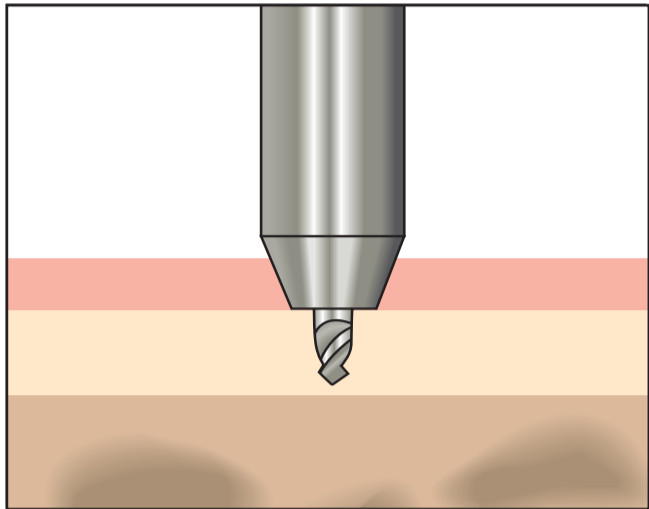


# Anchorage - A New Revolution

In this Q&A, Dr Richard Cousley, who created the new Infitas orthodontic mini implant system, talks about its qualities



Above: The cortical bone punch reduces insertion torque in area of dense cortical bone such as the mandible

**Q. You have been working with implants and mini implant anchorage systems for several years now. What intentions did you have for developing your own system, Infitas?**

A. I had appreciated the benefits of absolute anchorage provided by palatal implants in the first few years of the new millennium, and quickly found bone anchorage to be an indispensable part of my orthodontic armamentarium.

However, it was clear that implants have significant drawbacks – particularly their cost (especially if osseointegration fails) – surgical technique sensitivities, reliance on complicated laboratory work, and limited clinical applications. Having become accustomed to the unyielding feel of implants, I was initially sceptical that mini implants would be sufficiently stable. However, my opinion quickly changed after using mini implants in several demanding cases, and realising both the simplicity and reliability of this technique.

I then tried several mini implant systems over the next two years and realised that, while these were produced in a bewildering selection of head and body design options only a small number of features and sizes were actually required in the majority of patients and clinical applications.

In addition, I found that no single system had the specific combination of features that I identified as ideal. Therefore, in 2005, with the encouragement of David Burdess, a UK orthodontic supplier, I began to design the Infitas mini implant system with an emphasis on versatility, while simplifying several key aspects for the orthodontist: mini implant selection, the insertion technique, and ease of use.

**Q. One special feature with Infitas is a guidance system unique in orthodontics. Can you describe how it works and in how far it could contribute to orthodontists overcoming their inhibitions in using TADs?**

A. There are many reports of

different guidance approaches and stents for mini-implants, but I find these limited in terms of their lack of true 3D and direct (physical) guidance.

The Infitas planning and stent system arose from my experiences with 3D stents used initially for palatal implants, and then for both self-tapping and self-drilling mini implants.

I had found such stents to be invaluable in prescribing positional information especially when either a trainee or a surgical colleague needed to insert mini-implants.

However, the principal drawback with creating an accurate stent was that each one had to be custom-made by a relatively complicated series of laboratory steps.

Therefore, when designing the Infitas system I had two aims: to ensure the accurate transfer of positional details from the planning to the insertion stages, and to simplify the stent process such that an orthodontist would be able to easily and cheaply produce a stent.

The key feature of the Infitas stent is its guidance cylinder that accommodates all Infitas insertion instruments precisely inside its internal circumference. The position and angulations of this cylinder are determined when the orthodontist or technician first inserts an analogue screw into a plaster model, and then these details are transferred to the cylinder using a click-on abutment which links it to the analogue.

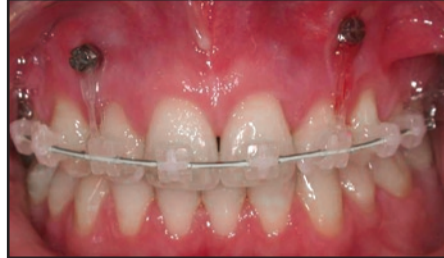
The stent is then easily made by vacuum-forming a baseplate over this guidance cylinder and model. In my experience, this planning process enable the orthodontist to precisely determine the mini implant position, and then makes the insertion appointment straightforward and relatively stress-free.

**Q. Infitas has a head designed similar to brackets. The obvious difference is a groove or special undercut. Which effects does it have and which advantages does it give in applying auxiliaries?**

A. The Infitas head's



An adult patient with a history of aggressive periodontal disease and absent UL3 & UR4. Mini implants were used to intrude the incisors and reduce the overbite after initial alignment, to enable bonded retention



Infitas is the only mini implant system which offers a 3D guidance system. This picture shows a stent in clinical use with a mini screwdriver insert being used with a speed reducing handpiece



'A Simple Approach' to mini implants – the picture shows the ergonomic handle design and selection of kit components

combination of internal and external undercuts means that all forms of orthodontic auxiliaries (coil springs, elastic chain etc) are easily attached directly to it without interconnecting ligatures. The undercuts are also sufficient to retain these auxiliaries, even with the head diameter being small. Furthermore, full-size orthodontic arch wires readily locate into the head's cross-slots. While my intention was not necessarily to mimic orthodontic brackets, I believe that the Infitas head is more similar to the brackets (which we are all familiar with) than any other mini-implant design.

