Surgical aspects of two-piece ceramic implants

A solution in compromised bone sites

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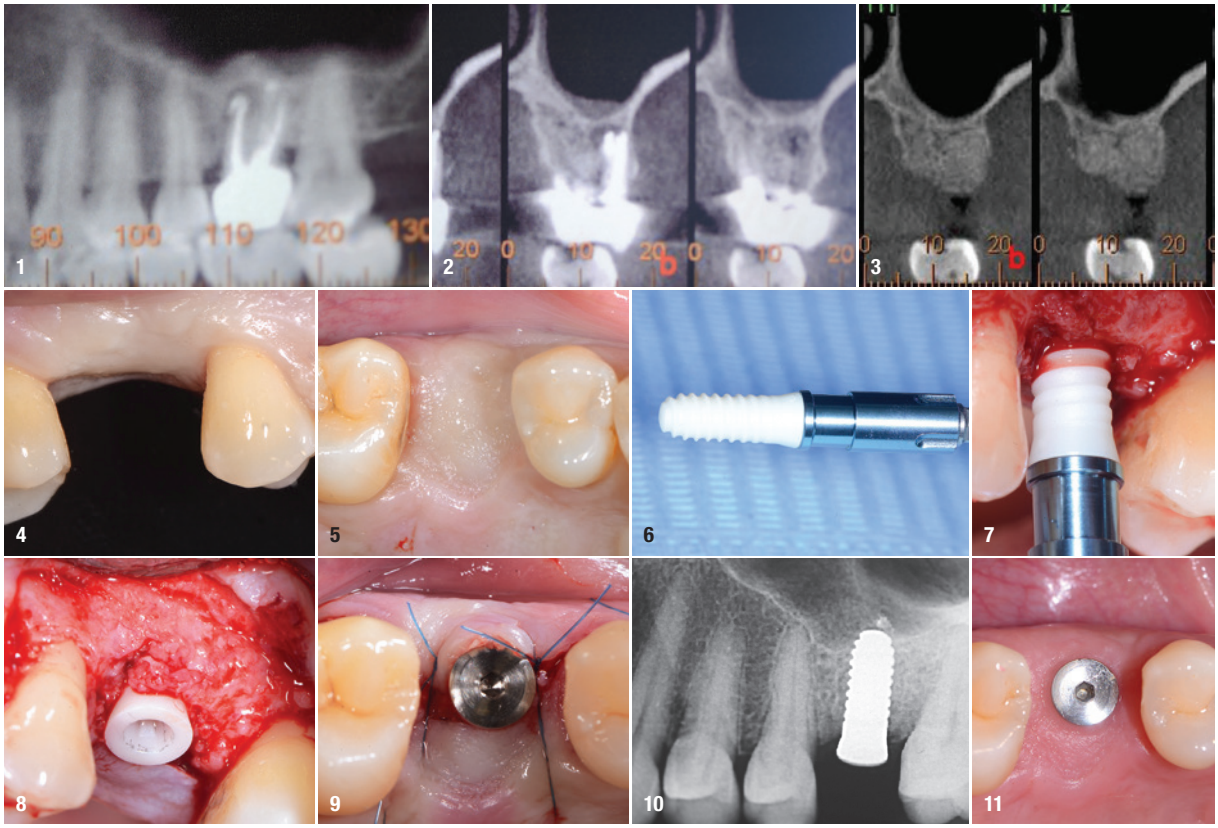
Introduction

Ceramic or zirconia implants have appeared in the literature for more than 30 years and have been proposed as a solution for replacement of teeth in edentulous areas. Clinical studies have also shown positive results, as opposed to with titanium implants. Throughout the last decade, ceramic implants have become a part of our implant treatment plans. Besides the aesthetic advantage, the significant interest in zirconia implants is related to its good soft-tissue response. This material seems to have greater biological acceptance by the body, which could lead to a decline in peri-implantitis cases. However, more research is needed to confirm this hypothesis.

To avoid mechanical obstacles, the first generation of zirconia implants was only available as a one-piece implant configuration. However, this specific implant was not suitable for clinical situations with a bone deficiency (quality or quantity), for instance in immediate implant placement procedures, in cases of a lack of bone volume or reduced primary stability, and in cases in which there was no indication for immediate loading with a one-piece implant. In recent years, a novel ceramic implant with a two-piece design has appeared, giving the



Case 1—Figs. 1 & 2: Radiographs before the extraction (first stage). **Figs. 3–5:** Healing of the socket preservation. **Figs. 6 & 7:** Implant insertion. **Figs. 8–10:** End of surgery. Two-piece ceramic implant at tissue level. **Fig. 11:** Successful tissue integration at two months.

