Dentistry Clinical

Not another paradigm shift in implant dentistry?

Nobel Active is presented as the third generation of dental implants. Nigel Rosenbaum describes his first impressions of this new system with illustrated clinical cases

Figure 1: Nobel Active External

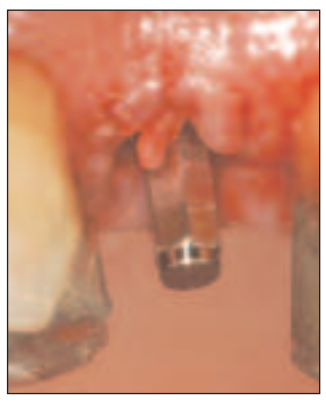


Figure 6: Immediate Temporary Abutment torqued to 35Ncm

Figure 2: 2.4-2.8mm step twist drill

Figure 3: Nobel Active 13mm x 4.3mm

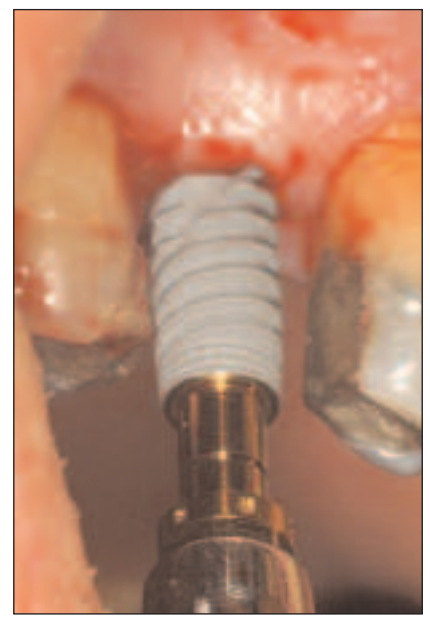


Figure 7 (above): Temporary Crown UR5

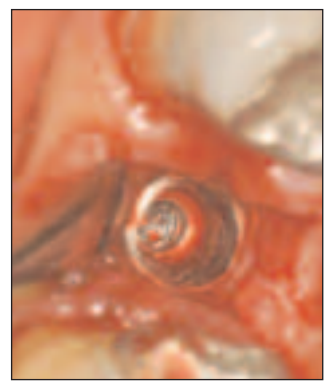
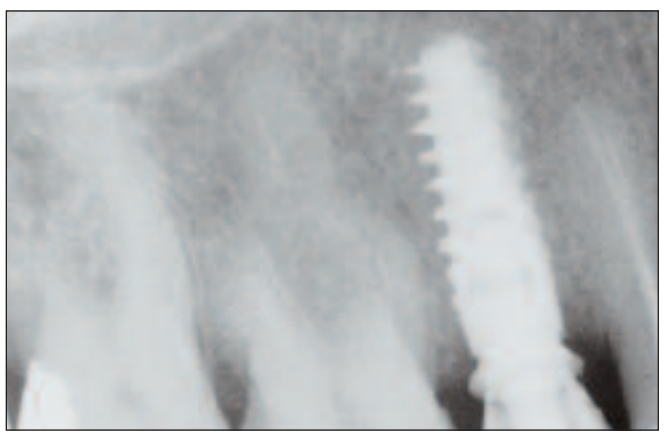


Figure 5: Nobel Active Internal in position

Figure 4: Nobel Active Internal placed by hand, allowing positional fine tuning

Figure 8 (below): Post operative radiograph UR5



A couple of years ago I had seen the latest introduction to the Nobel Biocare stable, at the World Conference in Las Vegas, with a mixture of intrigue and despair. Can there really be room for yet another implant choice - I mean really? Like so many loyal customers, over the years my loyalty has been stretched with the regular introduction of novel 'advances'. I cannot be alone in having redundant implant kits languishing at the back of cupboards. It is not that long ago that Novum, offering a 'one size fits all' solution, which would save us all from the challenges of custom mandibular fixed prostheses, or the numerous changes to implant design that have been a constant feature of Noble Biocare 'progress' over the last decade. Is anyone placing scalloped implants these days?

