Restoring the function and aesthetics of central incisors

Literature

Dr Philippe Jourdan, France

A 62-year-old male patient was referred to the practice of the author after failed endodontic treatment of teeth #11 and 21, which had made the tooth roots mobile (Figs. 1 & 2). The patient had attended the practice several times in the past to have the central incisor crowns refitted, since they had kept falling off. Owing to the hopeless prognosis of the existing restorations, treatment options for restoring tooth #11 and 21 were discussed with the patient, who decided on extraction and replacement of these teeth with two dental implants. Radiographs were taken to confirm that the patient had sufficient quantity and quality of bone to support implant placement. Two 15.5 × 4.0 mm Z1-infinity implants with a zirconia collar height of 1.5 mm (TBR Dental) were planned for. The only indication for which the author uses the longest implants available, as was done in this case, is in post-extractive situations, because, in order to obtain sufficient primary stability, the implant needs to go beyond the apex of the extracted tooth.

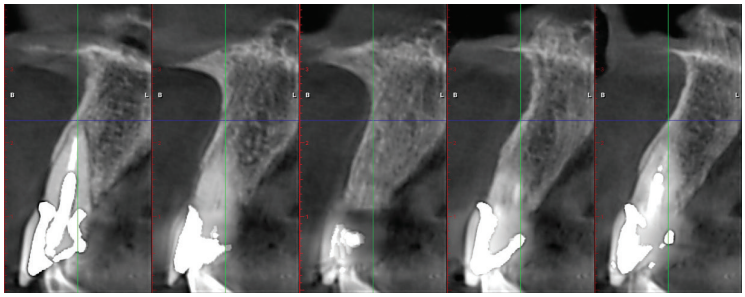

Fig. 1: CBCT scan of endodontic failure of teeth #11 and 21.

Implant placement

Surgery began with using the piezo-surgical unit to atraumatically extract the roots of the central incisors (Fig. 3). The sockets were cleaned manually and an Er:YAG laser was used to remove the periodontal ligaments. The implant sites were prepared by creating osteotomies in each socket, the implant sites parallel to each other and positioned palatally (Fig. 4). The implants were placed into the sockets at 15 rpm (Figs. 5 & 6). Using a contra-angle handpiece makes this process much quicker and easier than carrying it out manually. Impression copings designed for taking closed-tray impressions were fitted once the implants had been placed (Fig. 7). Acrylic was applied around the impression copings and the excess material was removed distal to the lateral incisors. The acrylic was then used to take a closed-tray impression, which was treated by the dental technicians at the integrated dental laboratory at the author's practice. This impression taking technique is easier, faster and more accurate than other methods and one that the author often uses in cases where there are multiple implants and joined crowns.

Thereafter, healing abutments of 5 mm in height were fitted temporarily to maintain the soft tissue while the provisional restorations were produced by the laboratory. At the same time, a grafting material called sticky bone (Fig. 8) was placed in order to regenerate the bone in this area. An allograft (Bone Bank Allografts) was mixed with a liquid platelet-rich fibrin (PRF) to create the high-viscosity sticky bone grafting material.[1, 2] A biopsy punch was then used on an PRF membrane to create two holes that were

Fig. 2: Central incisors before implant surgery. **Fig. 3:** Preparation and extraction of central incisors. **Fig. 4:** Osteotomy preparation for implant placement.

slightly smaller in diameter than the healing abutments. This PRF membrane was used to hold the grafting material in place before the surgical site was sutured together using monofilament sutures (Figs. 9 & 10). The laboratory designed a unique abutment system that enabled a cement-retained crown to be fitted effectively. The dental technicians put acrylic composite around the abutment to create a transgingival barrier designed to prevent any cement from going under the soft tissue when the abutment was fitted. The specially designed abutment was placed and the provisional restoration (Fig. 11) fitted using cement (Figs. 12 & 13). The surgical site was sprayed with a combination of air and water to remove any excess and prevent cement infiltration under the gingiva. The patient was provided with appropriate postoperative care instructions to aid healing.

Implant restoration

After seven months of healing, the patient came back to the practice to have the definitive restoration placed. Figure 14 demonstrates that there was perfect healing with no signs of inflammation and an excellent emergence profile. The provisional crowns and abutments were removed to reveal pink and healthy soft tissue around the zirconia collars of the implants (Fig. 15). A radiograph also demonstrated that there was healthy bone around the implants. The definitive crowns were fabricated from a zirconia framework with an outer layer of feldspathic ceramic. The cervical part of the crown was polished rather than glazed, as this increases gingival cell adhesion and proliferation, creating an antibacterial shield for the crestal bone and the gingiva.[3] The crowns were then finished with pigment and glaze (Fig. 16) before the abutment was refitted and the definitive restorations cemented into place (Fig. 17). The patient was very happy with the outcome.

Result

The implant was reviewed three months after the definitive crowns had been fitted. The papilla had been effectively maintained and a creeping attachment of the gingiva had started to develop (Fig. 18). Having placed Z1 implants for almost 15 years, the author had every confidence that the papilla would eventually close the diastema between tooth #11 and tooth #21. The patient reported that he loved the final result. His aim was to eventually have tooth #25 replaced with an implant, but this would require a sinus lift, as there was inadequate bone to support implant placement in this area.

