Guided implant surgical placement with Cad/CAM CEREC Crown

Nilesh R Parmar presents a surgical case study

Guided surgery has been around for a long time. However, very few dentists in the UK are placing implants via the use of a guided surgical procedure. The reasons for this are multiple, ranging from dentists not wanting to, or not having confidence in the procedures, the increased costs of guide fabrication and the time delay and extra appointments needed to obtain a fully working and reliable surgical guide.

In this case study I shall be demonstrating an in house manufactured surgical guide using the CEREC AC BluCam. These guides do not require any impressions to be sent to a third party and can be made rather cheaply in the surgery within around 30 minutes. The guide can then be used in conjunction with specific drill keys, which are compatible with the guided surgical drill sets from all leading implant manufacturers. In this particular case the Astra/Dentsply Implants Facilitate system was used to place the implant.

Once the implant was osseointegrated the final restoration was fabricated chairside using the CEREC milling machine and an Ivoclar Vivadent e.max block.

Case Study

This young lady had lost her LL6 a few years ago and wanted an implant solution. Her medical history was clear and she had a mildly restored dentition with no current dental pathology. Her BPE scores were low, with excellent oral hygiene.

The patient was scanned using the Sirona AC BluCam and a proposal for the missing LL6 was created. A Galileos collimated lower jaw CBCT scan was taken with a CEREC Guide reference body set in thermoplastic over the edentulous area. The reference body is identified within the software and a virtual implant placement along with the CEREC crown proposal is all imported into the software. This allows the clinician to virtually place the implant, with reference to the ideal final crown position. In this case, it was deemed that a screw-retained restoration would be desirable; hence the screw access hole was positioned through the centre of the crown.

Once the implant position was decided, the information is ported over into the CEREC software and using a CEREC Guide Mill Block a drill body is milled by the MCXL milling machine. Once this has been milled it will lock tightly into the thermoplastic drilling template. The surgical guide is now complete and can be used on the patient.

In this particular case an Astra 4.0 x 11mm TX implant was placed using the surgical guide. The patient is prepared using a standard sterile protocol and the area anaesthetised as one would for a regular...
implant placement. The surgical guide snaps firmly over the existing teeth, expanding over and undercuts, becoming a very stable platform to drill through. The Astra Facilitate soft tissue punch is used to remove the overlying soft tissue, and a standard drilling protocol using the Sirona drill keys is used.

A high primary stability of 40Ncm was obtained, with a 4mm healing abutment placed immediately. The patient healed with no pain, no swelling and no discomfort. The post op LCPA corresponds well with the pre-surgical planning with an ideal angulation for a screw-retained crown. After two months of healing a fixture level open-tray impression was taken and cast up using an Astra Tech replica. A standard metal abutment was inserted into the replica and cut back by 3mm from the occlusal table. This was then powdered and scanned using the Ac BluCam and an Ivoclar e.max CAD C14 block milled.

The CEREC 4.2 software was instructed to mill a hole that corresponds to the screw insertion path on the abutment. This is finalised using a high speed diamond bur with copious irrigation. The crown is glazed and sintered, allowed to cool and bonded to the abutment using Vario link II. The final crown can be screwed directly into the implant and a final check for contacts and occlusion is made.

This process shows just how far CAD/CAM technology has come. An implant can be planned, inserted and restored all in-house, using the current available technology.
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Dr Nilesh R. Parmar BDS (Lond) MSc (Prosth Dent) MSc (Imp Dent) Cert. Ortho was voted Best Young Dentist in the East of England in 2009 and runner up in 2010. He was short-listed at the Private Dentistry Awards in the category of Outstanding Individual 2011. Nilesh has a master’s degree in Prosthetic Dentistry from the Eastman Dental Institute and a master’s degree in Clinical Implantology from King’s College London. He is one of the few dentists in the UK to have a degree from all three London Dental Schools and has recently obtained his Certificate in Orthodontics from Warwick University. His main area of interest is in dental implants and CEREC CAD/CAM technology. Nilesh runs a successful five-surgery practice close to London and is a visiting implant dentist to two central London practices. Nilesh has a never-ending passion for his work and is famed for his attention to detail and his belief that every patient he sees should become a patient for life. He offers training and mentoring to dentists starting out in implant dentistry, more information can be found on his website www.drnileshparmar.com.

