Ceramic versus titanium implants

Three-year follow-up and a split mouth study

Drs Simion Bran, Manea Avram, Onisor Gligor Florin, Horia Opris, Gabrial Armencea & Mihael Baciut, Romania

In this study, we followed up the comparative tissue reaction to titanium dental implants versus ceramic dental implants. Both types of dental implants used were mainly those produced by TAV Dental. Only two-piece dental implants were used in this research. The following parameters were evaluated in each step of the procedures: quality of the prosthetic attachment, gingival attachment, dental plaque adherence, and primary and secondary stability. In all of these cases, implant uncovering and prosthetic loading were done ten weeks after implantation. In the two cases described here, there were no observable complications after implant insertion.

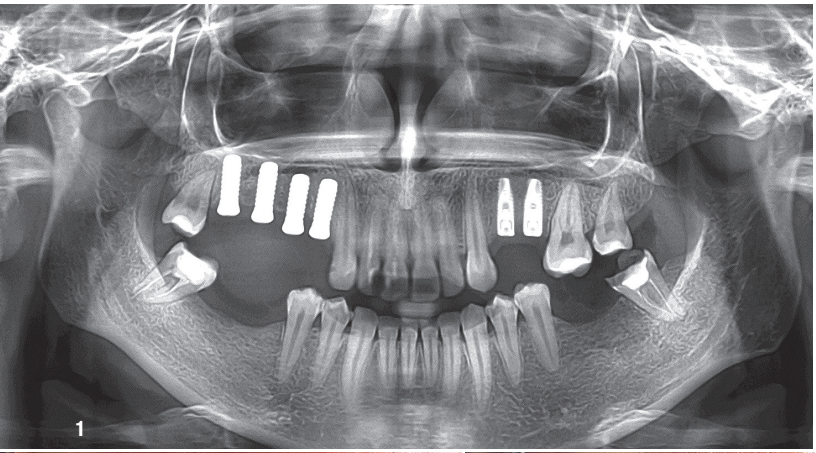
The two cases

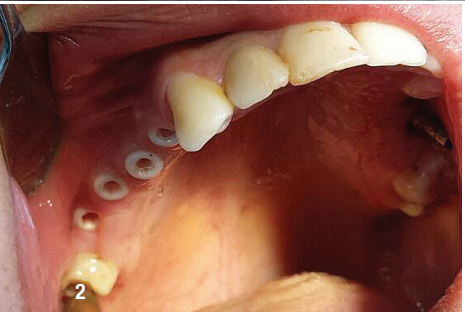
The patient of the first case described had four zirconia dental implants (TAV Dental) inserted in the right side of the maxilla. These implants were 4.2 mm in diameter and 10.0 mm in length. In the left side of the maxilla, she had two titanium implants (Silhouette, TAV Dental) inserted. These implants were 3.75 mm in diameter and 10.00 mm in length. Loading was performed ten weeks after implantation. At that point, no inflammation at soft-tissue level was observed and there was perfect gingival attachment (Figs. 1–3).

The patient of the second case described had two zirconia implants (TAV Dental) inserted in the left maxilla. These were first-generation implants with a diameter of 4.2 mm and a length of 12.0 mm. In the mandible, titanium dental implants (Biomicron) of 3.75 mm in diameter and 10.00 mm in length had been inserted and functioned for a total of 14 years. A radiograph was taken at ten weeks after uncovering and loading. The impression was done by means of the open-tray technique. The patient received a metal-ceramic prosthetic build-up. Mechanical failure of a titanium implant occurred after 14 years of function and 2.5 years after loading of the zirconia implants (Figs. 4–7).

