situation is very important.

… **Ensures results meet the practice standards**
- Practitioners and dental technicians believe technology solutions will deliver better patient care and improvement in profitability.

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- Practitioners and dental technicians have a strong belief in the emotional appeal of technology, customised solutions and use it to improve their business.

… **<u>Can assist and support clinical decision making and save time</u>**
- Improved patient consultation and treatment planning
- By involving the patient case acceptance is generally higher as they take ownership of the potential solution. Patients agree with the next stage (whatever that maybe) prior to physical models, stents, physical mock-ups and more being produced. Less is more.

… **<u>Is more accurate, re-producible likely to produce a predictable result and more consistent than the analogue technique</u>**
- There is a potential reduction in human error.
- What has been captured is there for everyone to see.
- With every new technique practice is needed. Time needs to be set aside to understand what is trying to be achieved.

… **<u>Can reduce costs</u>**
- Fewer remakes, patient case acceptance, digital files that can be 3D printed (no model storage required) if required.
- There are ongoing costs with your technology purchase. This maybe software, new PC's (from the manufacturer) in 2-3 years as well continuing education.
- Experience shows that some costs go up as the patient or practice expectation opens up opportunities that were not available or discussed previously with the patient.

… **<u>Allows for more control of the work flow and is simpler than conventional workflows</u>**
- Digital workflows are portable, transferable.
- Fully integrated from diagnostic to finished product.
- Ease of communications with all staff on and offsite. The digital workflow can have a common clinical/technical language which is software dependant.
- The same thought process is required. Try to think of the end result and work backwards. Planning is available for each stage that can evolve if required.

… **<u>Offers more options for treatment planning</u>**
- Treatment planning options can be optimised as the potential to show the end result before treatment starts. Just think orthodontic aligners or smile design software.

<u>Misconceptions to note:</u>

<u>"CAD/CAM and Digital Technology"</u>…

It would be a misconception to think that dental CAD/CAM technology has advanced to the point that non-dentally trained individuals could run the technology and fabricate restorations. This is not the case. Rather, clinical, functional, and aesthetic success of CAD/CAM restorations necessitates operation by an intelligent dental professional who can visualise what the proposed restorative should be in the 3-dimensional (3D) world.

Lack of understanding of the system purchased, understanding the clinical and technical applications, personal bias or lack of first-hand experience often generates these misconceptions. There are differences in applying the various CAD/CAM and digital technology solutions – such as I/O scanners, laboratory scanners, software (CAD), milling (CAM), 3D printing (CAM), materials available, education, support and manufacturers. Not all software talks to other software and there should not

be an expectation to *"push the button"*. Dental Laboratories will and should consider two versions of CAD software.

