Use of biocompatible materials for enhanced aesthetics and soft tissue stability after implant treatment

Fabrice Baudot examines how a challenging case to achieve an aesthetic outcome in can still be successful as long as the patient is satisfied

This case demonstrates the benefits of a dental implant with a zirconia collar and the difference this feature can make both to the treatment outcome and to the patient.

It was a very complex case to treat and despite the aesthetic outcome not being absolutely perfect, the products used enabled us to achieve a result that the patient was more than satisfied with. This allows us to determine treatment as successful.

I wish to share the case so that colleagues can learn from it and appreciate what can be achieved even in challenging aesthetic situations thanks to the zirconia collar.

Preserving soft tissue volume

This particular patient presented to the practice with a failing UR1.

The tooth was black and non-vital, with a longitudinal fracture on the root (Figure 1) so extraction was indicated. A flap was opened (Figure 2) to reveal significant bone loss. With such a huge bone defect in the aesthetic region, the challenge was to provide an aesthetically acceptable restoration.

The tooth was extracted, resulting in total loss of the cortical bone (Figure 3).

The surgical site was cleaned and Bio-Oss bone graft material was placed, followed by a collagen membrane with a slow resorption rate (Figure 4).

Once the flap was closed, a temporary bridge was anchored on the UR2 and continued to the UR1, providing an aesthetic solution while the site healed.

High quality soft tissue incisions are vital for an aesthetic finish when suturing the tissue closed after surgery, as shown in the immediate postoperative photo (Figure 5) and the image from eight days later (Figure 6).

The volume of the soft tissue is preserved (Figure 7) with healthy papillae. This, combined with the shape of the crestal bone, provided an ideal environment for implant placement and encouraged a highly aesthetic and functional result.

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Figure 1: Initial radiograph

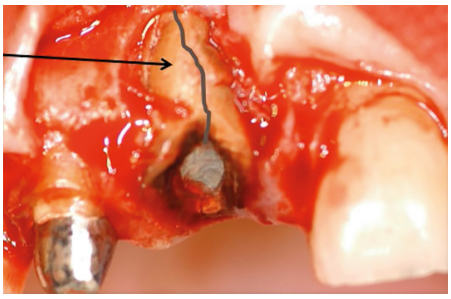

Figure 2: Longitudinal fracture on UR1

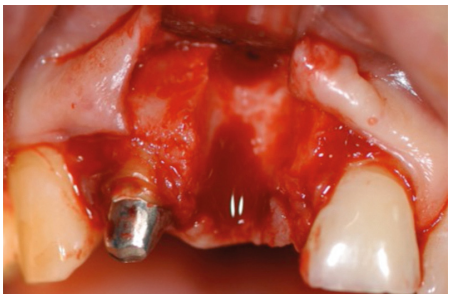

Figure 3: Post extraction

Implant placement

Six months after extraction and guided bone regeneration, a coronally positioned flap was raised and a 13mm TBR Z1 implant with a zirconia collar was placed in perfect alignment with the left central incisor (Figure 8).

With the small incision, it was possible to see the bone volume recreated around the implant. Impressions were then taken and two days later a provisional restoration was fitted, following immediate provisionalisation protocols.

At a review one week post implant placement, the soft tissue appeared to be healing well (Figure 9).

To maximise aesthetics, the soft tissue was over-constructed in anticipation of the natural shrinkage that occurs during healing.

Two months later, the soft tissues had healed as planned (Figure 10). It was still possible to see where the flap was raised, as the gingiva was more red in colour and more vascularised, but these would change with maturation to match the surrounding tissue.

This had occurred by a review four months later, along with a little soft tissue shrinkage to produce a good gum line between the two central incisors (Figure 11).

The zirconia collar of the implant was slightly visible, but this was of no concern to the patient. While we could have performed a connective tissue graft to optimise the aesthetic, he had already undergone several surgeries and didn't wish to have any more.