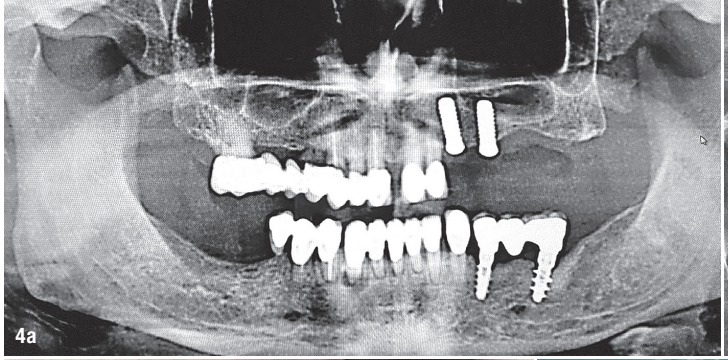
Findings

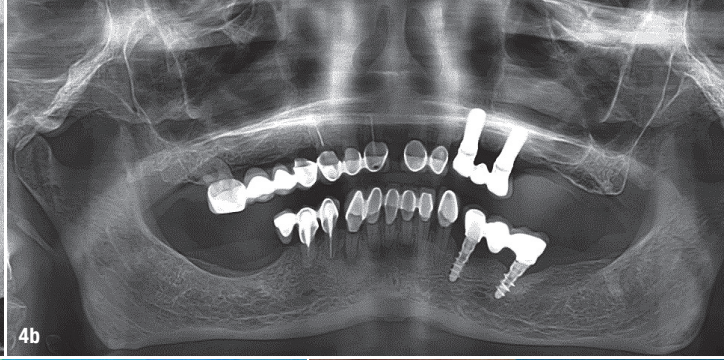
In our three-year follow-up of the cases presented, we found that the gingival attachment was better for the zirconia implants than for the titanium ones. Also, the inflammatory response was better for the zirconia implants. There was less peri-implantitis and less bone loss for the duration of the follow-up. The osseointegration process

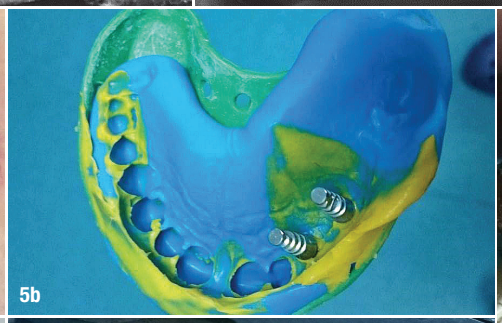


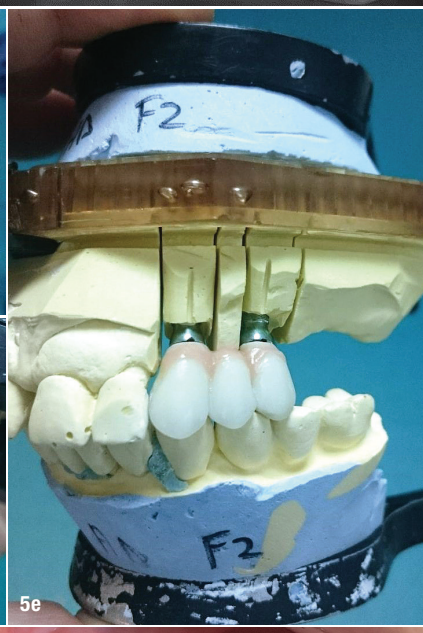


Case 1—Fig. 1: Initial radiograph of the patient with zirconia implants in the right side of the maxilla and titanium implants in the left side. **Fig. 2:** Ten weeks after implantation. Clinical examination revealed no inflammation at the soft-tissue level and perfect gingival attachment. **Fig. 3a:** Impression with open-tray technique. **Fig. 3b:** Final prosthetic result.





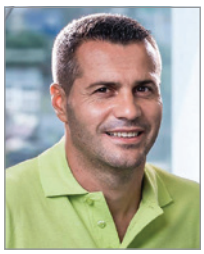




Case 2—Fig. 4a: Radiograph showing the situation after implantation of two zirconia implants in the left maxilla. The mandibular titanium dental implants functioned for a total of 14 years. **Fig. 4b:** Radiograph at ten weeks after uncovering and loading. **Fig. 5a:** Uncovering. **Fig. 5b:** Impression with open-tray technique. **Figs. 5c–e:** Metal-ceramic prosthetic build-up. **Fig. 6:** Mechanical failure (fracture) of the titanium implant in region #34 (after 14 years of function) 2.5 years after loading of the zirconia implants. **Fig. 7:** Clinical intra-oral aspect after the prosthetic restoration of the maxillary right implants and failure of one of the mandibular right implants.

of the zirconia dental implants was comparable to that of the titanium implants. Prosthetic loading can be done safely for both types of implants at ten weeks. The mechanical resistance of the zirconia implants and their superstructure was similar to that of the titanium implants. For example, the second case showed failure of one of the titanium dental implants.

about the author



Dr Simion Bran is an associate professor at the Iuliu Haţieganu University of Medicine and Pharmacy in Cluj-Napoca, Romania. He specialises in maxillofacial and orthognathic surgery with over 20 years of experience. His research interests include bone regeneration techniques and fundamental science.

contact

Dr Simion Bran
IMOGEN Medical Research Institute
Strada Louis Pasteur, FN
400349 Cluj-Napoca
Romania
Phone: +40 264 296928

Author details