

The Bern philosophy

Stephen Franks visited Switzerland to learn from **Danny Buser** at the 'spiritual home' of the International Team for Implantology

I have recently returned from three amazing days at the University of Bern, Switzerland, learning from some of the greats in the world of implant dentistry, including Danny Buser, Thomas von Arx, Michael Bornstein, Vivianne Chappuis and (by live link from New York) Istvan Urban.

Meeting Danny Buser and his team in the spiritual home of the International Team for Implantology (ITI) is about as close to a religious experience as you can get in the world of implant dentistry, and the course didn't fail to disappoint. Professor Buser is a man of great stature, both academically and physically – he towered over my rather modest five foot six! His larger than life personality tended to dominate proceedings; however, he was extremely warm and friendly and made all of the delegates feel most at home.



Dr Stephen Franks

would instead attempt to present some of the key concepts that particularly stood out.

Early placement is the currently preferred protocol in the aesthetic zone

A 2013 study by Chappuis et al used CBCT scans to examine the post-extraction bone remodelling patterns of upper anterior teeth. They found that when less than 1mm of labial bone remains immediately post extraction, extensive and unpredictable labial bone resorption often results.

Interestingly this informally-named 'thin labial plate biotype' group still tended to maintain good clinical ridge width, the residual bulk being taken up by 'soft tissue thickening' (Chappuis et al, 2015).

This additional new bulk of connective tissue can be a valuable resource in such cases and we will discuss how this can be utilised when discussing flap design below.

It has long been postulated that the thin layer of bone lining the socket – the so-called 'bundle bone' – is dependent on the presence of a tooth for its survival, and that once a tooth is removed its necrosis and resorption quickly follows (Schropp et al, 2003).

Research has found that this intense initial period of osteoclastic activity is substantially reduced after six to eight weeks.

These two clinical observations – the increased bulk of labial soft tissue and the slowing of the rapid bundle bone related osteoclast activity – both recommend an early placement protocol.

A majority of these sites will have labial bone defects and will therefore require grafting. Guided bone regeneration (GBR) has been shown to be a reliable and predictable method of replacing this lost bone, and early placement with GBR is now the standard Bern protocol for replacing upper anterior teeth.

Immediate placements are rarely a predictable option

The vast majority of cases in the aesthetic zone (90%) fall into the 'thin labial bone biotype' group described in the post-extraction bone loss study above, and as such they exhibit highly unpredictable levels of

The Bern team recommends a hybrid approach, placing autogenous bone scrapings directly over the implant site to stimulate rapid bone growth

The programme was packed from morning to night and over the three days we watched four live surgeries, received 14 lectures and participated in two hands-on sessions. The 60 delegates came from all corners of the globe including India, Asia, the USA, the Far East, the Middle East, and of course Europe.

It was a wonderful experience to socialise with colleagues from such diverse backgrounds. Academia really is a wonderful forum for breaking down political barriers.

A fine-tuned approach

Professor Buser was happy to acknowledge that there are often several different methods

of achieving the same clinical outcome; he nevertheless limited his presentation to the Bern philosophy of implant dentistry, one which has been finely tuned over many years in response to clinical experience and published research.

On those few occasions where the recommended protocol was experience- rather than evidence-based, there was no attempt to be dogmatic, rather an honest and transparent approach was adopted.

Having personally been through the ITI education system, including its year-long Foundation in Implant Dentistry course and a largely ITI philosophy-based Masters at the University of Bristol, I was already familiar with the general Bern approach.

However, I still managed to learn several new concepts and pick up some refinements to my clinical technique, which made the trip extremely worthwhile.

While it is impossible to summarise such a comprehensive course in a short article, I

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Professor Buser (left) with Dr Franks (right)

labial bone loss post extraction.

This unpredictable loss of the labial plate occurs even in the presence of a dental implant or a bone graft.

In the small number of cases where immediate placement may be indicated, namely in those with a 'thick labial bone biotype', this treatment modality should be restricted to highly experienced surgeons and only after very careful case selection.

One noticeable modification in protocol has been to harvest bone scrapings and blood at the beginning rather than at the end of the surgery

Choice of membrane material

Bio-Gide is still the university's membrane of choice, as the alternatives have major shortcomings: non-collagen resorbable membranes have degradation products, which often elicit an inflammatory response, and non-resorbable membranes require a second surgical intervention, as well as being prone to infection if exposed through wound fenestration.

One limitation of porcine materials, however, is that their resorption rates cannot be

modified. The use of a double layer has been proposed as a possible way of lengthening the barrier period, but the length of time that the barrier is effective is still relatively short. This will be discussed in the next point.

