

IMPLANT FOCUS



SIMON ALLUM MADE
 A JOURNEY DOWN
 THE NORTH EAST
 COAST TO VISIT
 DAVID VIVIAN AND
 DONALD STARR. HE
 REPORTS ON THE
 BENEFITS OF
 PLATELET-RICH
 PLASMA AND THE
 CURRENT RANGE OF
 NOBEL BIOCARE
 IMPLANTS



Simon Allum BDS graduated from Guy's Hospital in 1982. He is an experienced lecturer in the use and application of implants in private dental practice. He runs an implantology referral clinic in Darlington, County Durham

I visited David Vivian BDS and Donald Starr MB, FDS, FRCS working together at Hallgate house in Cottingham near Hull (Figures 1 and 2). David is a GDP, having qualified from Newcastle in 1988. He undertook prosthetic training in the Brånemark system in 1993 and completed the Eastman 'Step-by-Step' year course in 1997. He has attended international meetings in Sweden, the USA as well as in the UK. Donald is a Consultant Oral & Maxillofacial Surgeon at Hull Royal Infirmary.

On arrival, I soon realised that we had a lot of ground to cover. Not only had I come to see Nobel Biocare's two sister implant systems in use (Brånemark and Replace Select), but I was also to have the benefit of watching and reviewing Don's preferred

sinus lifting technique, incorporating the use of platelet-rich plasma. We were also to discuss and review the Brånemark Novum technique ('same day teeth').

David calls on Don's services to help with Novum cases and those involving more extensive grafting. I watched them work together on a bilateral sinus lift case, which had been planned to involve simultaneous placements using both Replace and Brånemark fixtures. The treatment was undertaken with local anaesthesia and intravenous midazolam (conscious sedation).

PLATELET-RICH PLASMA (PRP)

Alpha granules in platelets are rich in growth factors including platelet derived

growth factor and transforming growth factors Beta 1 and Beta 2. Cancellous marrow cells have been shown to have receptors for these factors and it is postulated that a concentrate will produce faster and increased bone formation. The enhanced soft tissue healing which has also been reported with PRP has also been recognised as being beneficial in improved bone grafting outcomes. Platelet-rich plasma is a concentrate produced by spinning a sample of the patient's own blood in a dedicated centrifuge.

For my own part, I first really heard about PRP at the ADI London 2000 symposium when Alan Meltzer from New York gave a presentation on the use of the then new 3i Platelet Concentrate Collection System (PCCS). PRP was certainly a 'hot topic', at and subsequent to that particular meeting, with a number of manufacturers advertising their own PRP machines. Like many other practitioners involved in implantology at the time, I was holding back on buying a machine - in part because of the cost of the initial investment, but also because I wanted to see whether this technique would in fact have a lasting place for dental implantology in private practice. Subsequent to the initial interest and following a limited amount of published material on the subject, it seemed that there was a

Figure 1: Hallgate House - the practice occupies the first floor suite





Figure 2: The waiting room at Hallgate House

significant body of opinion that took the view that PRP might offer limited long-term benefits. Then at the recent 2003 ADI symposium in Birmingham, PRP again came under the spotlight. In a presentation of the work undertaken at the University of Miami, Professor Arun Garg related how they were finding significant clinical benefits in the use of PRP when used in association with various grafting techniques commonly employed in dental implantology.

With such issues very much in my mind, I was very interested to see Don Starr put the 3i PCCS to use for the sinus graft case scheduled for that morning. David and Don had jointly purchased the machine, and informed me that it was in regular use for David's implant cases in the private practice setting. It was also being used for some of Don's cleft palate cases at Hull Royal Infirmary.

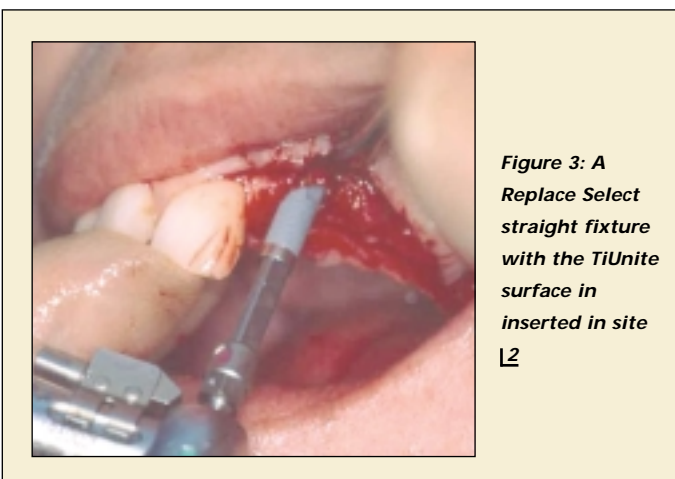


Figure 3: A Replace Select straight fixture with the TiUnite surface in inserted in site
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Figure 4: David at work



