In our practice in Charleston, S.C., we utilise dental implants as the preferred alternative to bridgework for replacing a missing tooth, filling extraction sites from removal of a broken tooth and, of course, for replacing aging, worn-out bridges. For the single tooth replacements, we are able in one surgical procedure to replace the tooth root with a permanent implant with no loss of bone.

Young patients who have lost one or more teeth from accidents and sports injuries benefit from permanent implants rather than sacrificing healthy teeth to accommodate a three or four unit bridge. The bridge eventually will have to be replaced and the young patient likely would face a lifetime of compromised dentition. Once the implant is in place, however, it functions the same as a normal tooth without complications associated with bridgework.

Our patient, Bobby, was hit during a soccer game and fractured his left front tooth. The remaining root was removed and the dental implant and temporary crown were placed in the same appointment. If not for this technique to replace just the damaged tooth, Bobby would have had to have new crowns on either side of the damaged tooth that held the three-unit bridge. Further, the bone above the gumline would have shrunk, leaving a defect that showed when he smiled.

Today baby boomers are coping with dental problems associated with advancing age, and for many that means replacing aging bridgework. A study published this year in the Journal of Oral Implantology reported that dental implants are 98 per cent successful and cause little or no bone loss. The study goal was to determine the level of bone loss over time at implant sites in the jaw. A key clinical issue was not whether bone loss would occur, but how much bone loss should be considered normal and acceptable.

The authors reviewed 60 charts of patients who received a total of 267 implants in two private dental practices in Israel and Germany. They found that 98.5 per cent of the implants survived and there was no discernible bone loss in 88 per cent of the implant sites. The mean follow-up time was 7.5 years.

These findings should be very encouraging for older patients who have had their original bridges in their mouths for 10 years or more and are considering implants.

For most, the bridges were inserted when the procedure was considered to be the norm in dentistry for replacing missing or compromised teeth. Unfortu-
As a result, bridges generally fail after five to 10 years as patients have trouble flossing them. Because these bridges link missing tooth spaces to adjacent teeth, many patients have great difficulty flossing the bridge, and root surfaces below and around bridgework often decay, if they are not kept exceptionally clean by flossing. Because it is impossible to repair this marginal decay, the entire bridge has to be replaced. Unfortunately, teeth supporting the old bridge often are lost, requiring insertion of longer bridges that further compromise dentition.

That's why we have been advising our patients to replace those bridges to nowhere with convenient, reliable and permanent dental implants. Implants are proven to be a superior treatment alternative because they preserve the bone of the jaw, can be flossed easily, do not decay and function just like natural teeth. Also, to have implants you don't have to sacrifice healthy teeth.

Our patient, Melissa, was missing her lower first molar and had been wearing a bridge. She had not been flossing regularly, as she stated it was too difficult to get under the bridge. The decay around the margin of one of the teeth in the bridge required replacement of the entire bridge. She chose to have a single tooth implant and replace the crowns on either side so she could floss normally and not have to replace the bridge again in her life. She is so happy that she can floss her implant just like a natural tooth.

In the last decade, prosthetic treatment planning has changed dramatically because of the acceptance of dental implants as a viable long-term option for replacing missing teeth. Why should we recommend higher risk procedures when dental implants are more predictable and a better alternative?

Also, we are advising patients with old endodontically treated teeth with failed root canals to extract them and have implants placed instead of choosing apicoectomies (surgery to try to save the root) that usually have a poor long term prognosis.

Today highly precise computer-erguided dental implant surgery has made the procedure faster, highly predictable, long-lasting and 97 per cent successful, which is far superior to outcomes with bridges. Therefore, we strongly recommend anyone with one or more missing teeth who is considering having a first bridge inserted or needs to replace an old one seriously weigh the benefits of dental implants before getting treatment.
Immediate implant placement and immediate loading after a complicated tooth extraction

By Xavier Vela, Spain

As implant dentistry continues to evolve to meet our patients' demands for aesthetic tooth replacements with minimal downtime or inconvenience, the dental implant industry has responded with new technological advancements and research.

For example, the development of enhanced implant surfaces, such as the Osseotite® Dual-Acid-Etched Implant Surface, improved on the results seen with machined surfaced implants. Studies demonstrated long-term cumulative survival rates (CSRs) with Osseotite implants in the range of 95 per cent to 98 per cent2 (at five years), which represented an improvement over the CSRs of machined surfaced implants (85 per cent to 95 per cent).3,4

With these enhanced implant surfaces, clinicians felt confident to perform early loading protocols and to place implants in compromised clinical situations. With multicenter, long-term prospective studies and the 10-year history of Osseotite, good long-term success with negligible peri-implant concerns has been demonstrated.1

With such positive results, why shouldn't dentists and implant industry continue to look for advancements in implant surface technology and designs?5 Implants typically demonstrate good initial primary stability at the time of placement; however, when bone remodels in the first few weeks after implant placement, primary implant stability can degrade with initial bone resorption, which in turn might impact the ability to successfully perform immediate loading protocols. To potentially address this concern, new nanotechnology in implant surface topography has been explored.