The latest design demonstrated in a pre-launch version in Las Vegas appeared to be a dramatic change in direction. Interest has been smoldering ever since, could this be just another smart marketing ploy?

Barcelona conference 2007

This year the European Association of Osseointegration (EAO) held its annual conference in October, this time in the wonderful city of Barcelona. On the bill was a satellite link to live surgery. Surgery live via satellite now seems de rigueur at any significant conference, symptomatic of the PR campaign waged by competing businesses. There is always risk in a live surgery setting, when dental superstars are in danger of suffering the way that mere mortals do in the solitude of their own surgery. With a choice available, I settled on watching Dr Ophir Framovich, live from Tel Aviv. Whilst the name may not be well known in the UK Dr Framovich has trained almost half the implant-placing practitioners in Israel.

What was immediately apparent was the control and precision in the surgery. The patient was having an upper central replace immediately with a novel implant. The implant in question has been released by Nobel Biocare as the Nobel Active system. I watched the surgery avidly - this was an implant that looked and behaved in a different way to those I am accustomed to. Having extracted the root very carefully Ophir perforated the palatal wall of the socket. He then enlarged the osteotomy and straightened the drill up to his approximate final position, so far a conventional protocol. The implant was inserted at 45° to the palatal wall, and whilst being screwed in place, was rotated into the ideal position. The implant is designed to condense bone as it is placed, and will cut only with a reverse turn. This allows a gentle process of clockwise and anticlockwise adjustments to cut or condense bone and achieve the ideal position whilst maintaining primary stability. Bone grafting material was placed along with a neat connective tissue graft from the palate. The graft was harvested in the shape of a doughnut - allowing the hole to be positioned over the abutment portion of the 'one piece' implant. The abutment is tapped into position in much the same manner as Bicon, though with Nobel Active External the transmucosal element protrudes from the fixture (Figure 1). The system is available in both a one piece and a two piece version, with the endosseous portion being very similar. The abutment was tapped into position and temporised.

I was impressed. I was impressed by the surgeon, surely one of the best performances I have seen in a live surgery situation. I was also impressed by a self-tapping, self drilling implant capable of re-orientation whilst being placed and able to achieve high primary stability in less than 2mm of bone.

Pre-launch training

I had been waiting to try this system, and took the opportunity of a place on the pre-launch training in Frankfurt in mid November. Why a training session? Nobel Biocare's directive is that everyone wishing to place Nobel Active must attend a training session as this implant is so different.

The next Saturday I was in the Frankfurt Marriott, for an 8.30am start to the training. Dr Ophir Framovich was the course leader, and introduced himself as one of the inventors of this system; the others being Dr Benny Karmon, Dr. Yuval Jacoby and Professor Nitzan Bichacho. The Nobel Active is a development of the Spiral Implant (SPI) and Spiral Flare Bevel (SFB) implants from Alpha Bio Inc., which Dr Framovich has used for many years; he commented that he alone has placed over 50,000 implants. That is quite a few. Alpha Bio Inc. has over 300,000 implants placed. So we are talking about a system that has been tried and tested.