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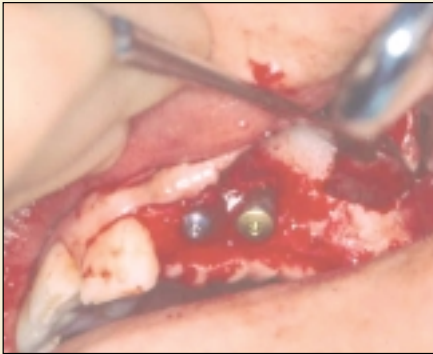


Figure 5: A tapered Replace fixture has been seated at site [3]. The maxillary sinus has been accessed via a lateral bony window

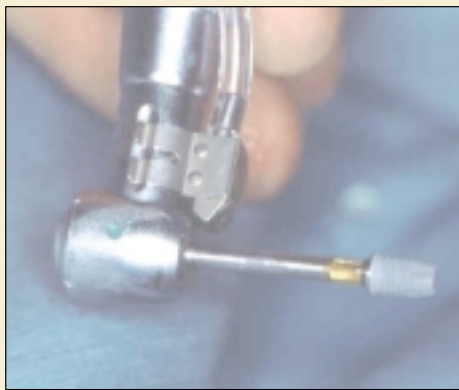


Figure 6: David has selected an 8.5mm Branemark mark IV TiUnite fixture for site [5]

Don told me about his personal experience to date: 'We've been using PRP now for two and a half years and our clinical impression is that we get improved and quicker healing. In the sinus lift work that we were doing for David prior to using PRP, David was going in at six months, and there was bone. He was getting primary stability, but he didn't want to torque the fixtures at that point. Now, with PRP we're finding that we can put the fixtures in at

three months and we have dense bone giving primary stability and we can torque the fixtures right up to the limit. So the impression is that it does what it says on the tin! It also makes the graft much easier to handle.

'When we've harvested the bone from the trap with the PRP and added the calcium to counteract the anti-coagulant, the PRP goes off you end up with a bone graft which is best described as looking like a Thornton's strawberry truffle



Figure 8: Bio-Oss bone slurry and PRP are mixed to make up the graft



Figure 7: The Branemark fixture has been seated. The graft material is applied around the apical threads of the fixture with access via the lateral bony window

(Figure 9). It's like polyfiller - it stays where you put it.

'We've found that when you do sinus lifts without PRP the bone granules just go everywhere. You can't always lift up the antral floor without perforating it and we find that you can't be absolutely sure that the bone has stayed where you put it. But with this stuff, it's like putting in polyfiller.'

Using the PCCS, Don takes 55ml of venous blood that produces around 7ml of PRP. He cures about half of the PRP to make a membrane (Figures 9 and 10) that can be used to line the sinus cavity and the bony window once the graft is in place. Don tells me that he usually has a couple of mls of PRP left over at the end, which can be infiltrated beneath the flap once it is

closed. 'It seems to make everything heal up quicker - certainly in my experience with cleft work using PRP the soft tissue appearance one week post-op is what you would normally expect to see at three weeks.'

Seeing the system in action I could appreciate the benefits of using a graft that appeared considerably easier to manipulate than in its more familiar granular form and following my visit I decided to purchase a PRP system myself. Limiting factors for PRP use in the practice environment might include the cost of the disposables (typically adding around £150-£200 to a case) and the clinical time involved in preparing the PRP prior to surgery which is easier with



Figure 9: Don's 'strawberry truffle' (left). Some PRP is left to clot in the base of a sterile container to produce a PRP membrane (right)

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Figure 10: Don carries the PRP membrane to the patient with two sets of tweezers



Figure 11: Surgery completed and the flap closed, remaining PRP can be infiltrated under the flap to further enhance site healing

some machines than others.