Biomet 5i is the first implant company in introducing a nanostructured implant surface, the NanoTite6–8, obtained by applying nano-scale crystals of calcium phosphate onto the Osseotite surface by using a Discrete Crystalline Deposition (DCD)® Process. This process creates a more complex surface topography, which renders it a Bone Bonding® surface by the interlocking of the newly formed cement line matrix of bone with the implant surface.

The result is a more rapid bone formation with improved bone-to-implant contact (BIC) as demonstrated in animal studies and human histology.9,10 What is the significance of these findings in clinical practice? Clinicians can immediately load the implants, reduce the time to loading and treat more patients, even in compromised clinical situations such as poor bone quality, limited bone quantity or in grafted sites.

What about crestal bone preservation? Preservation of crestal bone has proven to be critical for long-term implant success. This is especially true in the anterior aesthetic zone for support of the peri-implant soft tissues, as well as in areas of limited bone height so as to maximise bone-to-implant contact. One new implant design available today, such as the NanoTite Prevail® Implant, has built-in platform switching with the surface treatment to the top of the implant collar at the marginalisation point, creating a continuous bone loading surface allowing for this crestal bone preservation.11–13

This implant has been designed with straight and expanded collar configurations. The straight collar configuration is ideally suited for sites with limited restorative space, such as missing maxillary lateral incisors or mandibular anteriors. The expanded collar configuration was used in the following clinical case and is indicated for sites where engagement of the crestal cortical plate of bone is required to achieve a high level of primary stability.

Case presentation
A 45-year-old female patient presented with the upper right milk canine (tooth 53) affected by caries, which has caused important occlusal and distal destruction and pulpar necrosis. The radiographic examination revealed an included final canine (tooth 15) and minimum root support of the milk canine but no presence of periapical defects. The patient desired fast and aesthetic restoration of the affected tooth. The exploration revealed a preserved buccal bone plate, which allowed for the extraction of the included canine and immediate placement of a dental implant with immediate non-occlusal loading with a temporary crown, which would last for four months until the final crown would be inserted.

On the day of the surgery, extraction of the milk and the included canines was made after an intra-sulcular palatal incision from the first upper premolar to the central incisor to allow for good visualization of the area to be treated. The extraction of the canine required a previous osteotomy and the section of the tooth. The socket walls and bone defect were debrided before initiating the drilling for the implant placement.

After a meticulous drilling sequence, a NanoTite Prevail® Ceramic® implant 4mm in diameter and 15mm in length (Biomet 5i) was slowly inserted with the drill unit at 40 Ncm torque maintaining the direction of the osteotomy. This implant, thanks to its expanded collar shape, is ideal to seal the access to the alveolus, achieve optimal coronal stability and revitalize the grafted bone thanks to the integrated ‘platform switching.’ The palatal bone defect is filled with the bone chips collected in a bone filler from the drilling.

A 5mm emergence profile impression coping is placed and the tissues are sutured around it. Then an impression is made and sent to the laboratory for the fabrication of the provisional crown while a healing abutment of the same size is left in the mouth.

The following day the out-of occlusion provisional crown made of a Kanametal hexed provisional UCLA cylinder (Biomet 5i) and resin is inserted and the access hole closed with light-curing composite (Permit). A periapical radiograph for crestal bone levels control is taken.

The patient came back for periodontal controls after one month, two months, three months and after provisional crown insertion. At the fourth-month control, the provisional crown was retrieved observing the ideal emergence profile created. Then a final impression was made and sent to the laboratory for final crown production.

A month later, at five months from implant insertion, the final screw-retained porcelain-fused-to-metal crown made from a machined gold alloy Certain UCLA cylinder (Biomet 5i) was inserted, as seen in Figure 10. A periapical radiograph was taken to control the interproximal bone levels, which showed less than 0.5mm bone remodeling mesially and no bone remodeling distally.

One month later, after six months of implant insertion, the patient was back for control. We can observe in Figure 12 that the small defect in the distal papilla has been corrected during this time, thereby reaching the expected maximum distance between...
tween the interproximal bone crest and the contact point of the crowns. After one year from tooth extraction and implant placement, the patient showed optimal aesthetic results with the papillae fully covering the interproximal spaces, full bone regeneration of the palatal defect and optimal crestal bone preservation (Fig. 13).

