

Masterclass in Clinical Practice

Implant Dentistry with

Dr Andre W van Zyl¹



Essentials of basic implant dentistry



Scan to see video

¹ Andre W. van Zyl
MChD (Oral Medicine & Periodontics)
Private Practice, Hermanus, South Africa

Newly qualified dentists will be exposed to implant dentistry far sooner than what they think. Although a dentist may opt not to become involved in placing any implants soon after qualifying, dental implants have become the standard of care in replacing missing teeth and from day one patients may present with implants previously placed and restored. Implants have been available in South Africa since the early 1980's and thousands of patients have had implants placed over the past 3 decades. The implication is that patients will present with broken implant crowns requiring new impressions and replacement of crowns/bridges or implant supported dentures. All dentists will therefore have to become involved in implant dentistry- even if it is only on the restorative side. Nothing is as embarrassing or humiliating than not being able to help a patient because of lack of knowledge or training. This applies to all ages across the spectrum of dentistry.

This master class is therefore not aimed at the experienced implant clinician, but rather at the novice or those who have not had the opportunity to attend postgraduate training courses in implant dentistry.

It should be noted that all patients require a comprehensive assessment as to their dental needs before implants are considered as part of the solution. The objective with utilizing dental implants is to achieve an implant supported solution that mimics natural teeth. To achieve this, the ideal tooth position should be determined in relation to any adjacent teeth and to the opposing arch. Once this is done, a surgical stent can be produced to guide the placement of the implant in the correct position.

Dental implants are titanium screws placed inside the bone during a surgical procedure. Once the implant has attached to the bone (a process called osseointegration) it is ready to support either a single crown, a bridge or to provide attachment for a denture. It is not possible to cover all the restorative options of an implant in this Masterclass, so we will focus on a single implant to support a crown. To understand this better, a few concepts need to be explained (scan the QR code to see video for a demonstration of these concepts):

1. The difference between a bone level and tissue level implant.
2. Surgical placement protocol of an implant
3. Pick-up (open tray) versus a transfer (closed tray) impression technique of an implant. Digital impressions are rapidly replacing conventional impression techniques, but the scope of this master class does not extend to that.
4. Placement of a screw retained lab-cemented crown

1. The difference between a bone level and tissue level implant

This terminology stems from the fact that some implants when placed into the jawbone, will extend above the bone and end level with or just below the gingiva (the "tissue"). This is called a Tissue Level implant (Figure 1). A bone level implant on the other hand will end at or just below the bone level, and needs an abutment connected to it to reach supra-gingival (Figures 2-3).



Figure 1: Tissue level implant with body of implant ending at or just below gingival crest.

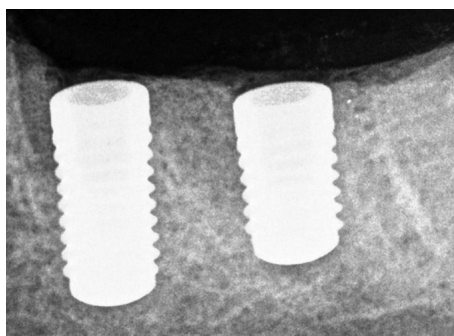


Figure 2: Bone level implant ending at or just below bone crest

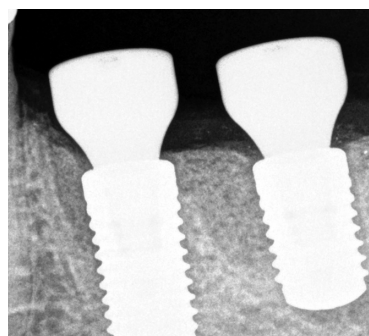


Figure 3: Bone level implant with healing abutments attached to keep the space open for where tooth will be placed.



Figure 4a: Missing 36 replaced and waxed into model to simulate the correct position of tooth for production of stent to guide surgery

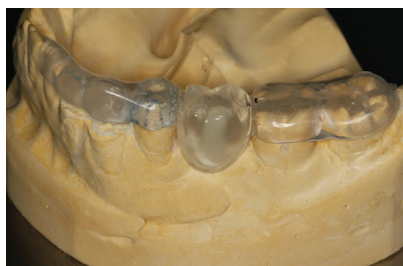


Figure 4b: Stent produced and fitted on plaster cast



Figure 4c: View of stent which will be placed in the mouth during surgery. A hole is prepared through the stent to guide the initial pilot drill in the correct position (middle of tooth)

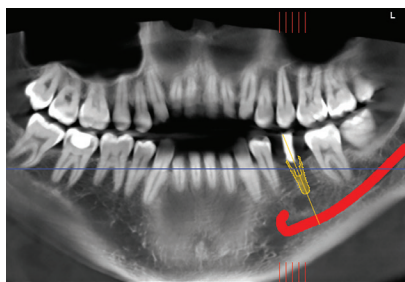


Figure 4d: The stent is used with a radiographic marker in the prepared hole for pilot drill. This can then be used with CBCT scan to assess the available bone below the planned tooth replacement.