**Q. We have noticed that the head of the Infitas mini implant is very low profile. How has this been achieved?**

A. Conventionally, mini implant heads have multiple levels, one for each use or form of attachment.

However, the Infitas head combines both of its cross-slot and retentive features all at the same level, giving it a much lower profile than other designs.

Other features, such as continuing the threads to the top of the implant body, and the neck design also contribute to the low head-neck length relative to the body length.

**Q. Looking at the neck of the screw we find it is angle-forming. How does the angle influence the insertion of the mini implant or the angle of 30° hitherto necessary?**

A. It's always perplexed me when I've looked at mini implant designs where the head and neck are joined by a 90° angle, since mini implant insertions are usually at varying angles to the surface of the cortical bone.

Therefore, the Infitas mini implant has a tapered neck that does not impede full insertion at virtually any

angle, and contours well with the adjacent bone and mucosa.

**Q. It is also plain to see that the Infitas kit contains a cortical bone punch with a 2mm stop that we do not find in other systems. Can you explain the reasons?**

A. Unfortunately, I think that some mini implant brochures are misleading by advertising that they are self-drilling, and only admitting in the 'small print' the need for pre-drilling in dense bone.

Recent research publications indicate that there is a range of optimum insertion torque levels in terms of mini implant stability. In particular, excessive torque (resistance to insertion) may lead to delayed stability failure, especially in areas of thick and/or dense cortical bone.

Consequently, the Infitas kit includes a re-usable cortical bone punch to reduce excessive torque by perforating the cortical plate in areas such as the mandible and hard palate. This still allows the mini-implant to behave in a self-drilling manner. The effective punch depth is limited to 2mm since further drilling may conversely result in a reduction in primary stability (by over-preparing the insertion bed). This cortical punch is a fully integral part of the Infitas system such that it can be used with a stent, and is available in both manual and handpiece versions.

**Q. The self-cutting thread as well as the increased cortical diameter should prevent a loosening of the screw. How far does Infitas actually provide this stability?**

A. Again, I have based the Infitas design on recent research findings. Firstly, these favour self-drilling rather than pre-drilled body designs in order to prevent the risks of bone necrosis and excessive insertion bed width.

Secondly, cortical bone is much more important for stability than cancellous bone. Therefore, the superficial portion of the Infitas body is tapered to increase width and hence its engagement of the cortical plate. This is evident clinically by an increase in insertion torque as the mini implant is finally seated.

**Q. The mini implant systems currently available are being offered in different diameters and lengths. With Infitas you are basically using one type of screw with most of your patients. How come?**

A. Experience, supported by an analysis of the available literature, has led me to conclude that only a small number of body length and diameter choices are necessary for all alveolar and hard palate sites.

For example, the 1.5mm diameter Infitas body size is well tolerated in interproximal spaces yet is sufficiently thick to avoid fracture problems. I reserve the 2mm diameter selection for edentulous sites and the hard palate.

In my opinion, kits that offer much more choice may unnecessarily complicate the selection process for the orthodontist without providing better insertion options or stability. Also, this simplifies stock maintenance and costs for the orthodontist.

**Q. Have you already been able to finish cases with**

**the new Infitas system? If so, where were remarkable differences to your experience with other systems?**

A. Yes, given that I've been clinically validating the Infitas design since early 2006 the first cohort of treated cases have been completed, and many more patients have had successful mini implant insertions.

My impressions, which are supported by the experiences of both orthodontic and surgical colleagues, are that Infitas mini implants are at least as easy to insert as the best of the other self-drilling systems that I had tried, even before the simple step of manual cortical perforation is added (in the mandible).

In addition, I have felt remarkably relaxed during the insertion visit for those cases where I've used a stent (usually where access is difficult) – it really reduces the need to concentrate on getting the insertion position and angles right.

In my opinion, this is a major benefit, especially for those new to bone anchorage. It's also easier to connect any forms of traction to fixed appliances, with immediate loading. The tapered neck ensures a good fit with the adjacent soft tissues, whilst patients have commented that the Infitas mini-implants don't feel prominent (relative to the fixed appliance bracket etc), which wasn't the case with earlier mini-implants that I had used. ■



Dr Richard Cousley is a consultant orthodontist working in the UK hospital service and private practice. He has published papers and lectured widely on the technical aspects of bone anchorage. He developed the Infitas mini implants system to overcome some of the limitations of existing mini implants. For further information, call free on 0800 783 3552 or visit the website, [www.dborthodontics.co.uk](http://www.dborthodontics.co.uk)