About the author

Figure 13: Standard abutment with 3mm of occlusal clearance

Figure 14: Soft tissue profile after 2 months healing

Figure 15: Cerec image of abutment

Figure 16: E-max crown glazed, stained and ready for sintering

Figure 17: Cerec image of block

Figure 18: E-max crown milled with screw hole

Figure 19: E-max crown with screw hole

Figure 20: Screw-retained E-max crown

Figure 21: Final restoration in-situ 2

Figure 22: Final restoration in-situ
Fixed Teeth in a Day: An interview with Dr Steven Bongard

Interviewer Dr Mark Lin

Mark Lin (ML): What is ‘Fixed Teeth in a Day?’

Steven Bongard (SB): The Fixed Teeth in a Day protocol delivers same day, full arch rehabilitation utilising four or more implants to support fixed, immediately functional, aesthetic prostheses.

ML: How does Fixed Teeth in a Day compare with conventional rehabilitations?

SB: Fixed Teeth in a Day is less invasive, reduces morbidity, is less disruptive and less costly. The principal surgical difference is in the implant placement. Posterior maxilla implants are placed on an angle, just anterior to the maxillary sinus, into the denser bone of the pre-maxilla, avoiding the need for sinus augmentation while still enabling a shortened posterior cantilever. In the mandible, implants are placed between the mental foramina, angled in the posterior bone, and to allow the use of longer implants where there is limited vertical bone.

ML: How do you decide on the number of implants you use?

SB: Some clinics use only four implants; we find that softer bone may require up to six implants to limit early micromovement. When planning each case we always consider bone quality and the anticipated bite forces generated by the opposing arch.

ML: Traditionalists prefer axial loading of the implants, while Fixed Teeth in a Day calls for tilted implants. How do you respond?

SB: We tilt the implants to shorten cantilevers and improve force distribution; to eliminate the need for sinus augmentation; to allow engagement of the denser anterior bone, and to allow the use of longer implants where there is limited vertical bone.

ML: Many fear that tilted implants will cause problems with bone reaction or prosthetics.

SB: Our tilting implants are rigidly connected to other implants, creating a totally different force dynamic compared to a single off-angle implant. We have not seen any significant difference in bone reaction.

ML: How do differences in bone density affect your approach?

SB: Our surgical protocols are designed to maximise predictable primary stability. In the maxilla the implants are angled to avoid the less dense posterior bone. The pre-maxilla generally has fairly dense, compatible quality bone to that of the intra-foramina region of the mandible. We haven’t seen any significant difference in survival rates for either arch.

ML: What are the minimum clinical prerequisites for Fixed Teeth in a Day with immediate loading?

SB: Ideally, minimum requirements are 3mm of bone width for maxillary implants and 4-5mm of bone width for mandibular implants. Failure rates between 90-98% are reported. The opposing arch is not necessarily required as some patients may choose to have their teeth removed for a more ideal fit as part of the protocol. However, when opposing arches are present, they should be minimally resorbed, 5mm of bone width or more in the maxilla and 7mm or more in the mandible. Patients with more severe resorption may benefit from a sinus lift.

ML: How do you respond?

SB: Our surgical protocols are designed to maximise predictable primary stability. In the maxilla the implants are angled to avoid the less dense posterior bone. The pre-maxilla generally has fairly dense, compatible quality bone to that of the intra-foramina region of the mandible. We haven’t seen any significant difference in survival rates for either arch.