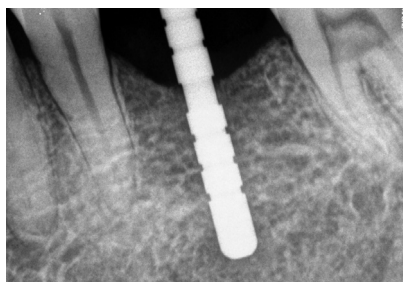


Figure 4e: The initial guide pin in place after drilling the pilot hole using the stent



Figure 5: A guided surgery stent with a metal sleeve which will guide the surgeon very precisely according to the planning on the CBCT scan

2. Surgical placement protocol of an implant

To place an implant into the jawbone requires a careful surgical procedure in order not to damage the bone and to ensure a tight fit between the implant and the bone. The implant must be placed in the correct 3D position without damaging any adjacent teeth or anatomical structures. To ensure this, a surgical guide or stent is used to help the clinician. A stent can be a rough guide manufactured to show the restorative space (Figure 4a-e) or it may be done to give precise guidance for the drilling using CAD-CAM techniques (Figure 5). Each implant system has its own surgical protocol

but share much in common, such as a slow drilling speed not to overheat the bone (800rpm recommended), using a sequential drilling sequence slowly enlarging the implant site without damaging the bone and the need for replacing drills before they get blunt and overheat the bone.

3. Pick-up versus a transfer impression technique of an implant

Taking an impression of the implant will transfer either the exact position of the implant to the lab technician or alternatively the abutment position. Most often an impression of the



Figure 6a: Impression post in position for a pick-up impression technique.



Figure 6b: Impression material syringed around impression post similar to a natural tooth crown impression.



Figure 6c: Impression taken with a putty-wash and a sleeve protecting the impression post screw from filling with impression material.

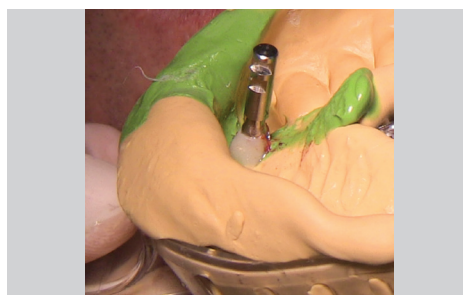


Figure 6d: Lab analog connected to the impression post. This step is usually done by lab technician.

implant is taken and the lab technician will decide on the most appropriate abutment. An impression post is connected to the implant whereafter an impression is taken in a similar manner as for a conventional crown. If the impression post has an extension protruding through the impression tray, it implies the post will be locked in the impression material and the screw of impression post must be loosened before the impression tray can be removed from the mouth. This is termed a pick-up technique (Figure 6a-c). If the impression post stays connected to the implant when the impression is removed from the mouth, it must be removed afterwards and then pushed back into the impression. This is termed a transfer or closed tray technique. Both techniques require a lab analog to be connected to the impression post (Figure 6d). The lab analog simulates the exact dimensions of the implant, and the lab technician will manufacture the implant crown on the analog once the master cast is poured in the lab.

4. Placement of a screw retained lab-cemented crown

The lab may manufacture a crown in different ways, from a

crown on the implant abutment that is cemented in the mouth (much like a conventional crown on a natural tooth) to a lab cemented crown that is screwed into the implant and the screw hole sealed in the mouth once it has been tightened (see video). With the latest abutments being mostly cone connection types, this gives a crown that does not have any gaps (called the micro-gap) between the implant and the crown. This provides an implant-crown connection where bacteria cannot accumulate to cause periodontal/peri-implant infection and gives tissue stability over time.

Conclusion

While this is in no way an attempt to provide a comprehensive overview of basic implantology, it will hopefully give the novice some insight into the basics of implant dentistry. This in combination with the video, will provide some background to the placement of a single posterior implant and the restoration of the implant.

For more comprehensive training a course incorporating anatomy, surgical skills and hands-on training, is a must.