Straumann successfully concludes digital dentistry roadshow

By DTI

MANCHESTER, UK: Swiss company Straumann has massively expanded its digital workflow solutions over the past few years. At the recent International Dental Show in Cologne, for example, 3D printers, which were created through a partnership with German developer Rapid Shape, were added to its already extensive portfolio. At a roadshow recently held in several locations throughout the UK, dentists and technicians had the opportunity to get their hands on the company’s new products and find out how these could benefit their practices.

Straumann has invested heavily in digital solutions in the last few years. Under the CARES umbrella, equipment, state-of-the-art materials and digital technology have been combined with the aim to offer dental professionals an efficient and validated workflow, whether they just need something for their case planning or want to produce customised dental prosthetics in-house. The compact, yet powerful Straumann CARES M Series milling and grinding system, for example, allows the dentist to mill almost any kind of prosthetics from a wide range of materials, including zirconia, glass ceramic or PMMA. With its comprehensive portfolio that also includes an outsourced scan and design platform, Scan & Shape, the company is now able to offer a digital workflow for almost any practice or lab in the country.

“Dentistry always used to be behind a bit in the implementation of digital technology. In the last few years, however, we have seen a real explosion of interest,” Annett said. “Straumann is well-positioned for the future as it not only offers a full digital portfolio, but also the support that, especially beginners, need.”

Straumann already has plans for another tour that will probably take place next year. Dates will be announced on the Straumann website, where professionals can also find more information about the company’s digital portfolio and product offering.

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Award-winning seaweed drug could help fight peri-implantitis

By DTI

CARDIFF, UK: Together with the Norwegian biopharmaceutical company AlgiPharma, researchers at Cardiff University have been working on new drugs to combat antibiotic-resistant diseases and infections. In the study, the team at the School of Dentistry has shown how alginates—found in seaweed—can disrupt the formation of microbial biofilms.

Biofilms form when a community of bacteria assemble in some form of watery environment, begin to excrete a glue-like substance and adhere to a surface. Biofilms have been found to be involved in a wide variety of microbial infections in the human body. An example is dental plaque, which can lead to caries and periodontal disease if undisrupted.

In an interview with Dental Tribune International, study leader Prof. David Thomas explained that specialised alginates work in two ways: “Firstly, they directly interact with the ‘sticky’ biofilm matrix, which encases the bacteria, and modify the biofilm’s structure by binding to calcium. These effects make the biofilm less robust and more easily disrupted. Secondly, they work directly on the bacteria themselves, changing their expression of quorum-sensing molecules (which control biofilm development) and making them more sensitive to the effects of conventional antibiotic therapy.”

The researchers have used the information about how alginates work to develop an inhalation therapy being tested on cystic fibrosis patients. If successful, the treatment could be applied to help clear mucus obstructions in the lungs and potentially slow the progression of the disease. In addition, it could be used in other, more common respiratory diseases, such as chronic obstructive pulmonary disease. The studies are also paving the way towards improved treatment of chronic skin wounds and combat of organisms that cause periodontal disease, for example.

Thomas explained that “the alginates may be useful in dentistry as an adjunct in the management of chronic biofilm infections”, such as “peri-implantitis, where the non-toxic agent may be applied directly to aid disruption of biofilms and stop biofilms reforming on treated surfaces”.

The project was launched with funding from AlgiPharma in 2007 for exploratory microbiology studies, but developed into a nine-year collaboration between the university’s Advanced Therapies Group (ATG), AlgiPharma, and Cardiff and Vale University Health Board. The ATG’s collaborative network helped attract researchers with expertise in specialist areas, paving the way for human clinical studies across the EU and Scandinavia.

Dr Philip Rye, Research and Development Director at AlgiPharma, said: “The collaboration has enabled us to make significant advances in the development of a new drug, which is now in human clinical studies, and has recently been included in the US Cystic Fibrosis Foundation drug development pipeline.”