Figure 9: Pre-op Fractured root UR1

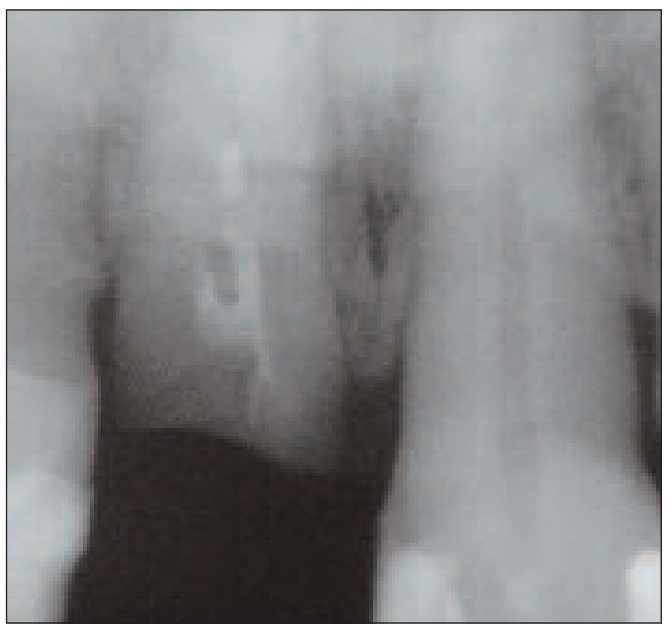


Figure 10: Radiograph Pre-op Fractured root UR1

Implants have been around for a long time; we have grown up with and out of blades and subperiosteal frames. Implantology became more acceptable with the biological basis of osseointegration and the introduction of cylindrical implants, with the standard screw providing high success rates, such that long term success is all but taken for granted and implant dentistry is now very much mainstream. Alpha Bio has evolved from this starting point and developed further.

Nobel Active training

Nobel Active is now presented as the third generation of dental implants.

It looks different - very widely spaced and deep threads which have variable pitch. This implant more resembles Osteo-Ti rather than anything from the Nobel Biocare family. The thread pattern is designed such that as the implant is placed the stability increases by condensing bone between the threads as the pitch dimension alters. The core of the implant is also designed to increase bone contact as it is placed. The threads are widely spaced with a pitch of approximately 2mm and a very shallow angle. The core is the tapered central portion which is designed to act like sequential osteotomes. Within the double threaded design is a spiral tap, again having a different effect to many systems with similar looking designs. With this spiral groove the effect is to condense bone rather than cut it, though it cuts in reverse.

A few of the delegates were concerned about the strength of the design, yet data was shown which claimed that the external version, in Narrow Platform variety, was capable of withstanding a five x 10^6 cycles load of 400N, well beyond physiological loading. This allowed the use of Narrow Platform in narrow ridges (even posterior), without bone augmentation, whilst leaving more space between adjacent implants - crucial if bone volume is to be maximised for soft tissue support.

Evolution of Nobel Active

The morning consisted of Dr Framovich and Dr Jacoby, describing the evolution of Nobel Active, with significant interaction from the small but well experienced group. With one exception everyone had been placing implants for more than 10 years, the morning was devoted to design features of the implant and prosthetic components yet was still fascinating. The system is, however, incomplete; currently it cannot be used with Nobel Guide, impression copings are being modified and there are temporary solutions still to be made. Nobel Biocare is addressing these issues and promises a complete system by early 2008.

Clinical techniques

After lunch we moved into a more clinical mode. Dr Framovich demonstrated a number of cases, and some impressive primary stability. It was our turn to place dummy implants into plastic models. Stability, in plastic foam, was truly staggering. The ability to alter the bodily position during placement a real benefit - have you ever placed an implant and wished it could be moved just a fraction? Well these can be moved a fraction, or more, and with a little practice either apical movement alone or bodily.

After the practical session we were shown some of Dr Framovich's home videos, including a number of his live surgery cases transmitted at major conferences. We were treated to some advanced and even extreme case studies.

My first Nobel Active placement

Nobel Biocare has decided that every clinician involved in Nobel Active must undertake training. I was certainly sceptical when arriving late at night in Frankfurt when I could have been at home. However, I believe that this implant is different enough to warrant this approach.

For my first Nobel Active placement I chose a straightforward case: an upper premolar in a healed site (Figures 1 and 2). Nobel Biocare rang me and asked if I would mind if one of the reps, Suzanne, could come along as this was to be the first use of Nobel Active in the UK. No problem. Suzanne, it turns out, is dentally qualified and awaiting registration following her degree from Pretoria, South Africa.

Mini crestal flap raised to reveal crestal bone, 2mm twist drill to determine depth and assess bone quality. Step drill (2.4/2.8mm) (Figure 2) to approximately 7mm and I was ready to place a 13mm Regular Platform – 4.3mm diameter Nobel Active Internal (Figure 3). I decided to use a hand held driver (Figure 4), this enabled easy control; regular placement and after a couple of anticlockwise turns the position was swiftly optimised (Figure 5). I used the new 'gold' torque wrench to check my primary stability, 70Ncm. Ready to load. I frequently immediately load, often using the Immediate Temporary Abutment (Figure 6), and am pleased to say that this favourite has been made for the Nobel Active system. The implant was immediately placed into light occlusal loading (Figure 7) and a radiograph taken to confirm position (Figure 8).