Choice of bone material

Osseointegration and long-term implant stability demands a high level of bone to implant contact.

This has been constantly demonstrated to be vastly enhanced by the presence of autogenous bone material (Jensen et al, 2013). Collagen barrier membranes are rapidly resorbed and as a result their barrier function is short-lived. It is therefore critical that a phase of rapid bone formation takes place during the short window of opportunity, during which the membrane's barrier properties are still present.

Autogenous bone scrapings have been shown to facilitate this rapid bone production, likely as a result of their inherent cell and chemical mediator content.

Despite these two major advantages of autogenous bone, rapid new bone growth and close bone to implant contact, autogenous bone still has one critical shortcoming: a lack of long-term stability. Fortunately, xenografts have been shown to be very stable over long periods.

Since no single material possesses all of these desired qualities (high bone to implant contact, rapid bone proliferation and long-term stability), the Bern team recommends a hybrid approach, placing autogenous bone scrapings directly over the implant site to stimulate rapid bone growth and a high level of bone to implant contact, and then covering this with a layer of Bio-Oss bone substitute to provide long-term stability.

Graft material preconditioning

A total of 43 different bone growth factors have been identified in autogenous bone scrapings, their release being stimulated by the trauma of harvesting.

One noticeable modification in protocol has been to harvest bone scrapings and blood at the beginning rather than at the end of the surgery.

These are mixed together and diluted with a little saline then left during the rest of the surgery for the factors to be released into the diluted blood.

This so called 'conditioned' blood is then mixed with the Bio-Oss immediately prior to placement, ensuring it is saturated with growth factors.



The delegates dive into a hands-on session

Granule size

Studies show that granule size has no impact on the final result and either small or large particles can successfully be used for grafting.

In aesthetic GBR cases, however, small particles are preferred as they are easier to handle and manipulate into the correct three-dimensional form.

Double membrane

There is often a strip of membrane material remaining after application of the primary covering and this is usually applied as a second layer, both stabilising the graft and increasing the length of barrier function.

Professor Buser recommends placing this double layer where the new bone is most critical, namely over the mid-facial cervical aspect of the implant, rather than just using the second layer to stabilise the graft.

Flap design

GBR requires an extensive flap that can then be mobilised to accommodate the added bulk of the new graft. This has typically been achieved with a three-sided flap, utilising mesial and distal relieving incisions.

More recently, the Bern team have adopted a triangular flap for anterior cases. For central incisors, the flap extends from the distal of the contralateral incisor to the corresponding canine tooth with a single relieving incision at the distal line angle of the canine.

This has the benefit of an improved blood supply, as offered by the very wide base, and avoiding scarring in the critical incisor region by taking the relieving incision more distally and outside of the aesthetic zone.

Maintaining the thick labial tissue at early placement

It was mentioned earlier that early placement cases often have an increased bulk of labial tissue in the region of the labial bone resorption.

This bulk of material can be used as a pre-formed connective tissue graft.

The mid-crestal incision is taken more palatally than is normally practised so that the blade hits bone on the palatal crest, leaving the labial tissue intact.

A narrow instrument is then used to lift the thick bulk of labial tissue, leaving it connected to the labial flap.

Use of short implants

Although many are recommending the use of short implants to avoid sinus floor elevation, there is a reluctance at the university to use short (6mm) implants where they are un-splinted.

In such cases, regular length implants with augmentation is the preferred protocol, especially in the posterior maxilla.

Of the different sinus floor elevation techniques, the lateral window is still the most popular and where this is possible, it is combined with simultaneous implant placement.

Choice of technique for larger grafts

In a live video linkup from New York, Istvan Urban presented his 'sausage technique'. This uses a pinned membrane to stabilise a large particulate graft.

The tension provided by Bio-Gide's natural elasticity gives a very stable graft and extensive bulk of new bone volume is routinely achieved.

Dr Urban also presented some very advanced techniques for flap mobilisation in the posterior mandible.

While these were fascinating to watch, they involve skilled dissection of the sublingual space and mental nerve regions well beyond the scope of practice of most dentists.

The sausage technique provides a very real alternative to block grafts, avoiding the associated morbidity of a second surgical site.

My general impression was that large particulate grafts, stabilised with pinned membranes, are replacing block grafts as the treatment modality of choice.

Conclusion

The course was extremely well run and was jam-packed with content from morning to night.

It was an excellent opportunity to consolidate the knowledge that I had already accumulated over several years of studying implant dentistry, while also introducing some

novel and useful ideas.

Three days well spent and thoroughly recommended! **IDT**

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