The project is a winning finalist in Cardiff University’s 2017 Innovation and Impact Awards.
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Digitising your implant practice

By Dr Ross Cutts, UK

Undoubtedly, digital dentistry is the current topic. Over the last five years, the entire digital workflow has progressed in leaps and bounds. There are so many different digital applications that it is sometimes difficult to keep up with all the advances. Many dentists are excited about the advantages of new technologies, but there are an equal number who doubt that the improved clinical workflow justifies the expense.

I have many times heard the argument that there is no need to try to fix something that is not broken. It is so true that impressions have their place and there are certainly limitations to the digital workflow that anyone using the technology should be aware of. For me, however, the benefits of digital far outweigh the disadvantages. In fact, the disadvantages are the same as with conventional techniques.

Chairside CAD/CAM single-visit restorations have been possible for over 20 years, but it was only recently that we became able to mill chairside implant crown restorations after the release of VaroBase (Straumann) and similar abutments. I made my lease of Variobase (Straumann) and similar implant abutments. I made my lease of Variobase (Straumann) in 2003 with a powder scanner, and the difference from what I remember then to how we can make IPS e-max stained and glazed restorations (Ivoclar Vivadent) now is amazing.

An investment not an expense

The results of a survey regarding the use of CAD/CAM technology were published online in the British Dental Journal on 18 November 2016. Over a thousand dentists were approached online to take part in the survey and the 385 who replied gave very interesting responses. The majority did not use CAD/CAM technology, and the main barriers were initial cost and a lack of perceived advantage over conventional methods.

Thirty per cent of the respondents reported being concerned about the quality of the chairside CAD/CAM restorations. This is a valid point. We must not let ourSELVES lose focus that our aim should always be to provide the best level of accuracy possible. For me, digital dentistry is not about a quick fix; it is about raising our performance and improving predictability levels by reducing human error.

In the survey, 89 per cent also said they believed CAD/CAM technology had a major role to play in the future of dentistry. I really cannot imagine that anyone using digital processes that he or she would revert to conventional techniques.

What is digital implant dentistry?

Many implant clinicians have probably been using CAD/CAM workflows without even realising it, as many laboratories were early adopters, substituting the lost-wax technique and the expense of gold for fully customised cobalt-chromium milled abutments (Fig. 1).

One of my most important goals in seeking to be a successful implantologist is to provide a dental implant solution that is durable. We have seen a massive rise in the incident of peri-implantitis and have found that a large proportion of these cases can be attributed to cement inclusion from poorly designed cement-retained restorations (Fig. 2). Even well-designed fully customised abutments and crowns can have cement inclusion if the restoration is not carefully fitted (Fig. 3). This has led to a massive rise in retrievability of implant restorations, with screw-retained crowns and bridges now being the goal. However, making screw-retained prostheses places even greater emphasis on treatment planning and correct implant angulation.

With laboratories as early adopters, we have been milling titanium or zirconia customised abutments for over ten years (Fig. 4). What has changed recently in the digital revolution is the rise of the intra-oral scanner. We now have a workflow in which we can take a preoperative intra-oral scan and combine this with a CT scan using Carestream (Dental Wings) in order to plan an implant placement accurately and safely. We can also create a surgical guide to aid in accurate implant placement, have a temporary crown prefabricated for the planned implant position and then take a final scan of the precise implant position for the final prosthesis.

Accuracy of intra-oral scanners

Figures 4–13 show the workflow for preoperative scanning, which includes the implant design, guide fabrication and surgical placement of two fixtures. Intra-oral scanners have improved over the last few years, and their accuracy and speed provide a viable alternative to conventional impression taking. The digital scan image comes up in real-time and you can evaluate your preparation and quality of the scan on the screen immediately. Seeing the preparation blown up in size no doubt improves the technical quality of your tooth preparations. The scan can then be sent directly to the laboratory for processing.