I chose to use the internal connection in this case, as it may be used in a different configuration in years to come if the patient loses neighbouring teeth. Immediately after surgery the patient was off to a meeting, a five-hour drive away. I saw him a few days later; other than mild sensation in the gum that evening he had nothing to report, and the site looked normal.

Debating the connection: internal versus external

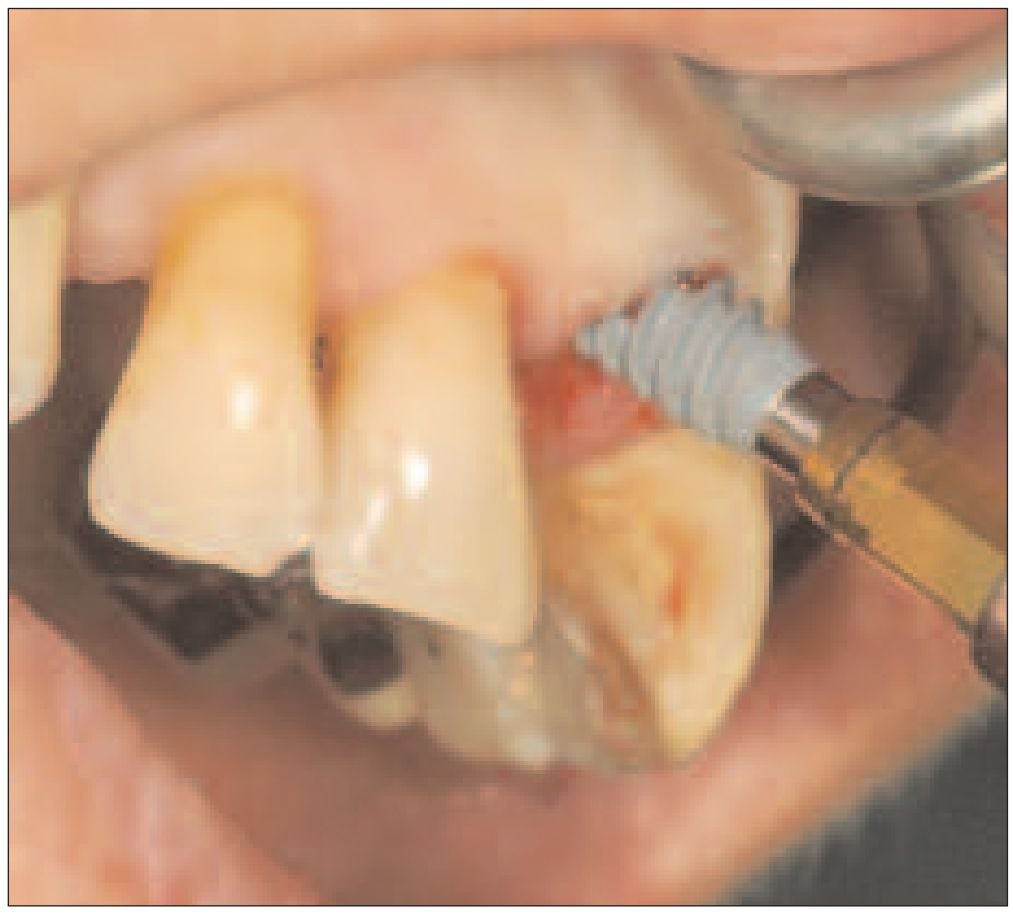
The choice between internal connection and the external is more than just a good debate. The two piece internal connection has familiarity with many implant systems, whilst a one-piece design has generally had a poor reception. The Nobel Direct one-piece system has provided some excellent results, both in my clinic and at the hands of supervised beginners at the Dental Hospital in Sheffield. It has a number of drawbacks, most notably the significant lack of flexibility – no option of an angled or custom abutment to get out of a tricky angulation. Experience will deal with this problem; however the more irritating problem is the difficulty in preparing and recording an accurate restorative margin. Nobel has addressed this to some degree with the posterior and anterior versions. Dr Framovich and his co-inventors have delivered a one-piece design rather surprisingly in two pieces, and have described it as a 'one and a half piece' design. It does need some explanation. The one-piece design has great mechanical advantage, as there is no internal screw hole and the implant is solid. As with any one-piece approach there is no 'micro-gap' at the crucial crestal bone level. In this instance the Nobel Active External connection component protrudes transmucosally, and allows an abutment to be tapped into place, with the same type of connection as the Bicon system, but in reverse. There are two additional advantages with this approach. Firstly the system has incorporated platform switching. This allows a narrower connection than the implant platform at the abutment level, though in this case the platform switch is incorporated within the implant itself. The second advantage is the unique way in which this implant will insert into bone with a corkscrew like movement. 'So what?' I hear. Well, Dr Framovich clearly demonstrated the placement of implants with 4.3mm diameter, through a 2.8mm osteotomy. This can occur by allowing the implant to expand the bone on insertion and due to the reduced diameter at the neck, the bone rebounds elastically to seal against the narrow connection. Impressive design, which will have implications when placing adjacent implants. This could for instance infer that the choice of internal or external will depend upon adjacent implant placement, which brings us back to the internal/external debate and expands the treatment planning possibilities in advanced cases.