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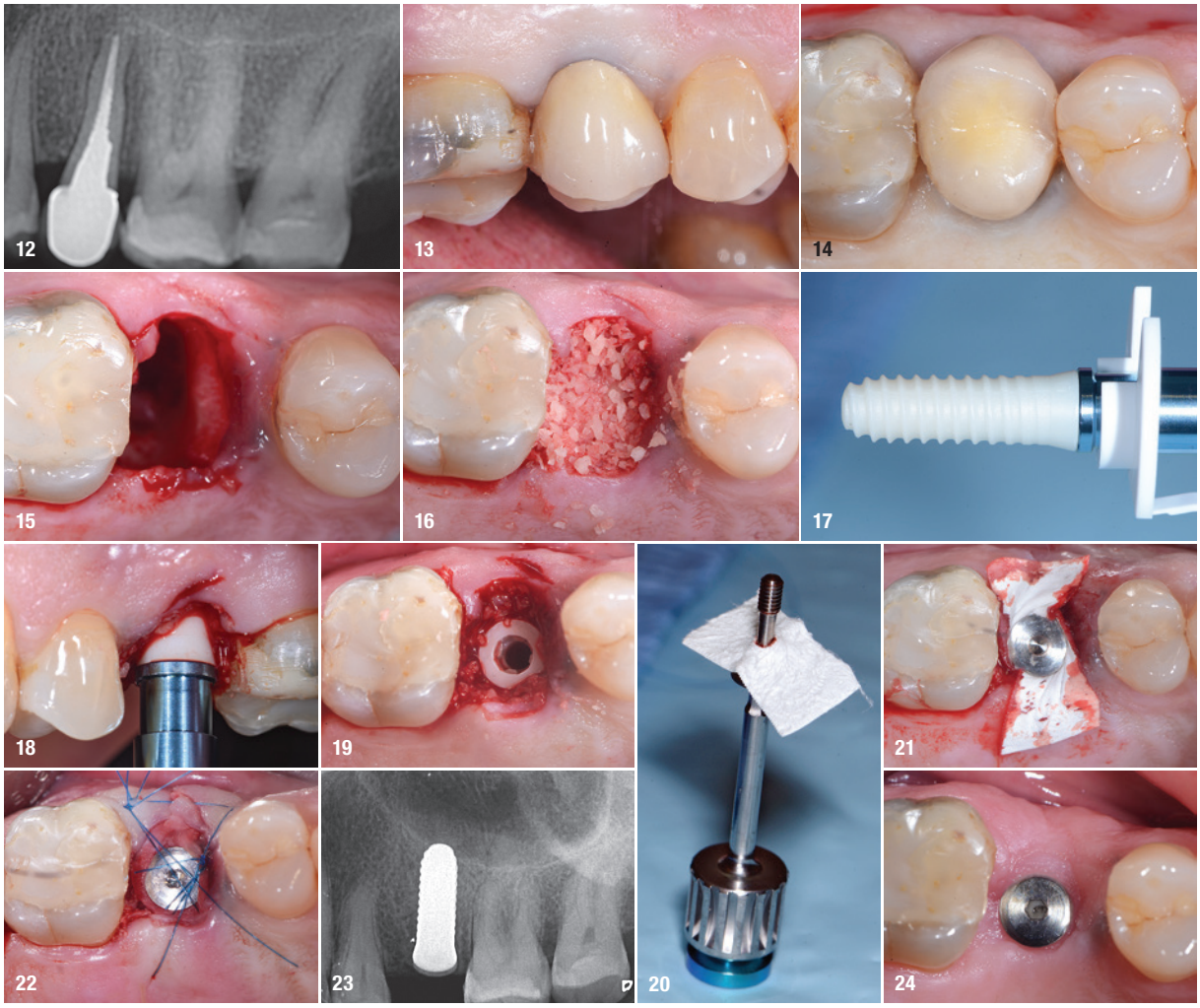

Case 2—Figs. 12–14: Hopeless tooth. **Fig. 15:** Atraumatic extraction. **Fig. 16:** Bone allograft for socket preservation. **Figs. 17–19:** Two-piece ceramic implant placement at tissue level. **Figs. 20–22:** Collagen membrane placement and suture. **Fig. 23:** Radiograph showing successful tissue integration at two months. **Fig. 24:** Successful tissue integration at two months.

opportunity to treat situations of deficient bone support and to allow healing without loading. In the following, five clinical cases involving surgery with two-piece ceramic implants are described.