While we do not think of intra-oral scanners as being any more accurate than good-quality conventional impressions, there are many benefits of scanning, such as no more postage to be paid for impressions, vastly reduced cost of impression materials, almost zero re-impression rates and absolute predictability.

Of course, there are steep learning curves with the techniques, but once a clinician has learnt the workflow, there really is no looking back.

We have three different scanners in the practice: the iEVO (Align Technology), the CEREC
Omnicam (Dentsply Sirona) and the Straumann CARES Intraoral Scanner (Dental Wings; Fig. 14). The CEREC Omnicam is fantastic for simple chairside CAD/CAM restorations, such as IPS e.max all-ceramic restorations on VariaSheath abutments. For truly aesthetic results, we, of course, still have a very close working relationship with our laboratory, but, undoubtedly, patients love the option of restoration in a day. Being able to scan an implant abutment and then an hour later having their tooth being milled for everything, from simple conventional crowns and bridges to implant supported or screw-retained CAD/CAM-milled titanium and cobalt–chromium frameworks. Even though intra-oral scanning appears extremely reproducible and accurate, I still use verification jigs where needed to ensure our frameworks are as accurate as possible. There are many intricacies that we consider and tips and techniques that we employ to make the scans more accurate. The technology, however, is superb as is the open nature of the system, which provides the advantage of being able to export files into planning software. A colleague of mine even uses it for his orthodontic cases now instead of wet impressions.

We invested in the iTero scanner five years ago and have used it for everything, from simple conventional crowns and bridges to scanning for full-mouth rehabilitations. When fabricating definitive bridgework, we use Createch Medical frameworks for screw-retained CAD/CAM-milled titanium and cobalt–chromium frameworks. Even though intra-oral scanning appears extremely reproducible and accurate, I still use verification jigs where needed to ensure our frameworks are as accurate as possible. There are many intricacies that we consider and tips and techniques that we employ to make the scans more accurate. The technology, however, is superb as is the open nature of the system, which provides the advantage of being able to export files into planning software. A colleague of mine even uses it for his orthodontic cases now instead of wet impressions.

**Figure 20** shows a CBCT volume to aid in planning for mandibular implant placement and realising the implant placement (Fig. 21). We exposed the fixtures and placed Straumann Mono Scanbodies (Fig. 22). Then, we took an iTero scan of the fixtures in situ (Fig. 23) and made a verification jig from this (Fig. 24) to ensure passive implant positioning. The iTero models were made (Fig. 25) and a Createch titanium framework was used to support porcelain in a screw-retained design (Fig. 26). The last two figures show the excellent outcome and accurate framework seating (Figs. 27 and 28).

Choosing your workflow

There are many different systems on the market now, each offering a one-stop shop. If you are considering investing in a digital scanner, then take some advice from colleagues. One of the most important things is to ensure the system you opt for is an open one that allows you to extract the digital impression data into different software. We extract our files into CT planning software, model production software, chairside milling for stents, temporaries and definitive restorations, and now orthodontic planning software. I am convinced there will be yet more advances with time. The size of the camera is critical—some can be very cumbersome—and it is worth asking the salesperson what developments are underway.

Some companies are more on the cutting edge than others. My favourite at the moment is the Straumann scanner. Its design is light and user-friendly and it synchronises perfectly with CoDiagnostiX implant planning software. Furthermore, while it offers a chairside milling unit, it also synchronises perfectly with my laboratory for larger cases.

To conclude, digital implant dentistry is the future and so why not take advantage of it and help improve your clinical outcomes?
Dynamic navigation for precise implantation in cases of critical anatomy

By Dr David Burgess, UK

Introduction

Using the CBCT image as a map, dynamic navigation guides surgeons just like a GPS guide drivers. The clinician virtually plans where implants should be placed. During surgery, the navigation system dynamically tracks the drill and the patient’s jaw, providing guidance and visual feedback to ensure the implants are placed according to plan.