Second case was a dental phobic

My second case arrived in the practice, as a dental phobic, with a fractured upper central root in situ (Figures 9 and 10). Where bone allows I try to immediately place in such cases although there is plenty of debate as to the 'best' time. When faced with a visible gingival margin the maintenance of the gingival aesthetics are essential; favourable parameters in this case were the thickness of buccal bone, gingival biotype and the type of implant available. Flapless surgery should be the approach of choice in cases uncomplicated by significant bone defects, certainly with immediate placement.[1,2,3] We all know that implant positioning is crucial, and I have experienced the 'buccal drift' when placing a fixture against the harder palatal bone. I know

Figure 11: Perforation of palatal socket wall

Figure 12: 45° placement of Nobel Active External implant



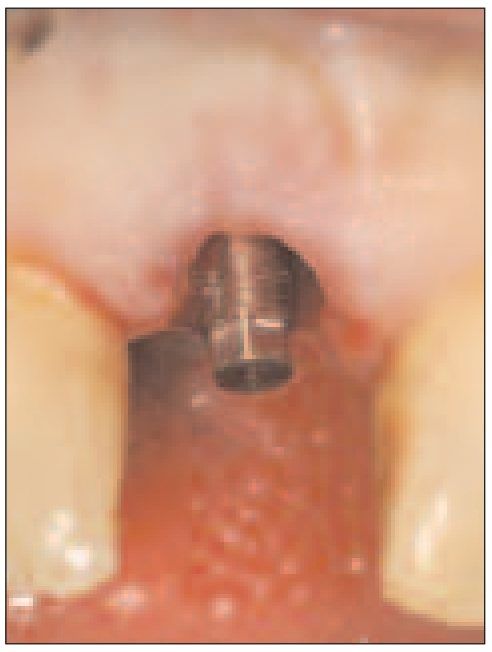


Figure 13: Nobel Active External implant labial view

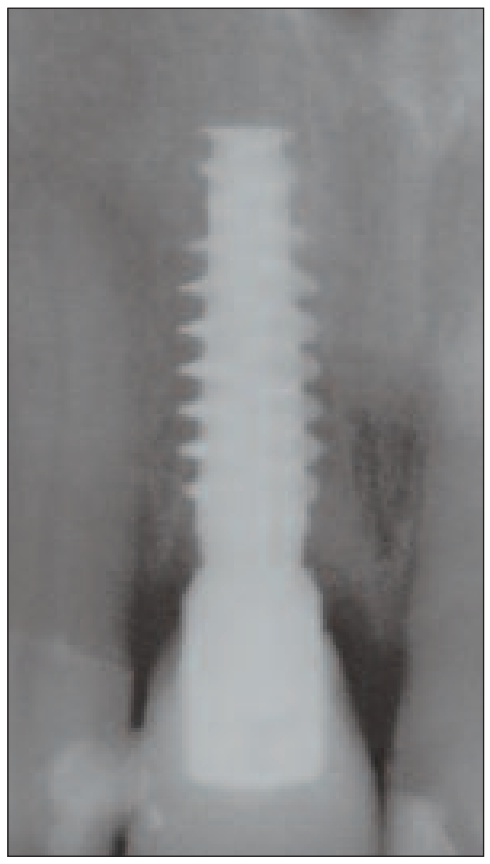


Figure 14: Jumping distance filled with BioOss

Figure 17: Post operative radiograph

Figure 15: soft tissue graft

Figure 16: Healing abutment tapped into position

I want placement a little more palatally; I know where my osteotomy was, yet the final position has drifted buccally. Trying to reposition either a tapered or cylindrical implant does little for primary stability.

With the Nobel Active as an option I luxated the root as 'atraumatically' as possible. Measuring the buccal bone I was happy to proceed with immediate placement. The socket was thoroughly debrided and irrigated. I perforated midway up the palatal wall of the socket at approximately 45° to the socket wall (Figure 11), and then whilst still drilling rotated into upright. The same procedure was undertaken with the 2.4/2.8mm step drill.

I chose a 4.3mm diameter, 13mm long Nobel Active External implant. Placement was by hand, again starting at 45° to the palatal wall (Figure 12). Using the ability of the spiral taps to cut when turned anticlockwise the implant was manoeuvered into position. It felt good. I checked from all angles, and decided I wished to re-orientate in a mesio-distal angulation by a fraction (Figure 13). I unscrewed half to three-quarters of a turn and screwed the implant into a better position. Amazing. Primary stability had not been diminished. Any attempt at repositioning with previous designs would have been disastrous in an immediate placement and immediate load case.