Cases

Case 1: Implant placement in regenerated bone (two-stage approach)

The implant insertion was preceded by endodontic treatment, which had failed. The first stage of implant treatment involved tooth extraction and socket preservation by means of an allograft and a collagen membrane. Six months after the initial treatment, a two-piece ceramic implant was inserted into the bone, which had regenerated at that point, as part of the second treatment stage (Figs. 1–11).

Case 2: Immediate implant placement

The clinical diagnosis revealed a cracked premolar. As a consequence, atraumatic extraction was carried out. Immediate placement of a two-piece ceramic implant at tissue level was done along with socket preservation (allograft bone substitute and a resorbable collagen membrane). No loading was done at that point (Figs. 12–24).

Case 3: Implant placement combined with lateral bone augmentation (guided bone regeneration) via a simultaneous approach

The site in the mandibular molar area presented with an alveolar crest too narrow for predictable implant placement without augmentation. Two-piece zirconia implants were placed simultaneously with lateral bone augmentation using an allograft and a resorbable collagen membrane (Figs. 25–34).

Case 4: Implant placement in molar area with guided tissue regeneration

A patient with an infrabony defect came to the practice explicitly demanding a zirconia implant in the molar area. Thus, a two-piece zirconia implant was inserted, and at

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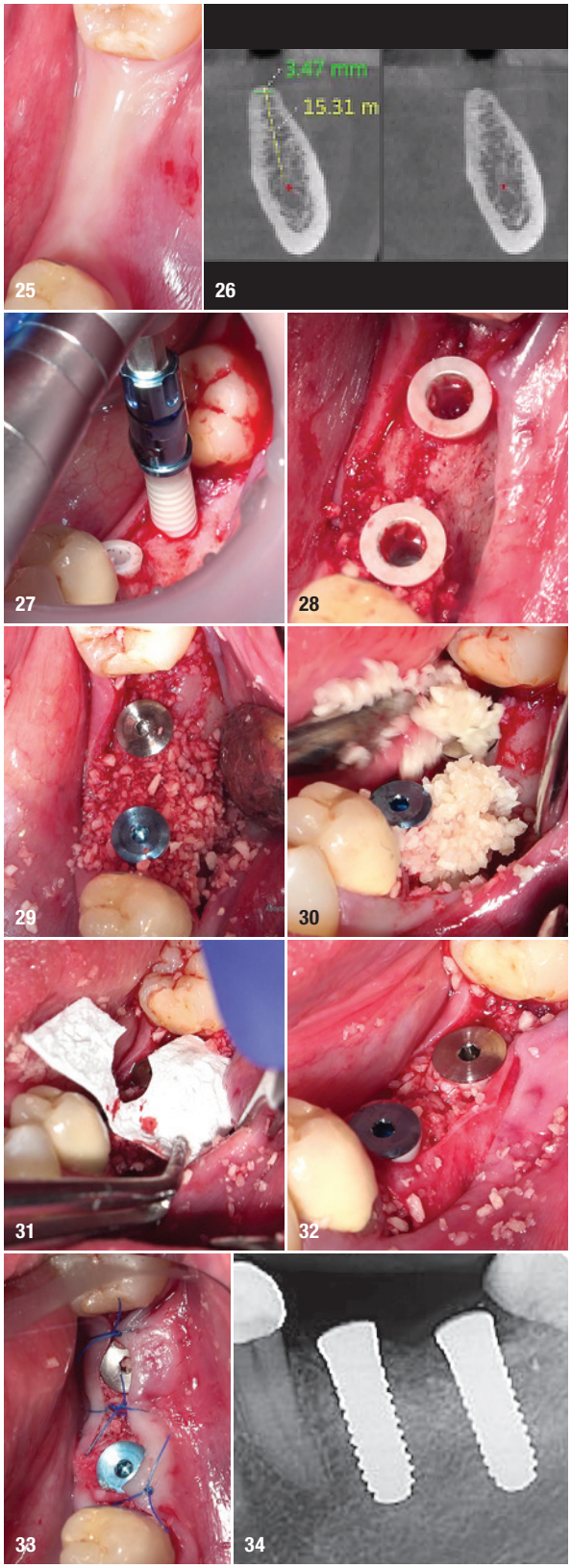
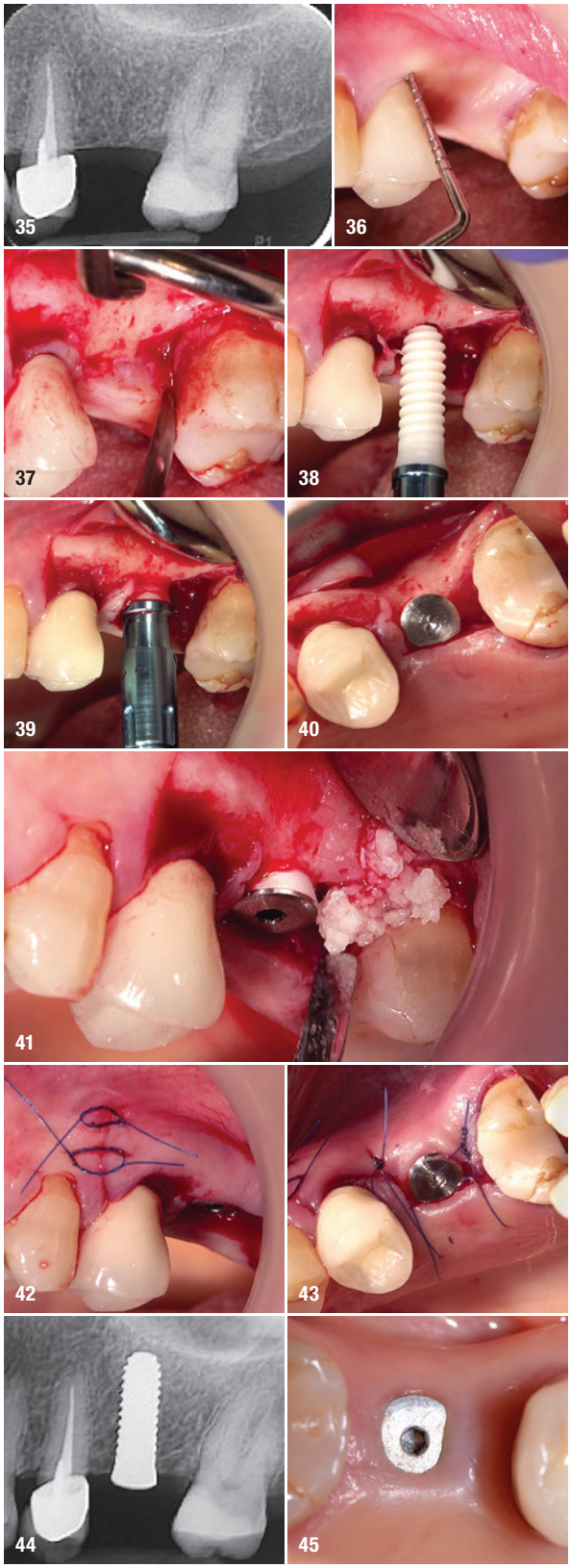
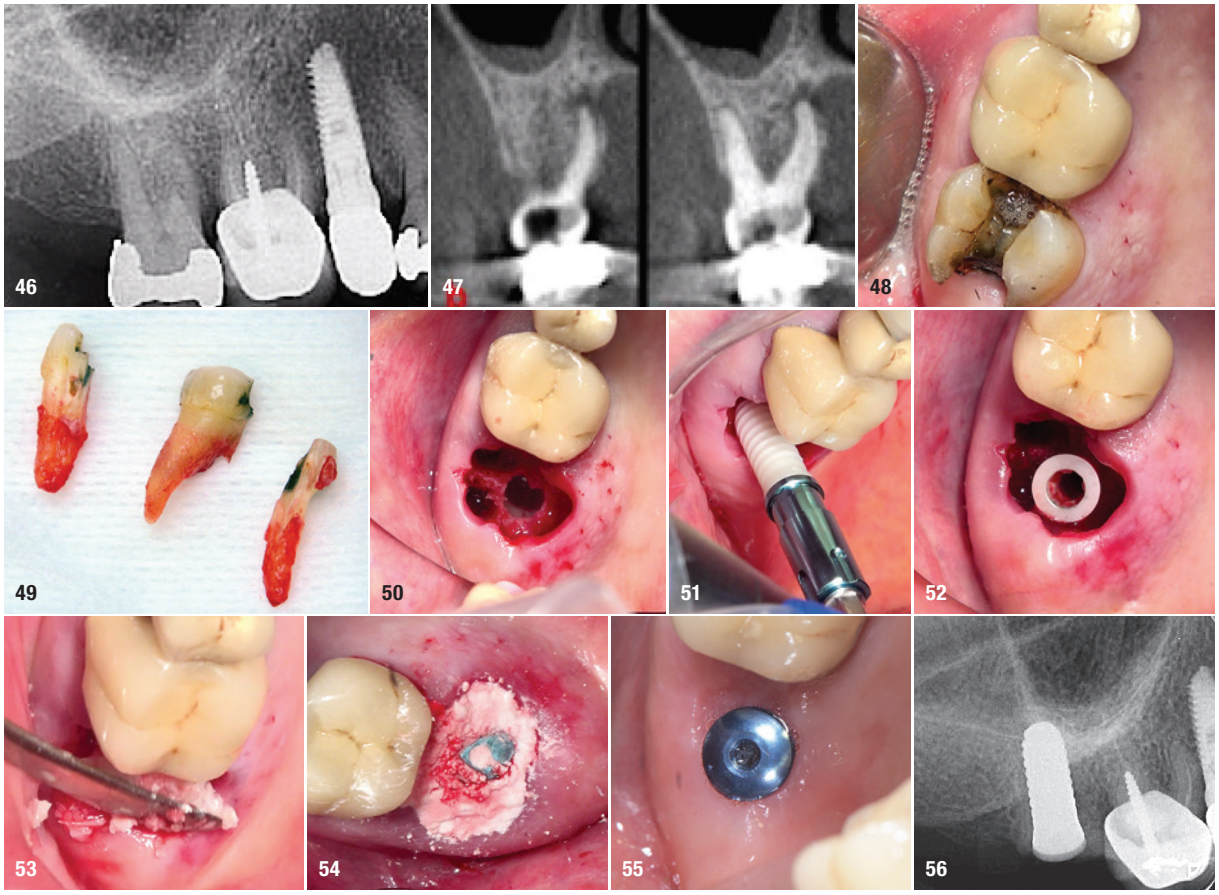