DON AND DAVID AT WORK

Don and David worked on the case illustrated (Figures 4-11). David identified the chosen sites using a modified partial denture as a surgical guide and marked all proposed osteotomy sites with a round bur. Implant fixtures were inserted where existing bone volume allowed and then Don took over to perform the sinus lifting and the localised augmentation. Additional implants were planned at a later visit. I was intrigued to find out why David decided to 'mix and match' Replace and Brånemark implants side-by-side in the same patient, so I asked David how he comes to choose Replace or Brånemark fixtures in any given situation: 'Replace is a very simple system, but the shortest Replace fixture is 10mm. It's nice to have a nice simple

system and Replace is a lot simpler with inventory. But I do still like the handling of a Mk III / Mk IV Brånemark fixture when I'm working on the posterior maxilla for some reason - it just feels nice in your hands! Mixing Brånemark and Replace is not a problem because now they've all got the same types of abutments. The prosthetic side has all been brought together so it is almost identical for both systems really - even the screwdrivers are the same now. I'm use to working with the external hex as well as the internal connection so it doesn't make a lot of difference to me personally. I've started mixing and matching in a few cases now because I'm tending to favour the tapered Replace implants for anterior sites, but I'm still tending to favour the parallel Brånemark implants in the maxilla. In the case we've done today I'll probably splint

the units because I used quite a short fixture at the back'.

I was interested to hear David's views on the external hex in view of previously reported issues with loose abutment screws on this fixture design. David tells me that he tends to splint multiple units and favours the internal connection for single units -he hasn't therefore had any real problems in this respect, but he feels that the market generally is moving away from external hex fixtures.

BRÅNEMARK AND REPLACE

Before my visit to Cottingham I was already aware that there had been quite a number of changes in Nobel Biocare's product lines in recent times - probably the most widely advertised change being the introduction of the new TiUnite surface for both Brånemark and Replace implants. Talking to many implant practitioners at

meetings, courses and symposiums both in the UK and abroad, I think it would almost be an understatement to say that the introduction of the 'rough' surfaced Brånemark implant has been long-awaited. Brånemark system has enjoyed a very strong brand name based on claims such as 'the most clinically proven, original system' but of course, TiUnite fixtures are still in their infancy in the world of evidence-based practice, and I suspect that there has been a dilemma in whether and when to introduce a new surface under the Brånemark banner in view of its history of being marketed on a more established evidence-based foundation.

Looking through the product ranges, all Brånemark fixtures still feature the now traditional external hex connection and are available with narrow platform (3.3mm), regular platform

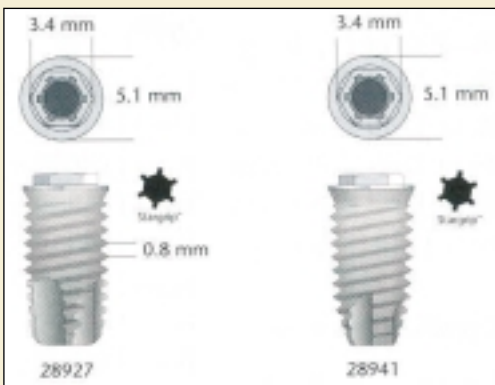


Figure 12: Brånemark fixtures. The mark III (parallel fixture) is shown left, and the mark IV (tapered fixture) right



Figure 13: The new range of Replace Select straight fixtures are essentially mark III Brånemark fixtures with and internal connection

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Figure 14: One of Don and David's Novum cases. The Novum is essentially an acrylic denture bolted onto a pre-formed bar. The primary can be seen at the base of the lower acrylic reconstruction

(4.1mm) and wide prosthetic platforms (5.1mm) - either as Mark III or Mark IV fixtures (Figure 12). These implants come in lengths ranging from 7-15mm.

All Replace Select implants have the internal Tri-Channel connection. The Replace tall external hex fixtures have been recently discontinued and the SteriOss name has now been dropped. Replace fixtures are available with 1.5mm, 2mm, and 3mm machined collars. The 2mm and 3mm collars are said to be best suited for one-stage surgery with transmucosal healing. All collar heights offer the potential to take the abutment connection supra-crestally to avoid the saucerisation of crestal bone that occurs with Brånemark (external hex) fixtures.

