

Full-arch restoration of the maxilla with two-piece zirconia implants

Dr Nashat Gara, Israel

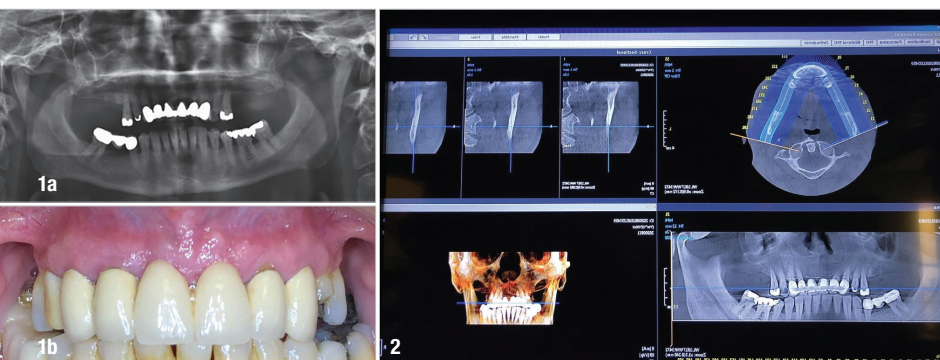


Fig. 1a: Panoramic radiograph of the initial situation. **Fig. 1b:** Patient before treatment. **Fig. 2:** CBCT scan of pre-op situation.

Case presentation

A 54-year-old male patient consulted our dental practice at the beginning of 2020 expressing the wish for the full restoration of his teeth on the basis of implants. He appeared to be in good general health without any major background conditions. Panoramic photographs and CBCT scans were captured in the practice (Figs. 1a–2). The patient had advanced aggressive periodontitis. A blood test indicated that the patient had mild hyperglycaemia and increased cholesterol levels. The treatment plan was discussed with the patient, who gave his consent for the extraction of the teeth

in the upper jaw and replacement with two-piece zirconia implants, which would support immediate loading. Radiographs were taken to evaluate the quality of the bone in both jaws in order to support the implant placement. After I found that bone augmentation would be needed, my recommendations were discussed with and approved by the patient. The planning was for ten TAV Dental implants in the upper jaw. The number of implants that were inserted in the upper jaw were ten as planned and they lent sufficient stability.

Treatment procedure

The patient was brought into deep sedation by an accompanying anaesthetist. Surgery commenced with the atraumatic manual extraction of the teeth, first loosening the gingiva from the tooth with a scalpel, then gently pulling from the upper jaw using a manual spoon excavator. The sockets were cleaned manually, and a laser was employed to clear the periodontal ligament. Finally, the sockets were treated with ozone therapy to safely sterilise the alveolar bone and clear it of all pathogens. The implant sites were prepared by adjusting and aligning osteotomies in each socket. The sockets of the incisors received four implants of 12.0mm in length and with a diameter of 4.1 mm, using a contra-angle handpiece, which served to speed up the process. Locations #16, 17, 26 and 27 received four implants of 10 mm in length. The lengths of the implants were determined on the basis of the CBCT scans, which gave insight into there being sufficient bone height, taking into consideration that the implant has to enter 1–2 mm beyond the apex of the extracted tooth. The posterior jaw had less bone than the incisor area, which is why the shorter implant was selected. Once the implants had been inserted (Fig. 3), to maintain and protect the soft tissue, healing abutments of 5 mm in height and made of titanium (TAV Dental) were screwed on to the implants. A closed-tray impression was then taken (Fig. 4). Acrylic was applied around the impression copings, and the excess material removed. The closed-tray impression was employed by the in-house laboratory. The impression was supplemented by scans taken with an intra-oral scanner. The images and impression together were used for the CAD/CAM complete provisional restoration, which was delivered to the patient on the same day.

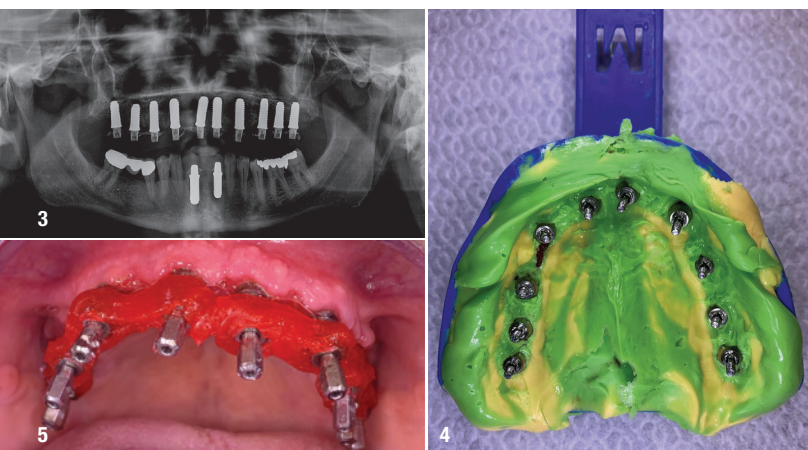


Fig. 3: Panoramic radiograph post-op. **Fig. 4:** Closed-tray impression post-op. **Fig. 5:** Post-op situation with healing abutments and platelet-rich fibrin mixed with bone grafting material draped around the implants and abutments.