The zirconia collar of the Z1 implant made it possible to stop treatment at this stage – had we used an implant with a titanium collar, we would have had to proceed with another surgery.

As the patient was satisfied about what had been achieved, it was perfectly acceptable to follow his wishes.

Final impressions were therefore taken for the permanent restoration. At the fit appointment for this, the temporary restoration was removed to reveal healthy soft tissue (Figure 12).

The final restoration was fitted onto a TBR zirconia abutment, which was placed in the mouth. The high quality and integrity of soft tissue was evident by the lack of inflammation.

This is very typical of the soft tissue when using the Z1 implant with zirconia collar and the final result was more than acceptable to the patient.

The postoperative radiographs (Figures 14 and 15) show good anchorage of the implant in the native bone and show how well the bone substitute material adapted to the zirconia collar as well.

Reflection

Upon review, this case shows what the zirconia-titanium implant can achieve. We were able to restore the aesthetics of the anterior teeth, improving the gum line and ensuring stability of the soft tissue (Figure 16).

The biocompatibility of the zirconia collar encourages healthy soft tissue. It is far superior in this regard compared to ceramic or gold abutments and it also leads

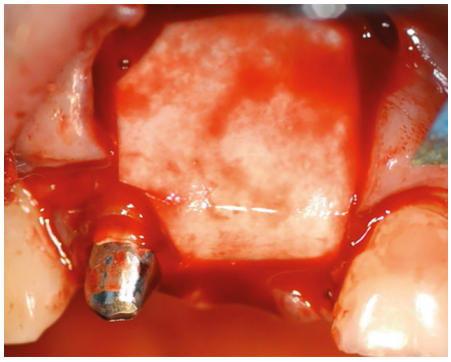

Figure 4: Membrane placed

Figure 5: Surgical site – immediately postoperative

Figure 6: Surgical site – eight days postoperative

Figure 7: Healed soft tissue occlusal view

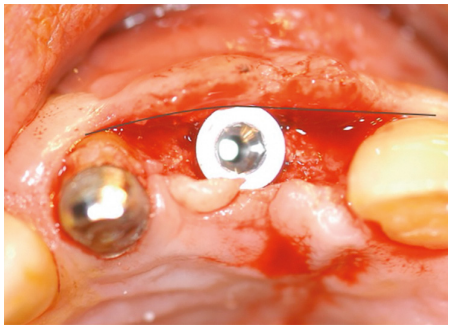

Figure 8: Z1 implant placed

Figure 9: Soft tissue healing, one week after implant placement

Figure 10: Two months after implant placement

Figure 11: Four months postoperative – anterior view

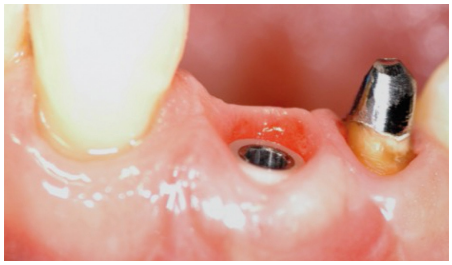