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and 10 mm of bone height between the canines in the maxilla, and 5 mm of bone width and 8 mm of bone height intraorally in the mandible. For patients with significantly less bone we are working on protocol modifications which are already showing favourable short term outcomes. For immediate loading we need at least 35 Ncm of initial stabilisation on at least four implants in both mandible and maxilla.

ML: What is the patient’s post-op advice?
SB: A softer foods diet for the first three months. At the two-week appointment we introduce a Waterpik to the hygiene regimen. We ourselves pay meticulous attention to the occlusal scheme and adjust it using the T-scan system at two and eight weeks.

ML: What type of occlusal scheme are you seeking?
SB: Our protocols require bilateral, simultaneous, equal intensity posterior contacts in the maximal intercuspation position (MIP). We try to avoid contact in the cantilever portion and premature contacts.

ML: This sounds like a mutually protected occlusal scheme where when the teeth are in MIP there are posterior, equal intensity, simultaneous contacts with little or no contacts to the anterior teeth.
SB: In fact our protocols demand the front and back teeth contribute equally to MIP.

ML: What if the patient presents with existing dentition?
SB: More than 60 per cent of our cases present with failing teeth. We try to reduce the number of operations by extracting the teeth, immediately placing the implants, and immediately loading them with the Fixed Teeth in a Day all acrylic transitional prosthesis. Provided the initial stabilisation parameters are met,

Table 1 from Malo et al. JADA 2011;142(3):310-320 shows the cumulative success rate over ten years for Fixed Teeth in a Day mandibular implants.
we achieve the same success rate as for edentulous cases.

**ML:** What types of prostheses are you using?
**SB:** The transitional unit is an all-acrylic, screw-retained, fixed, provisional prosthesis. Our final restoration is a hybrid comprising a screw-retained, milled, titanium bar with premium acrylic teeth.

**ML:** What are your thoughts on porcelain teeth?
**SB:** We prefer acrylic for its predictability and ease of repair, and our patients are happy with the aesthetics of high-end acrylic teeth.

**ML:** What aftercare and recall do you recommend?
**SB:** Aftercare measures depend on each patient’s commitment to plaque control. Recall appointments, usually at the referring practice, check the implants, occlusion, and tissue surfaces.

**ML:** Are there any special risk factors for Fixed Teeth in a Day treatment?
**SB:** The risk factors are similar to those for other implant protocols, typically smoking, poorly controlled diabetes, parafunction, poor oral hygiene etc.

**ML:** How do the patients react to Fixed Teeth in a Day?
**SB:** We are able to provide 95 per cent of cases with an immediate fixed transitional prosthesis, and I have never performed treatment with has delivered such consistently high levels of patient satisfaction.

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### About the author

Dr. Steven Bongard graduated from the University of Toronto in 1986, practices in Toronto, and has extensive experience in bone grafting and implant prosthetics. Dr. Mark Lin is Co-director of Post Graduate Prosthodontics, University of Toronto, and has his own practice. He and Dr. Bongard host courses all around the world on the revolutionary “Fixed Teeth in a Day” concept. (Neither were paid for this interview.)

For more information on how Fixed Teeth in a Day referrals can benefit your practice, call United Smile Centres on 0800 8 49 49 59, email info@unitedsmilecentres.co.uk, or visit www.unitedsmilecentres.co.uk.
Short Implant Placement Does Not Require Bone Augmentation

Armin Nedjat discusses short implants

Conventional dental implantation concepts have been questioned. For several years, short implants have been inserted without the need of a bone augmentation. An implant is considered as short if its thread has a length of less than 10mm. Short Champions® implants are now available as well. The one-piece Champions® are available in lengths including 8mm and 6mm. The two-piece Champions® (B)Evolution implants are available in lengths including 8mm and 6.5mm. Results from a recent study and the 97.5 per cent success rate of short implants have shown that the short implants are as beneficial as those with thread lengths ranging from 10-24mm. The following clinical cases of the online forum show the good treatment results with short implants.

