Full-arch rehabilitation using ceramic implants in guided surgery protocol

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Patients with metal allergies and heightened allergic status represent a challenge for dental implant treatment. Nowadays, ceramic implants are emerging as a viable solution for such patients, offering the advantages of tooth-like colour, enhanced soft-tissue healing and lower affinity to plaque accumulation. However, fast and efficient treatment protocols with ceramic implants are still very demanding, particularly when it comes to full-arch restorations.

Initial situation

A 62-year-old patient (Fig. 1) with a history of multiple metal allergies and advanced periodontal disease turned to the clinic for aesthetic fixed restoration. The patient was concerned about surgical trauma and hoped for a fast and painless procedure. Further examination revealed a heightened allergic status (increased immunoglobulin E level), painful occlusion

Fig. 1: Initial situation. **Fig. 2:** Straumann PURE monotype ceramic implant. **Fig. 3:** CoDiagnostiX planning. **Fig. 4:** Surgical guides and prefabricated provisional restorations.

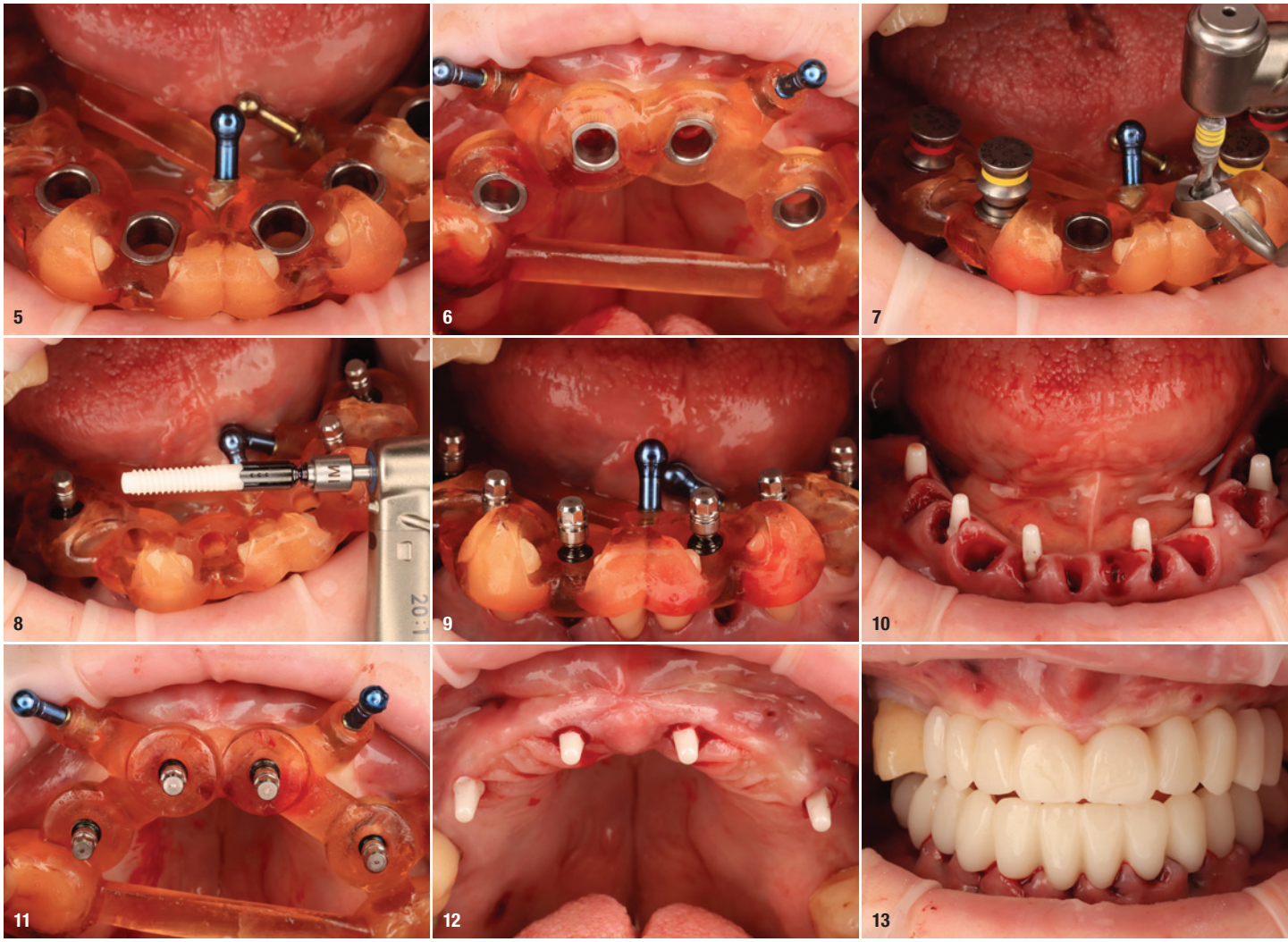

Fig. 5: Surgical guide fixed on the mandible. **Fig. 6:** Surgical guide fixed on the maxilla. **Fig. 7:** Guided implant bed preparation **Fig. 8:** PURE ceramic implant mounted on handpiece adaptor. **Fig. 9:** PURE ceramic implants placed via the insertion guide in the mandible. **Fig. 10:** PURE ceramic implants in place in the mandible. **Fig. 11:** PURE ceramic implants placed via the insertion guide in the maxilla. **Fig. 12:** PURE ceramic implants in place in the maxilla. **Fig. 13:** Immediate provisional restorations cemented.

with several mobile teeth and a largely hopeless dentition.

Treatment planning

Given the patient's allergic status, Straumann PURE monotype ceramic implants (Fig. 2) were the option of choice to support full-arch restorations in the upper and lower jaws. To minimise surgical trauma and ensure precise, parallel implant placement, it was decided to use the Straumann guided surgery solution to place the implants flaplessly. To increase the precision of fit of the surgical guides, it was planned to use some of the remaining teeth for the surgical guide fixation and to extract them after implant placement. Furthermore, guided surgery based on fully digital workflows also allowed immediate provisionalisation at the end of surgery, thus facilitating patient comfort.

The patient's CBCT data, together with the data from the intra-oral scan, were imported into coDiagnostiX (Dental Wings), and virtual planning was done (Fig. 3). Based on that planning, the surgical protocol was determined and the surgical guides and the immediate provisional restorations were fabricated (Fig. 4).

Surgical procedure

To facilitate the precision of the implant placement, two dedicated surgical guides were used: one guide for the drilling and another one for the guided insertion of the implants. The insertion guide was produced based on the dimensions of the transfer piece for the PURE ceramic implant.

To further control potential deviations, the implant bed preparations were done starting from the distal sections