Discussion

Cement-retained crowns were chosen over screw-retained ones in this case, as these solutions are much easier to fit, particularly with the Z1 implant. There can be angulation issues with screw-retained restorations, as these would need to be placed more to the buccal side of the bone, meaning access to the implant could be more challenging and the overall aesthetic could be compromised. In cases of immediately loaded implants—at the stage when the soft tissue is still healing—the concern with cement-retained restorations is that excess cement can cause peri-implantitis and subsequent failure of both a bone-level and a tissue-level implant.[4, 5] Once the soft tissue has healed, excess cement remains a poten-

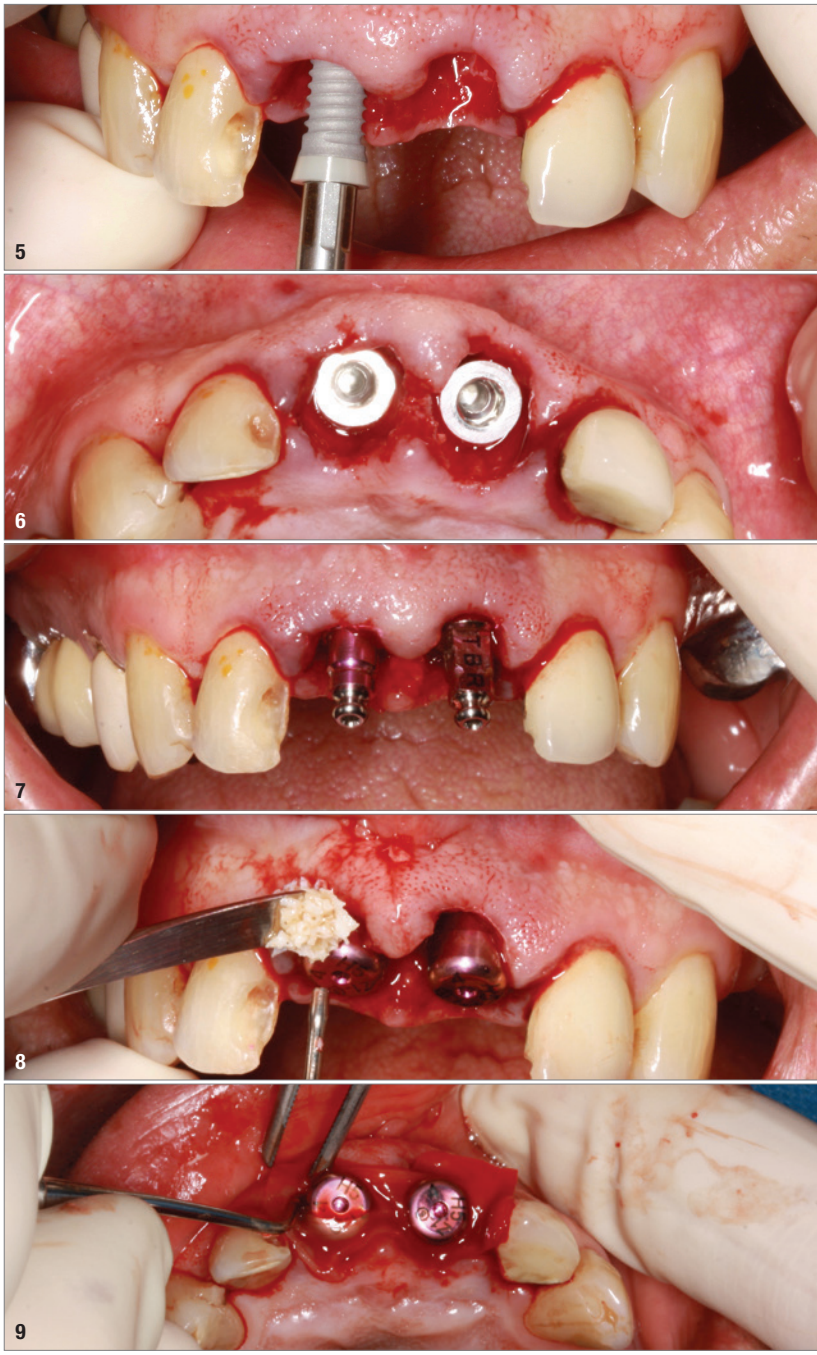

Fig. 5: Placement of implants. **Fig. 6:** Implants placed in positions #11 and 21. **Fig. 7:** Impression copings fitted. **Fig. 8:** Application of sticky bone. **Fig. 9:** Application of PRF membrane.

