A system that has a one-size-fits-all protocol may leave you unable to handle a tricky situation thus compromising your treatment outcome. Having osteotomes to hand (that match the system) is also a useful tool in your armamentarium.

As previously mentioned, a good range of prosthetic choice is useful. The fewer the number of prosthetic instruments though would be highly commendable!

**Long-term studies**

It is an unfortunate result of market forces that more and more implant manufacturers, even the highly reputed ones, tend to launch new products or designs onto the market with fairly short studies showing their efficacy. As they are all in a race to gain market share, one-year studies seem to be the norm nowadays, whereas in the past, three to five-year, even 20-year studies were available for comparison.

It is unlikely that we shall return to the balmy days of 20-year studies, but it would seem essential that a new system we haven’t used before should have at least a three year study showing its stability over this period of time. Even better would be a well-designed study with a large number of cases. Even better than that would be two or three independent studies.

So many factors come into play with dental implants. Just because a new system seems to be the same as another well-known one, it doesn’t mean that it is. The manufacturing process may be poor. The packaging of the implant may be inadequate. The abutment screw might not fit correctly etc. Even new items produced by well-known manufacturers ought to be approached with caution and a degree of lateral thinking, but again without compromising the principal of the null hypothesis: that it may not work. One or two manufacturers have had to sheepishly retract new products from the market once their poor performance was discovered.

**A matter of cost**

Without doubt one of the major factors in your choice of implant system will be cost. There is a wide variation, with the most well-known manufacturers being fairly costly. It would be easy to get on a high horse and say that only the more expensive implants deserve to be used. This would be unfair and incorrect. Some systems are less expensive while maintaining the use of good-quality materials, design and manufacturing.

Hopefully, their increased usage will bring down the costs incurred by the ‘high-end’ manufacturers. This is not without good reason as many of us are faced daily with patients who would genuinely benefit from dental implants but are limited by finance and it is our duty as healthcare providers to try our best to solve this problem. Often it is the dentist who bears the cost of this, but ultimately, it will be a win-win situation in the long run.

There is some merit in choosing a manufacturer that is likely to still be in business a few years down the line. As implants age with the patients, components will need to be replaced and renewed. Problems would arise if the company that made your implant has gone out of existence and you can no longer get the necessary abutment screw. Then again, you’ll probably be able to get it made in China!

Finally, many companies claim that they will provide you with support in the forms of technical and marketing support. Technical support is vital, as even the best of us will come upon new systems and new techniques that we need to be adequately informed about. A rep who knows the system well is invaluable. Marketing support is probably best taken with a pinch of salt, in my opinion. Inasmuch as a company can print a nice brochure and let people know about you, it is ultimately our own work and how well we provide it that will promote us in the eyes of our patients.

**About the author**

Ali Abdellatif completed a Master’s Degree in Implant Dentistry at King’s College (Guy’s Campus) in 2007. He has since set up a general and implants referral practice in Devonshire Place. He enjoys treating difficult cases and helping colleagues to offer dental implants to their patients. His practice is based at 2 Devonshire Place, London W1G 6HJ. You can contact him on 020 7486 2723, 07965 999 875 or by emailing ali@dentalimplantslondon.com. Ali is happy to receive correspondence or referrals from colleagues.
Combined Endo/implant treatment

Terry Pannkuk shows how a combination of digital communication, microscopy, precision measurement, and team co-ordinated implant placement led to success.

This case represents a combined endodontic-implant treatment plan. Generally, I do not extend my implant services beyond that which is a natural extension of my endodontic treatment plan, but this case was a little different. Sometimes I feel a need to break the political and philosophical rules for “special circumstances”. This was one of those cases.

The patient lived outside my referral area and did not have a relationship with a local periodontist/oral surgeon (Figure 1). I treated tooth #5, which was severely compromised, necessitating removal of the pontics to lighten the occlusal load (Figure 2) and shelling out the gold abutment to use it as a matrix for the extensive dual fiber post build-up. Once the implants have integrated, and if #5 holds up, it can be restored assuming the implants will share more of the load and the occlusion on #5 will be protected if it goes to final restoration.

Precise placement
This is a technique I developed to “home” in precise placement. It’s very easy for single-implant placements and a bit more complicated with more math measurements for multiple implant placements such as this one. Restorative dentists may have one perspective about where the implants should be placed which does not always coincide with the implant surgeon’s perspective. One of the biggest problems an implant surgeon has is ‘communication’. Digital imaging and email communication eliminates these conflicts.

I make my own diagnostic casts and surgical guides using a suck down machine and light plastic, not really using any rigid metal for the guide hole because in a case like this where the patient had limited jaw opening, I only used the surgical stent to get the initial penetration drill holes in the right position on the tissue surface.

Work before treatment
Here’s what I made sure I did before I carried out the necessary work.

1. Email correspondence between the restorative dentist and surgeon creates an exchange to determine the best placement. This was done by taking digital photographs of the casts and marking where preliminary entry locations should be positioned through the pontics. Actual “in-mouth” photographs were taken to compare actual soft tissues measurements to the study models (Figure 5).