I now had a well-positioned implant, solidly bedded into the palatal wall. Of course there is the gaping space to the buccal, known by some as the 'jumping distance'. Experts agree that blood clot will fill this space and predictably reorganise into bone, though they cannot agree on the dimensions.[4,5,6,7] In practical terms, space greater than 1.5mm needs augmentation. My preference is small particle deproteinised bovine bone, BioOss. This was packed into the space, and filled level to the bone crest (Figure 14).

I placed a socket seal type soft tissue graft, taken from the palate, and secured this with an overlying mattress suture. The graft was outlined on the palate and a partial thickness defect created in the position of the external connection, so that when harvested there was a hole for the implant connection (Figure 15).

There are a number of abutment options available, I chose a healing abutment (Figure 16). This is tapped into place, reliant upon the morse taper for retention. Whilst there are no screws to place the abutment, there is a neat screw access for abutment removal, should this ever be required. I temporised with Quick Temp (Schottlander). Post-operative radiograph was taken to confirm position, and demonstrates the 0.8mm space between the implant 'crest' and the base of the healing abutment which is crucial to the development of a crestal bone seal (Figure 17). The patient was absolutely delighted with the experience, though I credit that to the iv Midazolam (Figure 18).

First impressions of Nobel Active

I have described my first impressions of this new system and obviously I do not have any long term data. However it is apparent that the Nobel Active is capable of providing terrific primary stability in limited available bone. With primary stability being a significant predictor of implant success this bodes well. As well as the thread pattern the geometry is designed to distribute stress more evenly throughout the implant body, which aims to reduce crestal pressure concentration and thereby reduce crestal bone loss. Nobel Active implants continue with the familiar and proven anodized surface – TiUnite, and also have the 'groovy' thread pattern. Like any Nobel Biocare implant they are compatible with the Procera® custom abutments in ceramic or titanium. I feel that this system can justify its claim as 'third generation', and judging by my early experience is a system which will not be joining the collection at the back of my cupboard. ■

Figure 18: Post operative immediately placed and immediately temporised

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