Bone augmentations like an external sinus lift, an iliac crest transplantation or a bone distraction can be traumatic for the patient and can increase health risks. Therefore, our thesis is: “the best augmentation is no augmentation at all!” In addition, it is very important to inform the patient about all dental treatment approaches, including the minimally invasive method as an alternative therapy in comparison with the conventional implant treatments.

Some theses, which were considered as accepted truths in the 80s, have now proven controversial. For instance, studies have shown that it is not absolutely necessary to place implants with a length of 12mm and a diameter of 4.7mm! In addition, the dogma that there should be a large amount of titanium in bone has been questioned. Since according to the conventional Implantology theory, the implant length should be 2:1 in relation to the length of the crown, I had previously doubted the efficiency of the short implants and had not planned to insert a short implant such as a 6mm long implant. However, from our experiences as dentists and current scientific studies, these theses against short implants are proven wrong.

Therapy with short implants does not necessarily require bone augmentation, and it is beneficial and also affordable. In this way, the crestal bone site can be treated. Our experience with several implant systems has shown that the first 3-4mm in the crestal implant site are particularly crucial. Certain implant systems are equipped with a micro-thread, allowing for placement in the crestal implant site. In order to successfully insert and restore the short implants, primary stability of at least 35Ncm⁴ should be achieved. Mechanical stimuli will be converted into biological condensation, ensured through MIMI®, has proven highly beneficial for patients. You must avoid micro-traumata which overload the interface between the implant and the bone. In addition, lateral shear forces must be avoided during the first two to eight weeks after implantation.

Conclusion

Currently, conventional Implantology theories which argued that short implants were less effective than long ones have been questioned. Over the past few years, recent studies have shown that short implants with a thread length of less than 10mm ensure good soft and hard tissue regeneration on the long-term. In this way, minimally invasive augmentations can be avoided in many cases. Implant therapy, especially minimally invasive implant therapy, can be incorporated as an additional treatment in the dental office. The implants which integrate Platform-Switching prevent crestal bone loss. In order to ensure the successful placement of short implants, a certain number of implants/teeth and primary stability of at least 35Ncm are necessary. The minimally invasive method of implantation (MIMI®) has proven to be optimal to ensure peri-implant nutrition and good periost preservation. Your patients will appreciate it.
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Fig 7-11 Illustration of the internal sinus lift and the enlarged 3D X-ray image. First, you drill with the yellow Champions® triangular drill in the bicortical bone. Then, you lift the bone flap and the membrane with the 3.0 mm-condenser. After this step and also after the drilling procedure, you check the bone cavity quality with the BCC® (Bone Cavity Check) probe. After some weeks or months, autologous bone around the implant will be solid and regenerated.
References

Implant therapy has been an amazing breakthrough in restorative dentistry which has brought benefits to our patients. We are all aware of the high success rates of dental implants and that they will integrate given time. Over the past 10 years implant companies have been developing the new implant surfaces to increase the amount of bone to implant contact and to reduce the time needed for the implant to be loaded. I suppose the ultimate goal for dental implants would be to completely emulate a tooth/ root. That is to achieve a true connective tissue attachment inserting into an implant surface thereby forming a true biological width with a junctional epithelium and connective tissue attachment protecting the bone. This has not been possible; Listgarten’s studies in the 1980’s showed that the connective tissue around an implant is parallel to the implant surface.

A good friend of mine Ken Nicholson who is an implant dentist, in Northern Ireland and the academic lead in the Institute for Postgraduate Dental Education at the University of Central Lancashire, introduced me to Biohorizons dental implant over three years ago. I have enjoyed using this implant system for three years now. Two years ago Biohorizons introduced a new implant surface technology Laser-Lok. Biohorizons have been able to develop a true microthread, the top 2mm of the implant is prepared utilising a laser to threads which are 8 and 12microns apart. Professor Jack Ricci developed this laser technology in the 1990’s at New York University. He found that the microthreads could control the behaviour of the fibroblasts allowing the fibroblasts to orient themselves on the Laser-Lok surface.