Alternatively, collars can be positioned at the crestal bone level if so desired. Replace fixtures are available with 3.5, 4.3, 5, and 6mm diameter prosthetic platforms to accommodate a range of emergence profile requirements (narrow, standard and wide platforms). Replace implants are now available in the original tapered design or as the newer straight fixtures which are essentially the Brånemark Mark III fixtures but with the internal

connection (Figure 13). Hydroxylapatite or TiUnite endosseous surfaces are available in lengths ranging from 10-18mm. The whole system is colour coded throughout making it very user-friendly.

With both Replace and Brånemark systems now well established under the same company and moving ever closer together as products, the two systems appear to be gradually merging.

BRÅNEMARK NOVUM

The Brånemark Novum technique has been successfully marketed as the 'tea time teeth' concept in which edentulous mandibular cases are restored with a definitive acrylic screw retained bridge in the course of a single day of surgical and prosthetic reconstruction. The process is based on the philosophy that most adults exhibit a mandibular jaw anatomy that falls into standard parameters. Therefore a preformed and pre-manufactured titanium bar can be supplied as a one-size-fits-all component and this can be bolted into place on three carefully placed implants. Once this 'Primary' bar has been fitted, a jaw registration, and wax-up and processing can

be completed onto a 'secondary' bar which screws on and off the primary.

Don tells us about his experience in working with Novum: 'David and I were on the pre-launch course. We were in right at the beginning over two years ago. We have been told by Nobel Biocare that we are one of the most experienced surgical teams working in the private practice setting outside of London and I would say that we've put more than 20 Novums. I do the bulk of the bone work.

'There's a lot of bone reduction in creating the platform. The difficulty you have with it, if you're doing an immediate - taking the teeth out and putting the Novum in straight away - is that you've

got to take away so much bone to accommodate the superstructure. If just burr it away, it takes forever and a day. I just do a big rim peripheral osteotomy with a big fissure burr and take it all off en bloc - which is usually quite quick.

'Invariably you find that the implants are in and the superstructure is on and you're losing local anaesthesia as you're closing. You've only really got about 90 minutes working time. Once we've got the implants in we check that we've got clearance at the heels and then close it up. David puts the bar on and tightens everything down.

'The shortest fixture that you've got for Novum is 11mm. We have cases where



Figure 15: A nice result and a very satisfied patient

we've put 11s in and you can feel the fixtures under the inferior border of the mandible. The only cases where we have run into real difficulty is that the Novum is designed for the Scandinavian mandible and we have had two or three cases where we've started off doing a Novum and we've had to bail out either because the anterior mandible shape's not right, or the mental nerves are too far forward and we can't clear the mental nerves with the distal fixtures. In these cases we've had to insert four standard fixtures for a custom-made bridge.

'I think the only cases that it's definitely not suited to are where the patient does not have enough bone height.'

The Novum is an unusual concept in implantology terms, not least because it involves immediate loading on only three fixtures, where most protocols stipulate the use of a least four mandibular fixtures. I suggested to David that there was still only limited evidence to support the longer-term performance of the technique - the first published papers on Novum dating from 2000 (detailing two years of experience from the pioneering teams). David tells me, 'The Novum concept is based on Swedish experience of long-term survival of fixed beam cases where one or more fixtures have failed, but the prosthesis has continued to perform well.' In view of the potentially heavy loading requirements, I was a little surprised that all of the

Novum fixtures are still machined, and Nobel Biocare do not currently offer them with their new Ti Unite microtextured surface. Perhaps time will tell.

NEW DESIGN CONCEPT

Nobel Biocare have plenty of new ideas that are expected to be translated into new product lines in the near future. The prototype scalloped margin implant was recently presented to the ADI 2003 congress in Birmingham. I am told that the initial clinical trials are shortly to be published and the product will be commercially launched later this year. The essential design feature of this implant is based on the clinical finding that interstitial bone peaks to a higher level than the buccal rim, and the use of implants with a flat prosthetic platform often therefore lead to interstitial bone loss (with a risk of compromised interdental papilla).

Whilst the scalloped design is yet to establish a track record, it will undoubtedly be watched with great interest and I am aware of at least one other major manufacturer with clinical trials underway with a similar design concept. **PD**

For more information on Nobel Biocare call 01895 430650.

To contact David Vivien call 01482 875888 or visit www.thehullimplantcentre.co.uk

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