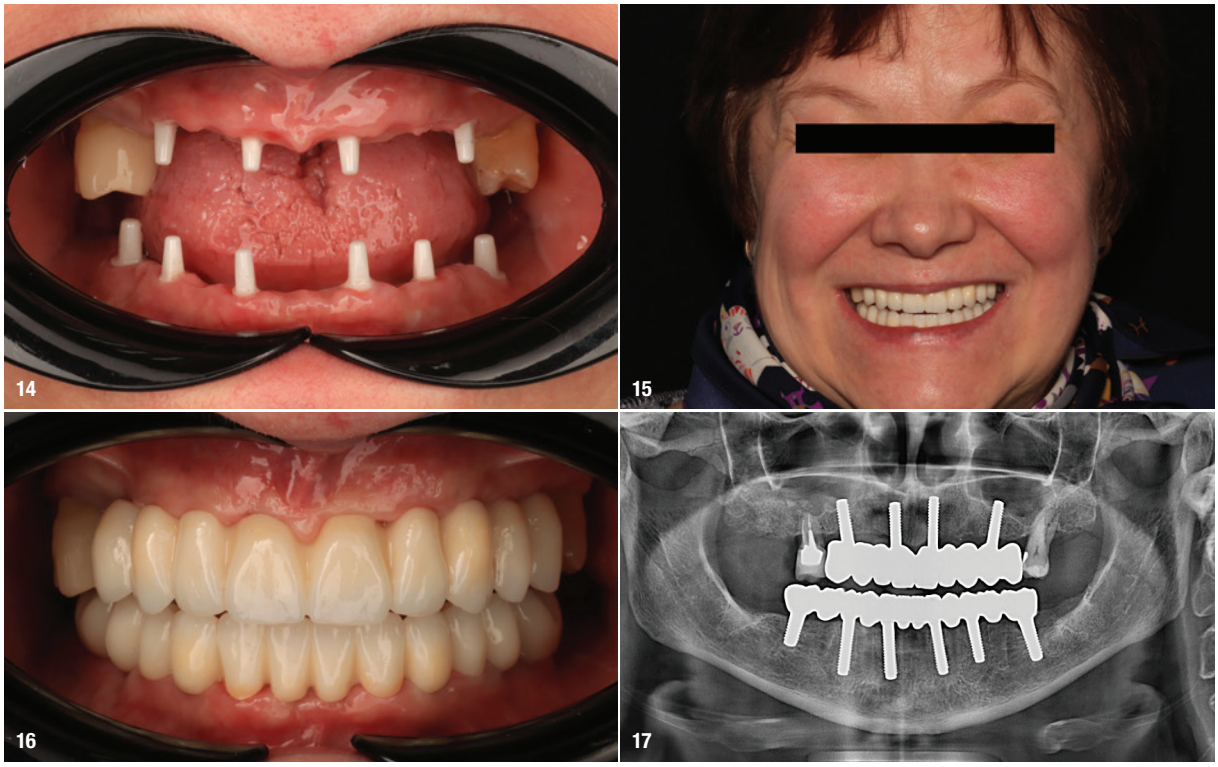

Fig. 14: Soft-tissue healing at the two-month follow-up. **Fig. 15:** Result and smile line. **Fig. 16:** Definitive restorations cemented. **Fig. 17:** Dental panoramic tomogram at the one-year follow-up.

and moving mesially while fixing every prepared osteotomy with the additional fixation pins (Figs. 5–7). The insertion guide was then fixed, and the fully guided implant placement was carried out (Figs. 8–12). Finally, the prefabricated provisional restorations were cemented and the patient could leave the office (Fig. 13).

Prosthetic procedure

At the two-month follow-up visit, the clinical examination showed good soft-tissue healing (Fig. 14). Conventional closed-tray impressions were taken. It was decided to leave the distal teeth in the maxilla to provide better proprioception. At the final appointment, the definitive full-arch zirconia restorations were cemented (Figs. 15 & 16). The patient was satisfied with the functional and aesthetic outcomes. The dental panoramic tomogram at the one-year follow-up showed stable results (Fig. 17).

Conclusion

This clinical case illustrates a successful full-arch rehabilitation using Straumann PURE ceramic implants in a digital protocol. The Straumann guided surgery system helped to manage several clinical challenges: digital tooth extraction, prefabrication of immediate provisional restorations and post-extraction placement of multiple PURE monotype implants precisely parallel to each other—all in an efficient and minimally invasive protocol.

about the author

Dr Alexandr Bortsov graduated with a DDS from South Ural State University in Chelyabinsk in Russia. As a surgeon, his focus areas are implantology and guided surgery, aesthetic dentistry and digital dentistry. Dr Bortsov is the director of the Dental Art clinic in Chelyabinsk and of the International Team for Implantology study club in Chelyabinsk. He is the head of surgery and prosthodontics at the Central Dentistry clinic in Russia.

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