There are several advantages with dynamic navigation. The technology allows clinicians to place implants more accurately than free-hand. This results in improved safety and aesthetics, as it helps the clinician to anticipate and to avoid potential complications. Other advantages are the ability to have more minimal invasive treatments, which means less chair time, less patient discomfort and less recovery time. This treatment option has generally been seen as a “blind” procedure in the past, but the ability to avoid delicate anatomical structures due to the real-time surgical feedback makes so-called flapless surgery a valuable option.

In this case report, Dr David Burgess describes how using computer-guided dynamic navigation helped him overcome clinical challenges for dental implant placement in the lower posterior region.

Case report

A 75-year-old male patient had endured a gap for five years, following removal of his lower left second molar, due to an acute apical infection. He was finding mastication increasingly difficult and sought advice about the treatment options available.

Planning for optimum implant positioning

As there was no tooth distal to the space, conventional fixed bridgework was not possible. The treatment options were either a unilateral single saddle lower partial denture or restoration of the space with two dental implants. The patient chose to have dental implant treatment as he did not wish to have any form of removable prosthesis.

What makes Navident dynamic navigation stand out is it precisely guides the surgeon to prepare and place the implant in a pre-determined position (Fig. 1). This allows me to achieve greater accuracy and certainty than I have previously been able to, using conventional protocols. Whilst there is no physical guide, a simple scanning template (Navistent) is used to hold the fiducial in place whilst taking the CT scan, and secure the jaw reference (jawtag) for the navigated osteotomy.

In this case, the Navistent was fabricated, the fiducial marker attached and a CBCT scan taken two weeks prior to surgery (Fig. 2). The treatment plan was created immediately after the scan (Fig. 3), with the patient present. He was able to see the proposed treatment displayed by the Navident software and appreciated that great care was being taken to achieve the optimum implant positioning, with minimal risk of potential complications (Fig. 4). The patient was impressed with, and reassured by, the state-of-the-art technology.

Confidence from continuous feedback

Treatment was carried out under local anaesthesia. Prior to preparation of the implant sites,
Dr David Burgess

BDS DDSD MScConSed

has been principal of Carbis Bay Dental Care in Cornwall since 1988 and has placed over 2,000 implants. Throughout his career, David has striven to combine clinical perfection with the ultimate in patient care. He has been a willing pioneer of new technology, particularly in the field of digital dentistry. David was the first UK clinician to introduce the Navident dynamic navigation system into his implant treatment workflow, with the objective of achieving a higher degree of precision and greater patient comfort.

Navident provided guidance for accurate implant location, even with restricted visibility and the drill being impeded by opposing teeth. Tactile feedback can often be reduced when using a physical drill guide. Dynamic navigation removes this obstacle. The author was able to achieve the best-possible buccal and lingual position of the implants, and their relation to each other and to adjacent teeth (Fig. 5). This would allow for optimal shape, position and occlusal function of the final restorations.

Avoiding damage to the inferior alveolar nerve was a crucial factor in the treatment planning of this case. Access was difficult, due to the limited opening of the patient’s mouth. The issue was compounded by the plan to place an implant as distal as the second molar. These challenges were overcome using Navident’s continuous internal visual feedback, which gave the author the confidence to use the optimum length of implant, whilst staying within a safe distance from the inferior alveolar nerve and avoiding post-surgical complications, such as paraesthesia.

Ankylos® Balance posterior sulcus formers were fitted and the incision was closed with simple interrupted sutures. There was no need for bone augmentation.

The clinical outcome was excellent. The planned placement was restoratively driven and the implants were well positioned, with good primary stability. Having used the Navident dynamic navigation system for more than a year, the author would not want to go back to preparing and placing dental implants without its 3-D visual guidance. The patient was comfortable and reassured, with no postoperative pain, swelling, bruising or paraesthesia. He was delighted and, if he needed any implant treatment in the future, would insist on dynamic navigation.

Conclusion

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