- … **Is not advanced enough to effectively produce complex cases**
  - This is possible depending on the type of procedures being undertaken.
- … **Has advanced to the point that non-dental trained personnel can manage a digital workflow to the restoration stage**
  - Yes you could have non-dental person complete a restoration. The difference is they may not be able to understand the requirements of what is presented. Areas include occlusal anatomy, emergence profile, shape, form and function.
  - What is a fulcrum point, emergence profile and soft tissue management for implants? Connector size, position and shape for bridges and more.
  - Have they had formal software training? Suppliers of the technology are not a substitute for formal dental training offered by educational institutions.
- … **Reduces the need for proficient clinical and technical knowledge and experience**
  - Absolutely not. By agreeing with what is seen on the screen and pressing "*next, forward, enter"* you have taken into the account the clinical and technical consequences of what is to be produced. Technology can enhance techniques.
- … **Can cover my mistakes or inexperience**
  - See above for the first part to this answer. The restorative outcomes are only as good as the quality of data (preparation). Ask yourself how you are going to seat, fit or cement the restoration or prosthetic appliance.
  - The digital method should be an enhancement to the traditional technique.
- … **Digital workflows are fundamentally different to traditional workflows**
  - Not necessarily. There may be fewer processes. Digital workflows do not change the clinical and technical outcomes. Knowledge of materials and techniques and their applications is still key to successful dentistry.
  - Refer to a previous article ***"Preparation Technique Encompassing Milling or Grinding Strategies - What are the Consequences and Limitations?"***
  - It is important to review all current workplace protocols to see what is possible.
- … **Chairside and laboratory CAD/CAM systems (scanning, milling or 3D printing) can do it all, they are digital**
  - Not all systems can do it all. The weakest link in the technology is the best it will be.
  - The dental laboratory is still a very important component to a dental practice. A lot of knowledge and expertise resides in this group.
- … **Is expensive, difficult to learn, time consuming, complicated, requires lots of training and on-going training**
  - Understanding what is trying to be achieved with the various systems available on the market is important.
  - What is your expectation vs. your budget vs. the clinical or technical outcomes?
- … **Is not reliable and leaves me stranded when it doesn't work**
  - Yes things go wrong. So does the provider of your technology solution offer onsite, online or telephone support?
  - In a clinical situation, simply take an impression, temporize and dismiss the patient. Enjoy a cup of your favourite beverage and relax before the next patient. Remember the person on the end of the phone is going to try and help.
- … **It will be redundant the day I invest in the technology as there is a new version coming**
  - There are always advancements in technology. It does not mean that the technology you purchase or currently have is redundant. A consideration is, is the technology capable of what is available for the clinical application today as to when it was purchased.

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- You would hope there would be newer technology and that the company suppling that technology continues with R&D for your benefit.
- A simple analogy would be the iPhone. My current version (4S) still makes phone calls, allows me to look at the internet, receive emails, take photos, listen to music and more. As compared to an iPhone 7 which still makes phone calls allows me to look at the internet, receive emails, take photos, listen to music and more – nothing has changed.
- So what has changed between the two phones (certainly not the price), a faster processor, better camera, larger screen and new software applications? You will need to plan for next mobile phone but that is part of reviewing your business and what is important to ensure you have the functionality and applications with the technology available.

… **Technology will come down in price**

- New technology does not necessary mean any cheaper. Refer to your latest smart phones, where most people are on a plan so consideration would be financing equipment.
- There are lower priced models so yes the price has come down but is there a simple upgrade path from black and white to colour, new computer and more.

… **3D printing is just *"pushing the button"***

- You are now moving into the engineering world. An innate understanding of CAM software, mathematics, proper support structures, post curing and more.
- Understand the volumes, types of material to be used.
- Does the material supplied have TGA approval for appliances such a surgical guides or occlusal splints?
- Ongoing daily and weekly maintenance.

… **I have looked CAD/CAM and digital technology before and it is not for me**

- Generally this information comes from their peers opinions, read blogs or have had good/bad experiences (potentially lack of formal training).
- The company selling a solution could not easily answer your clinical and technical solution easily.
- Have you reviewed all the current solutions including what was available?

I'm a hard core researcher in advanced CAD/CAM, emerging digital technologies and materials with practical applications for the Dental Professional. DDC is focused on dental applications from a clinical, practical and technical for the dental surgery, educational institutions, design CAD and CAM, including dental CAD/CAM, intraoral scanning, dental materials and techniques.

I have collaborated and worked with or been exposed to technologies from Dentsply Sirona, Ivoclar Vivadent, KaVo, Vita Zahnfabrik, Formco, Straumann, Dental Wings, Planmeca, Nobel Biocare, Carestream, Heraeus Kulzer, GC, Amann Girrbach, core3d, Zfx Australia, Stoneglass Industries, Materialize, HyperDent and SUM3D, Roland DG, 3M, VHF, 3D Systems, Artec 3D, S-Ray Ultrasound and more.

Recognizing that the dental professional have quite different and distinct needs, DDC offers a consultancy or partnership model which allows you, the dental professional, to extract from DDC the support and advice that is appropriate and most useful for you.

Conversations never hurt and often fantastic results occur when we put our heads together and collaborate!

Geoff

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