Figure 12: Temporary restoration removed

Figure 13: Post treatment

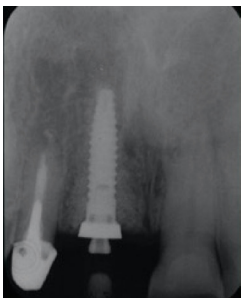

Figure 14: Postoperative radiograph of implant

Figure 15: Postoperative radiograph with restoration

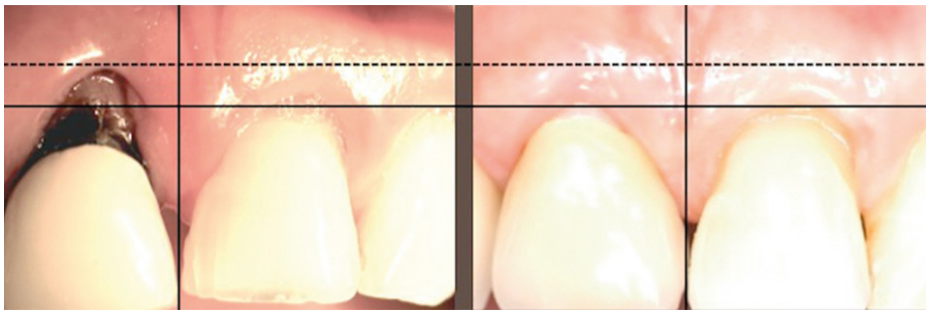

Figure 16: Before and after gum line

to reduced bacteria around the implant compared to titanium.

A study by Rimondini et al (2002) demonstrated the benefits of zirconia over titanium, showing a much greater colonisation of bacteria on the latter material (Figure 17). As such, zirconia produces enhanced aesthetics and stability of the soft tissue (Figure 18).

In time, the biological behaviour of the transgingival portion of the implant is improved and we would therefore expect to see the papillae naturally grow to reduce the visible amount of zirconia.

This can be seen in the nine-year follow of this case outlined (Figure 19) showing once again the benefits of the Z1 zirconia collar implant from TBR.

Hopefully it is clear from this case that even when aesthetics are not absolutely perfect immediately after implant surgery in very complex situations, a more than satisfactory result can be achieved with careful material selection.

Ultimately, we need to aim for results that our patients will be happy with – a very satisfied patient in this case made treatment a success. **IDT**

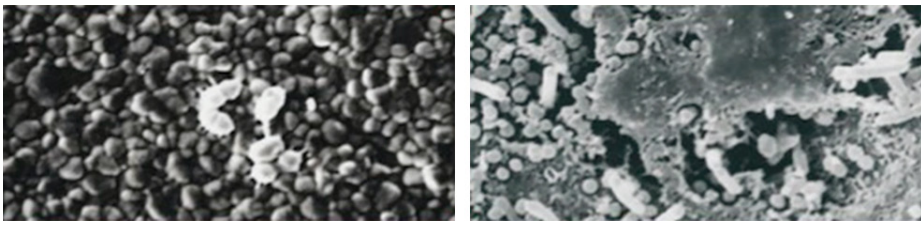

Figure 17: Bacterial colonisation of zirconia (left) and titanium (right), taken from Rimondini et al (2002)

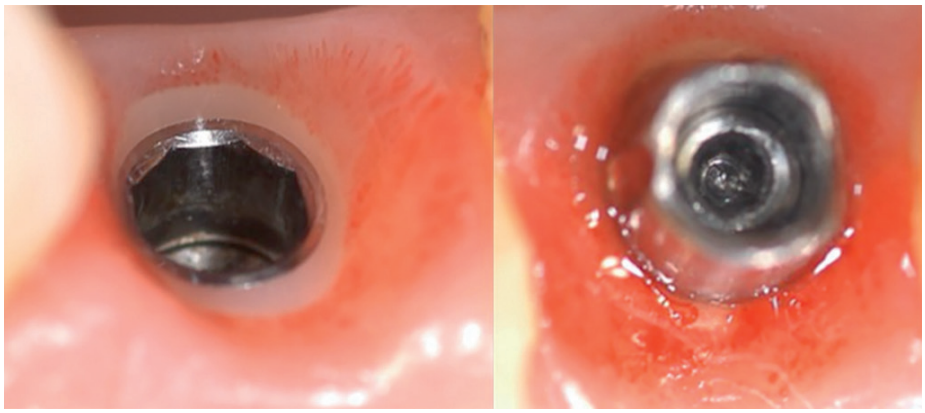

Figure 18: Zirconia collar compared to titanium abutment

Figure 19: At the nine-year follow up the papillae has grown to reduce the amount of visible zirconia

REFERENCES

Rimondini L et al (2002). Bacterial colonization of zirconia ceramic surfaces: An In Vitro and In Vivo study. Int J Oral Maxillofac Implants 17(6): 793-8