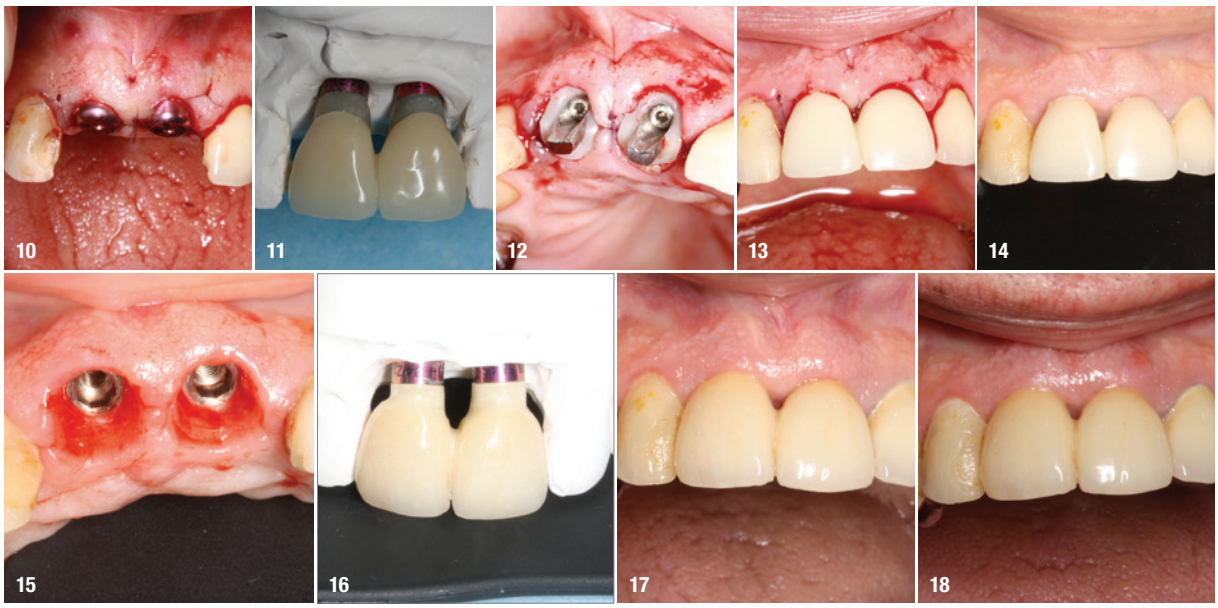

Fig. 10: Surgical site sutured together. **Fig. 11:** Provisional crowns. **Fig. 12:** Abutments fitted two hours post-op. **Fig. 13:** Provisional crowns fitted using cement. **Fig. 14:** Provisional crowns after seven months of healing. **Fig. 15:** Soft-tissue healing after removal of provisional crowns. **Fig. 16:** Definitive crowns on cast. **Fig. 17:** Definitive crowns fitted. **Fig. 18:** The result three months after placement of the definitive crowns.

tial threat to the success of bone-level implants, but not necessarily to tissue-level implants, especially if the implant is a Z1. In this regard, the soft tissue attaches itself to its zirconia collar, creating a natural barrier between the implant and the soft tissue and thereby reducing the risk of infection. If it had been available at the time, a Z1 implant with a 2.5 mm zirconia collar height would have been used in this case, replacing the transgingival barrier that the dental technicians had created with the acrylic composite around the titanium abutments. This would have created greater surface adhesion between the zirconia collar and the soft tissue, ensuring that the implant was even more impervious to bacterial infiltration at the crestal bone level.

A tissue-level implant should be the most commonly used type of dental implant as opposed to a bone-level system, which makes no biological sense to use. So long as a tissue-level implant is placed, restored and maintained properly, the risk of complications is minimised. The numerous other benefits of the implant used were apparent throughout this case. As it is a tissue-level system with a transgingival portion made of zirconia, exceptional aesthetics can be achieved with this implant that are superior to that achieved by bone-level implants, as well as other tissue-level implants that are fully titanium. Some degree of recession is inevitable with implant treatment, but the titanium components of conventional bone-level and tissue-level implants are more likely to become visible through the gingiva, thus compromising the overall visual result. To combat this issue, the zirconia collar of the implant encourages fibroblast cells to adhere and proliferate, creating an effective soft-tissue seal around the collar.[6] As such, even if there is a minimal degree of recession, the result of treatment with this particular implant is always highly aesthetic: the collar mimics the function and appearance of a natural tooth. Furthermore, this implant offers time-saving advantages. For instance, it promotes regeneration of the soft and hard tissue simultaneously for accelerated healing. This implant is also placed in one surgical step, which saves both the patient and the clinician an additional appointment. This is not necessarily the case with bone-level implants, as the surgical site has to be accessed after the implant has been placed, resulting in longer treatment times. This is why the Z1 is the preferred option for the author in most of his implant cases.

about the author

Dr Philippe Jourdan is a dentist from France who specialises in oral surgery. Between 1983 and 1988, he completed several postgraduate training programmes in both Toulouse and Marseilles in France. Since 1986, he has led a private practice in Balma in France.

contact

Dr Philippe Jourdan
Balma Dentaire
Balma, France
+33 5 62576222
selarl-balma-dentaire.chirurgiens-dentistes.fr/fr

Author details

Zeramex

The ceramic implant

The naturally, white ceramic implant

Flexible, reliable and efficient use.

- 100% metal-free
- Reversibly, two-piece screw-retained
- Customized prosthetic flexibility

Made in Switzerland – Since 2005

ZERAMEX
naturally, white implants

www.zeramex.com