In locations #12 and 14, an allograft (Cortical Mineralized/ Demineralized Blend, Maxxus) was mixed with a liquid platelet-rich fibrin (PRF) to create a high-viscosity bone grafting material that is adhesive to the natural bone, achieves quicker healing and supports the immune response. The fibrin is extracted from the patient's blood sample by spinning it in a centrifuge. The graft was applied to fill up any remaining space around the implants and on the buccal side. The implant area bone was flattened. The abutments were partly covered by the grafting material as well (Fig. 5). A PRF membrane was then applied to fit snugly around the healing abutments and to cover the bone grafting material on the labial and buccal sides. To allow the abutments to peek out, holes were punched into the PRF membrane with a biopsy punch. The PRF membrane is designed to hold the bone grafting material in place as well as promote the growth of soft tissue. The surgical sites were then sutured using PTFE suture thread. Upon being made ready, the provisional restoration was fitted and then attached using Temp-Bond cement (Kerr; Fig. 6). A mix of air and water was sprayed over the gingiva to remove any clinging cement residue, to prevent it from invading the operation sites. After the patient was checked again by the anaesthetist and after some resting time, during which he was provided with postoperative care instructions to promote healing, he was released. In terms of postoperative care, the patient was called in for check-ups every two to four weeks. After two weeks, the sutures were removed. After one month, it was found that the implants had achieved proper stability, and after six weeks, the membrane was removed with a probe.

Prosthetic restoration

After a total of five months of healing, the patient was invited back to the practice to evaluate restoration in his upper jaw. There was perfect healing of the gingiva with no signs of inflammation around the implant areas or at the papillae. At removal of the provisional restoration and abutments, a clear pink profile was exposed with healthy soft tissue around the zirconia collars of the implants. A panoramic photographic and CBCT scan showed that the bone was healthy around the implants. In two further sittings, the provisional restoration was replaced by another provisional restoration, made of acrylic, before the definitive complete restoration made of zirconia. The procedure for this was as follows. A total of eight tailor-made zirconia abutments designed by our in-house dental technician were made, aided by CAD/CAM. The new acrylic provisional restoration was placed over this and bonded with Temp-Bond. At the following appointment, the acrylic restoration was removed to take an impression again of the zirconia abutments (Fig. 7). Two weeks later, the definitive complete denture made of zirconia was delivered without glazing. The colour and shape were evaluated before it was glazed. One week later, the denture was cemented with Premier Implant Cement (Premier Dental; Fig. 8). The patient expressed his delight at the functional and aesthetic result and said the teeth felt natural in his mouth (Fig. 9).

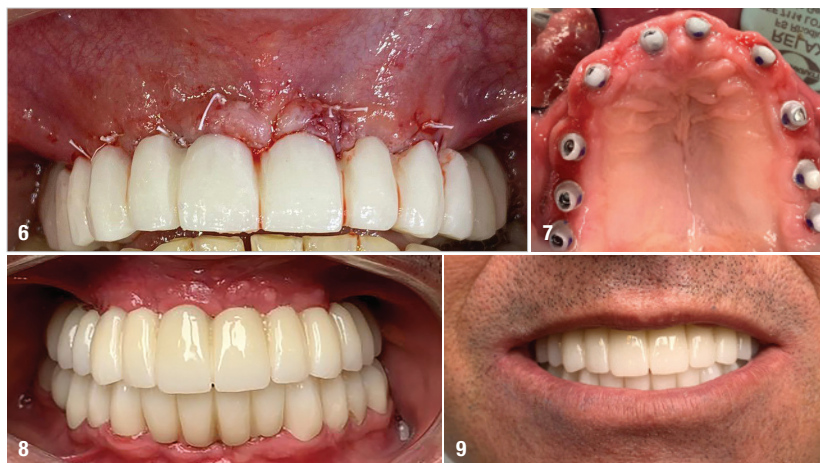


Fig. 6: Provisional acrylic restoration fitted and healing site sutures. **Fig. 7:** Intra-oral situation of upper jaw with zirconia abutments. **Fig. 8:** After placement of zirconia complete denture. **Fig. 9:** Final result: the patient's smile.

Conclusion

Two-piece zirconia implants were chosen over one-piece implants for the upper jaw, as these are much easier to handle in case of breakage or implant failure, in which case the entire implant does not need to be lost. The use of zirconia is almost an obvious choice these days, not least for the aesthetic advantage of avoiding a grey border shimmering between the tooth and the gingiva. In addition, there is the important and scientifically proven advantage of zirconia, being non-metal: biocompatibility with the hard and soft oral tissue. The two-piece implants in our case were cemented. In many cases, a two-piece implant will be screwed, which is more friendly to the gingiva in that it avoids the need for cement, which could potentially harm the soft tissue.

about the author



Dr Nashat Gara is a leading Israeli implantologist and aesthetic dental surgeon. In 1995, he graduated with a DMD from Goethe University in Frankfurt am Main in Germany. In 2010, he completed an MSc in oral surgery and implantology at Danube University Krems in Austria. He established his own private dental centre in Tel Aviv in Israel in 2000. In

2010, he took over a dental practice in Hilversum in the Netherlands, which provides implant and surgical procedures to patients from the Netherlands and Belgium.

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