I suggested drilling through the lingual cusps of the pontics knowing that the buccal bone would be resorbed a bit. Centered force vectors are also on the lingual cusps of maxillary teeth having normal occlusion. If the buccal plate is significantly resorbed, grossly altering ideal placement of implants, onlay grafting could be performed. Grafting should not be performed cavalierly, creating an unnecessary layer of complexity and increased risk of failure. In the final analysis it was decided to move the entry points a bit more buccal with the #3 replacement being the most buccal due to thicker buccal bone. If the implant is placed slightly

Figure 1. Preoperative radiograph

Figure 2a-d. Endodontic treatment of the maxillary left first bicuspid was performed. Extensive caries was noted after staining with caries indicator dye. The long-term viability of this tooth was questioned as it helped to maintain occlusion during implant rehabilitation.
lingual, placing it deeper allows for a better emergence profile.

Mesiodistal angulations were also considered and a compromise was required for the fact that #5 had a distally curved root and was slightly tilted toward the distal. If #5 had been extracted, or planned for extraction, its alignment would not have factored into the plan. The tentative plan to keep #5 dictated the angulation of the #4 guide pin as it was angled a little less parallel to the #3 guide pin, idealising it with the occlusion generated by #5 and #2. This tended to align the implants parallel to the roots of the adjacent natural teeth while not as parallel to each other.

There was more than enough bone between implants and natural teeth and they may not require splinting, allowing for easier oral hygiene. Many times adjacent implants in the posterior arches are splinted for better biomechanics, especially if space is tight. These two implants can still be splinted but it might require angled or custom abutments.

2. After the final email discussions, I drilled the guide pinholes through the desired areas on the pontics of the model, compromising my suggestion a bit toward the middle of the tooth in consideration of the restorative perspective (Figure 4). The plan was to place the implants as buccal as prudent, still hoping to avoid grafting. At this point models with drilled holes for guide pins (pontics drilled away) were photographed and emailed. It was decided to slide the four-guide pin a bit more buccal than I had initially planned. The hole was drilled more to the buccal and the guide pin was secured in a more buccal position with sticky wax. I then decided I was going to flap the case to make sure the implants were in bone. If the osteotomy had created a dehiscence I would be prepared to tack down a resorbable membrane, folding up buccal graft particles to insure thread coverage (it ended up not being necessary but laying a flap allowed for the option if it had been necessary).

3. The implants and parts were ordered.

4. The surgical flap was performed with releases.

Figure 3a-c. Preliminary measurements taken directly in the mouth to assess initial available heights and angles.

We found a gap
- time to challenge old truths

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Standard norm according to:
Albrektson, T. and Zlotolow, A., Int. J. Prosthodont. 1993, 6(2), 105-109

Less is More
5. I placed the surgical guide, made initial penetration holes with a pointed precision bur, and matched the penetration holes to the prepared cast making small adjustments.

6. I took a series of drill-sequence radiographs to insure that I was following planned angles, making minor corrections with the small drills, making sure it was ideal before proceeding to larger drills. The #4 site implant was placed first because it was the most difficult one to access and I wanted its placement to dictate any small required adjustments of the subsequent implant (#5), which was going to be simpler to place due to handpiece positioning. There were no problems with positioning so that concern was not an issue.

The reoccurring theme in the planning and placement of implants is to anticipate and account for all potential complexities. Implants were placed in the #4 and #3 positions to my satisfaction and I measured the critical distances along the way, making sure the paths and angles were correct. In the process of performing the #4 osteotomy I removed a retained root tip. I placed a longer implant in this site for better primary stability (there were no sinus proximity concerns). I tapped the sinus in the #5 site with osteotomes lifting the Schneiderian membrane two mm for the 10mm long implant (15mm long in the #4 site) (Figure 5).

7. Cover screws were placed and the flap was sutured, burying the implants completely. I swabbed the implant cover screws and internal space of the implant thoroughly with Metronidazole gel, keeping the blood out with microsuction.

There is a distinct advantage to using a microscope, employing digital imaging, and communicating via email. One of the biggest complaints a restorative dentist tends to have with an implant surgeon is the lack of communication and failure to coordinate plans. Preplanning and precise measure of each drill sequence allows the surgeon to stay on the planned path.

CT-planned surgical guides cannot always be used effectively if the patient has limited jaw opening. I have personally found that the guides are often too bulky and prevent proper positioning of the handpiece.

You can be just as accurate by ‘measuring twice, and cutting once’ (old carpentry proverb). Sometimes it’s very frustrating to order a CT-planned precision guide only to find out you want to change the angle slightly or that the patient cannot open wide enough to use it. There is a great sense of satisfaction and confidence showing implant positions within two-tenths of millimeter accuracy on the final radiographs when comparing them to the preoperative planned positions (Figure 6). In summary, successful implant placement requires communication and precise adherence to the plan.

I would like to thank Dr Robert Carraco of Santa Barbara, California for his input and contributions to this case.

About the author

Dr Terry Pannkuk, a native of California, graduated from the University of California at Los Angeles with a degree in biology; Georgetown University Dental School with a DDS; and Boston University with an MScD in endodontics. He is a Diplomate of the American Board of Endodontics, former editor and publisher of The Endodontic Report, former president of the Boston University Endodontic Alumni Association, current reviewer for the Journal of Endodontics (official journal of the American Association of Endodontists), and international lecturer-author of topics relating to clinical endodontics. He lives with his wife and two sons, and practices in Santa Barbara, California.