



The challenging aesthetic implant case:

New technologies and techniques for old dilemmas

BY DR DAVID B DUNN, BDS (HONS), FRACDS

Implant techniques and technologies have changed rapidly over the last three to five years. These improvements have assisted in treatment of the more difficult and aesthetically challenging cases, especially the maxillary single tooth implant cases with high lip-line smiles. Implant prosthodontics can be a most conservative treatment option when undertaken competently, however, if not, it is highly invasive with poor “fall back” options. The single tooth replacement in these case types can be an aesthetic mine-field for the unwary, where even the smallest mistake is readily apparent!

Today, osseointegration is a highly predictable procedure with excellent long-term survival rates. The issue is now not whether a fixture is successful or not, but whether aesthetically, the case is successful. The most significant “giveaway”, especially for single tooth implants in the aesthetic zone, is the disparity in soft tissue volume, colour and form. These extrapolate in the clinical setting to implant crowns that are too long due to gingival recession (or initial lack of tissue dimension), have a square-ish form to the cervical contour and lack either one or both the interdental papillae. There may also be a distortion in the symmetry of the muco-gingival junction and gingival hue disparity.

Perhaps one of the greatest challenges in implant and reconstructive prosthodontics is the treatment of an attractive, young female patient missing a single central incisor tooth and having the combination of a high smile-line with a thin, high-scalloped soft tissue biotype. Each step in the treatment of these types of patients is critical to the maintenance of soft tissue contour and volume and hence the final aesthetic success of the case. Any mismanagement including poor flap design; negligent component selection; three-dimensional implant placement error; improper suture technique; and deficient or excessive emergence profile contouring of provisional and final abutments and



Figure 1. Failed Maryland bridge.



Figure 2. Bridge removed – thin, high scalloped bio-type loss of labial contour.

crowns; will determine the success or otherwise of the case!

As Dr Peter Wohrle states, “tissue is the issue, but bone sets the tone.” In other words, whilst the soft tissue contour, volume and colour may be the critical determinant of aesthetic failure, the underlying cause of this failure is more often than not the lack of supporting bone for the gingival tissues. In aesthetically demanding situations, such as in the anterior maxilla, especially with high lip-line

smiles and thin biotypes, the aggressive scalloping of the bone necessitates that with the use of conventional “flat top” implants, that these implants be placed approximately 2-3 mm below the desired, mid-root cervical gingival margin. This placement, unfortunately, then determines that interproximally, the fixture head is some 3-4 mm, or more, below the interproximal bony peaks. Due to biological width considerations and the fact that epithelium cannot live in contact with the



Figure 3. NobelPerfect implant: Scalloped collar



Figure 4. NobelPerfect implant in situ: maintenance of soft tissue dimension and re-establishment of labial contour



Figure 5. Excellent soft tissue healing with healthy papillae and emergence profile dimension.



Figure 6. All-ceramic crowns (close-up): 21-implant supported, 22-tooth supported.

bone, remodelling occurs, resulting in bone loss circumferentially around the fixture. This bone loss occurs to accommodate a connective tissue zone of approximately 1mm between the epithelial tissues of the gingival cuff and the osseous support of the implant. The impact of this bone loss is obviously more severe interproximally than facially. It is even more critical as the dimension between the fixture or implant and the root surface of the approximating teeth, is reduced. This is one reason why there is the “rule” for a minimum of 1.5mm between the approximating tooth root surfaces and the head of the implant in mesio-distal placement orientation. Hence, more often than not, we see loss of interproximal papillae around single tooth as well as multiple tooth implant cases in the aesthetic zone, especially in high scalloped biotype’s.

An exciting advancement in the implant field has been the development of scalloped head implants to more closely conform to the scalloped bony architecture found in the anterior maxilla and to a lesser extent, the anterior mandible. Nobel

Biocare has developed the concept of the scalloped head implant that it markets under the name of “NobelPerfect”™. This design then enables the interproximal bony peaks to be supported by the coinciding scalloped interproximal peaks of the head of the implant, so that with the establishment of biological width considerations, bony remodelling has minimal impact on the interproximal bone peaks and hence papillae are maintained.

Further, the abutment design of the NoblePerfect Implant also contributes to improved soft tissue stability. Unlike other designs of implants, the abutment is internal to the implant shoulder and hence, with the removal of provisional crowns etc, there is no tearing of the epithelial attachment leading to possible soft tissue damage and recession. With “conventional” implant designs, removal of healing abutments, changes of definitive abutments or provisional crown removal and re-insertion, results in the epithelial attachment being traumatised, leading to potential implant gingival cuff recession and aesthetic compromise. To compensate

for this fact, or to try to avoid future “show” of titanium, implants are often placed deeper, contravening the 3-dimensional placement guidelines, resulting in greater bone remodelling, soft tissue recession and hence “longer crowns” as well as loss of the papillae.

There are, however, some limitations and challenges with the use of the scalloped implant. Firstly, this implant must be placed with a high degree of three-dimensional accuracy, as otherwise, future aesthetic embarrassment may occur due to the supra-gingival exposure of the interproximal titanium peaks. Secondly, the rotational accuracy and mesio-distal alignment are critical to the success of this implant type. Unless this alignment is ideal as well as the bucco-lingual placement, again aesthetic embarrassment due to titanium show will occur. Thirdly, often we will have differing heights of the interproximal bony peaks in a single tooth implant situation to complicate the depth of placement issue. One option is to graft the deficient interproximal peak or, alternatively, compromise the other interproximal

IMPLANTS



Figure 6. All-ceramic crowns (full view): 21-implant supported, 22-tooth supported.

peak, by placing the fixture more deeply. Finally, at this time, we do not have a ceramic abutment to compliment the use of all-ceramic crowns. Hopefully, in the next six months, this situation may be rectified. These are some of the issues that must be assessed and dealt with in using this type of implant in an attempt to fulfil the desired aesthetic requirements.

Implant prosthodontics in the aesthetic zone can be very challenging and it is

only with meticulous case assessment and planning; an intimate understanding of the biological basis of implant placement; careful management and awareness of the varying gingival bio-types; and a control of abutment/crown design and contour; that we can hope to achieve success with this form of treatment. Thankfully, new technologies including improvements in implant surface science; implant macro-design changes such as

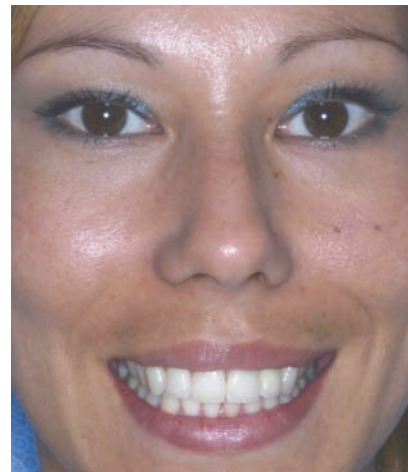


Figure 7. Smile aesthetics re-established.

the scalloped-head implant; and developments in abutment and crown material science; have dramatically assisted us in our quest for aesthetic excellence!

Dr David B Dunn is a Senior Clinical Associate, Sydney University, a member of the Pierre Fauchard Academy and works in a private Practice Restricted to Prosthodontics in Macquarie Street, Sydney.