Summary

As demonstrated in the clinical case, the new implant designs available today with the nanotextured implant surface allow us to replace lost teeth immediately and place a provisional restoration also immediately, even in complicated tooth extractions that require bone grafting at the same time. Thanks, among other factors, to the platform switching included in the coronal implant macro design the peri-implant crestal bone and thus the optimal aesthetic result obtained can be preserved over time.

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Recently, this ground-breaking technology was further validated using human histologic evidence, microcomputerized tomography and scanning electron microscopy by Nevins et al and published in the International Journal of Periodontics & Restorative Dentistry.

For more information, contact the BioHorizons Education Department at 08700-620-550 or visit www.biohorizons.com.

‡Clinical References available.

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about the author

Dr. Xavier Vela Nebot was born in Badalona, Barcelona, Spain, on Oct. 16, 1965. He received his medical and odontology degrees from the University of Barcelona (UB). He has lectured nationally and internationally about aesthetic and multidisciplinary oral rehabilitations. He maintains a private practice in Barcelona, Spain, mostly dedicated to dental implants and prosthodontics. He also does clinical implantology research and is co-founder and member of the Barcelona Osseointegration Research Group (BORG). Dr. Vela has published several articles about dental implants nationally and internationally.

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Tips for carrying out implant treatment
David Bloom and Jay Padayachy of Senova Dental Studios offer their top 10 tips on assessing your patient in order to assess the best treatment method

1. Ensure you understand the components of your chosen system. Implant systems vary from manufacturer to manufacturer and all will have various components unique to that system both for the surgical and the restorative phases.

2. Ensure you have undertaken adequate training – especially for surgical phase but for restorative as well. There are many excellent courses but the GDC do not feel a weekend course is adequate training for surgical placement or anything but the simplest restorative procedures. See fig 1 showing zygoma implants – at 47mms these are not for the beginner.

3. Take radiographs to ensure components are fully seated before taking impressions and at final fit to ensure complete seating. See figs 2 to 4.

4. Use an implant type occlusion for implants when natural teeth are also involved in the occlusal scheme. This entails allowing a slightly lighter loading on an implant as there is no periodontal ligament to absorb the early forces and so excessive loading may not be apparent to the patient, which may result in occlusal overload and loss of integration. This is best checked with Shimstock to ensure the foil holds on natural teeth in light contact but not on implants. The foil should then hold in clenching on the implants.

5. Do not link implants to teeth – teeth have a periodontal ligament (allowing some movement) whilst implants do not and so the authors feel that linking implants and teeth is asking for problems in the future due to undue forces on the implants.

6. Ensure accurate diagnosis to ensure implants are the correct solution. Many factors are involved including the medical history, bone availability, and occlusal scheme. The placement of implants and their successful restoration is all about accurate diagnosis leading to an appropriate treatment plan as well as successful implementation.

7. Remember CT scans can be very useful to determine quality and quantity of the bone at each implant site. They are more accurate than ridge mapping. See fig 5 showing guided surgery using a Nobel guide constructed after a CT scan.

8. Ensure informed consent so that the patient understands the pros and cons of the

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procedures involved including complications, as well as all the alternative procedures along with the relevant prognosis. Alternatives can range from doing nothing, to different denture designs, and adhesive or conventional bridges.

9. Dense bone requires adequate irrigation to avoid overheating and with softer bone remember to under prepare the site and consider use of socket dilatation.

10. Ensure optimal aseptic technique. See fig. 6.

Dental implant surgeon, Guy McElhanan is credited for the implant surgery illustrated in this article. Mr McElhanan takes referrals at Senova for implant placement only or restorative, as well as placement.

About the author

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A graduate of the Newcastle-upon-Tyne Dental School, Dr Bloom has been a principle at Senova Dental Studios since 1990 focusing on comprehensive restorative and cosmetic dentistry. A past president of the British Academy of Cosmetic Dentistry (2007-2008), David is also an accredited member of the BACD. He is a member of The British Society of Occlusal Studies, The British Society of Restorative Dentistry, The British Dental Association and is a sustaining member of The American Academy of Cosmetic Dentistry (AACD). He is also a fellow of the International Academy of Dental Facial Aesthetics. David is on the editorial board of the Journal of Cosmetic Dentistry— the official journal of the American Academy of Cosmetic Dentistry. Dr Bloom is a clinical director of CO-OP.R8 seminars and instructs and lectures on all aspects of cosmetic dentistry in the UK and the US. (www.coopr8.com).

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