Case 3—Figs. 25 & 26: Narrow edentulous area compromised for implant placement. **Figs. 27 & 28:** Two-piece ceramic implant placement at tissue level. **Figs. 29 & 30:** Lateral bone augmentation (guided bone regeneration) with allograft bone substitute at the time of the implant placement. **Figs. 31–33:** Placement of a collagen membrane as a barrier and sutures. **Fig. 34:** Control radiograph at two months.



Case 4—Figs. 35 & 36: Edentulous molar area before implantation. **Fig. 37:** Exposure of the periodontal defect (the mesial aspect of the second molar). **Figs. 38–40:** Two-piece ceramic implant placement at tissue level. **Fig. 41:** Bone grafting and guided tissue regeneration at the mesial aspect of the second molar. **Figs. 42 & 43:** Micro-sutures. **Figs. 44 & 45:** Control radiograph and good integration of the ceramic implant in the environment.



Case 5—Figs. 46–48: Compromised maxillary second molar (crack and endodontic complication). **Fig. 49:** Atraumatic extraction, preserving the interradicular septum. **Fig. 50:** Osseodensification technique with Densah burs using the interradicular septum. **Figs. 51 & 52:** Two-piece ceramic implant placement. **Figs. 53 & 54:** Allograft bone substitute and biphasic calcium sulphate protection. **Figs. 55 & 56:** Tissue integration and control radiograph at two months.

the same time, the infrabony defect was treated by means of a bone allograft and Emdogain (Straumann). No loading was done at this stage (Figs. 35–45).

Case 5: Immediate implant placement with the osseodensification technique

Diagnostics found a furcation, and a compromised prognosis for the maxillary second molar involved was made because of an interradicular crack. The tooth was gently removed, keeping in place the interradicular septum into which the implant was planned to be inserted. The osseodensification technique was performed by means of Densah burs (Versah), allowing successful stabilisation of the implant at tissue level. Allograft bone substitute and biphasic calcium sulphate were used for socket preservation. After eight weeks, we could observe and appreciate the successful integration of the ceramic implant into the surrounding tissue (Figs. 46–56).

Conclusion

In conclusion, it can be argued that ceramic implants are increasingly becoming a part of the armamentarium of the Implantologist. The one-piece implants seem to have a better indication in favourable bone conditions. However, the two-piece ceramic implant will find its indication for compromised bone situations.

about the author

Dr Bernard Dahan obtained his dental degree in 1976 at the University of Toulouse in France and obtained his specialisation in periodontics from Aix-Marseille University in France in 1978. Today, Dr Dahan concentrates his activity on bone regeneration, implantology, microsurgery and laser therapy and is in charge of the Private Academy training centre in Haifa in Israel.

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