The Laser-Lok surface has been shown to elicit a biological response that includes the inhibition of epithelial downgrowth and the attachment of connective tissue. It has been suggested that this physical attachment produces a biological seal around the implant that protects and maintains the bone(Nevins,M et al. International Journal of Periodontics & Restorative Dentistry (IJPRD). vol.28, no.2, 2008)(Figure 1). Recently a study by Nevins et al. (IJPRD vol.30, no.5, 2010) has shown the use of Laser-Lok abutments to create a biological seal. They showed a connective tissue attachment to the Laser-lok abutment which was above the implant abutment connection (Fig 2). The crestal bone levels was also seen to be higher than in standard abutments (Fig 5).

A 51-year-old lady was referred to me by her dentist. She had been suffering from abscesses from her upper anterior bridge (Fig 4) for some years. She had decided that she wanted the bridge removed and replaced with dental implants. The bridge and retaining roots were extracted and replaced with an upper partial denture. The healing was satisfactory (Figure 6). The healing was satisfactorily. The abutments were left to integrate for a period of 8 weeks before the dental implants were placed (Fig 5).

The dental implants were left to integrate for a period of three months (Figure 11). The peri-implant tissue showed more than 1 mm (Fig 12). The implants were restored with a screw retained UL1 crown and a screw retained UL12 bridge (Fig 15). Interestingly a long cone periapical of the final restorations and implants showed that the crestal bone had remodelled to the correct level dictated by the Laser-Lok surface 12microns. You will note from the post-op radiographs the implants were placed at bone level (Fig 14). Another interesting point to make from this case is when I probed the peri-implant tissues you would expect the bone to be less than 1 mm away from the tip of the probe on a standard implant due to the parallel fibres of the connective tissue. Yet when the radiograph was taken the bone was further way.

Implant surface technology is improving every year and maybe one day the dental implant will be able to emulate a tooth/root in every way, it is improving every year and maybe one day the dental implant will be able to emulate a tooth/root in every way, it is improving every year and maybe one day the dental implant will be able to emulate a tooth/root in every way, it is improving every year and maybe one day the dental implant will be able to emulate a tooth/root in every way, it is improving every year and maybe one day the dental implant will be able to emulate a tooth/root in every way.
ADI brings together world implant experts at 2013 Congress

• International implant-focused Congress
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‘How long do implants last?’ will be the focus of the Association of Dental Implantology’s (ADI) 2013 Congress. The UK’s largest implant association is hosting their biennial Congress from 1 – 3 May 2013 in Manchester, focusing on the complications, risk management and prognosis of implant treatment.

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ADI President Professor Cemal Ucer says, “Following decades of research and development, when patient demand and expectations are rising, we should address: what are the real challenges and problems facing us today that affect the success and longevity of implant treatment? I am confident that – the ADI 2013 Team Congress will answer this important question.”

The presentations will cover the full spectrum of topics relevant to anybody who is involved with dental implantology or is planning to enter the field. The Congress will feature lectures on the complete dental implant process, from consultation, placement and after-care to associated risks and complications. It will also include sessions on many specific aspects involved in the running of a dental implant service, such as legal considerations and managing patient expectations.

The Congress exhibition, open over the two days, will give delegates the chance to see the latest products, learn up-to-date techniques and meet industry leaders.

The ADI 2013 Team Congress takes place 1 – 5 May at the Manchester Central Convention Complex. Visit www.adi.org.uk/congress2013 for the full programme and to confirm your registration.
About the author

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Amit is a Specialist in Periodontics practising at Grace House Specialist Dental Centre in Birmingham. His special interests are dental implants, regenerative and aesthetic Periodontics. Amit graduated from the University of Liverpool and completed a 4 year specialist training programme in Periodontics at Guy’s, King’s & St Thomas’ Dental Institute. Amit is also an Associate Specialist in Periodontics at the Birmingham Dental School. He has taught at undergraduate and post graduate level, including lecturing to dental practitioners both in the UK and internationally.