

Two-piece ceramic implants as a treatment option for full arches in the lower jaw: New era in implantology

The complete loss of teeth, also known as edentulism is considered by the Institute for Health Metrics and Evaluation at the University of Washington as the third oral condition with the highest global incidence in 2010 in the elderly population⁽¹⁾. The two main causes of tooth loss are tooth caries and periodontal diseases⁽²⁾.

In this sense, dental implants are a rehabilitative treatment option that presents favorable and predictable results over the years. Currently, commercially available titanium alloy implants are the primary option and are the most commonly used type of implants for the replacement of natural teeth. Furthermore, based on several systematic reviews, these implants reveal high survival rates and implant success over a long period of time^(5,6).

However, the number of patients requesting, and at times with no other options, metal-free teeth replacement solutions in terms of implants and prosthetics has been increasing in recent years. In addition to this fact, questions have arisen about the prevalence of inflammation in tissues around titanium implants, aseptic and premature implant loosening which may be partially associated with titanium particles resulting from titanium corrosion taking place in the harsh oral environment^(7,8,9). It is also worth noting that the presence of metals in the

oral cavity can generate corrosion reactions through an electrochemical redox reaction⁽¹⁰⁾ which can lead to hypersensitivity conditions⁽¹¹⁾ or even allergic reactions.⁽¹²⁾ Although identified and reported allergic reactions are statistically low (0.6%), Ti allergy can be detected in patients with dental implants⁽¹²⁾, however, such conditions may be due to impurities or alloys in the implant material, and not titanium itself⁽¹⁴⁾.

Among the treatment modalities that can be addressed with the use of dental implants, the implant-supported fixed prosthesis tends to be more attractive for the majority of patients, however this solution tends to be more costly and generates some hygiene difficulties⁽¹⁵⁾. Studies have shown that the rates of survival of implants that support overdentures varies between 91.9% to 98.6% in mandibles⁽¹⁶⁾. However, there are very few reports of fixed total prostheses on ceramic implants, therefore, the objective of the present case report was to demonstrate a new system of ceramic implants, two-piece, as a viable option to titanium in oral rehabilitation involving full mandibular arches.

Case presentation: Complete edentulism of the lower jaw

An 83-year-old woman presented for a consultation complaining of mobility of her lower teeth and difficulties eating due to the long-term use of a removable partial denture.

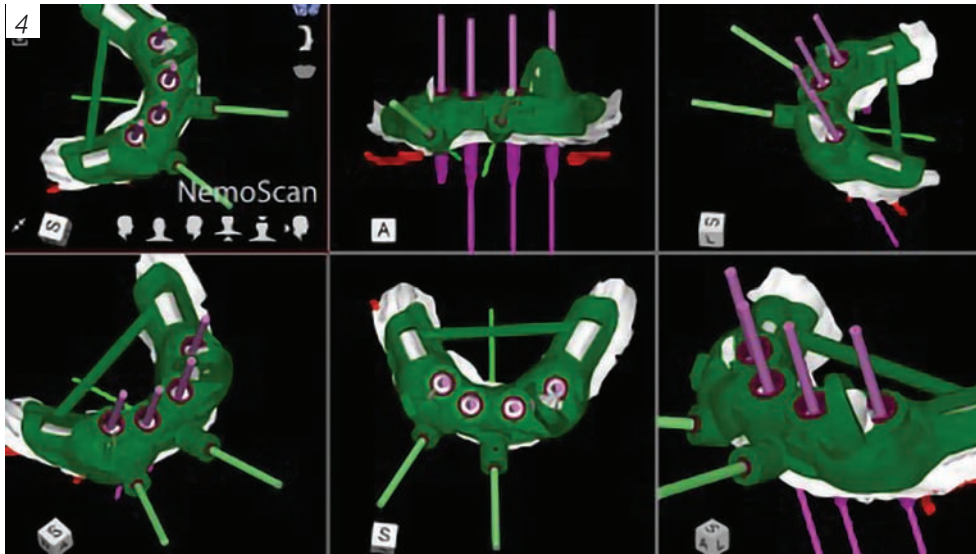
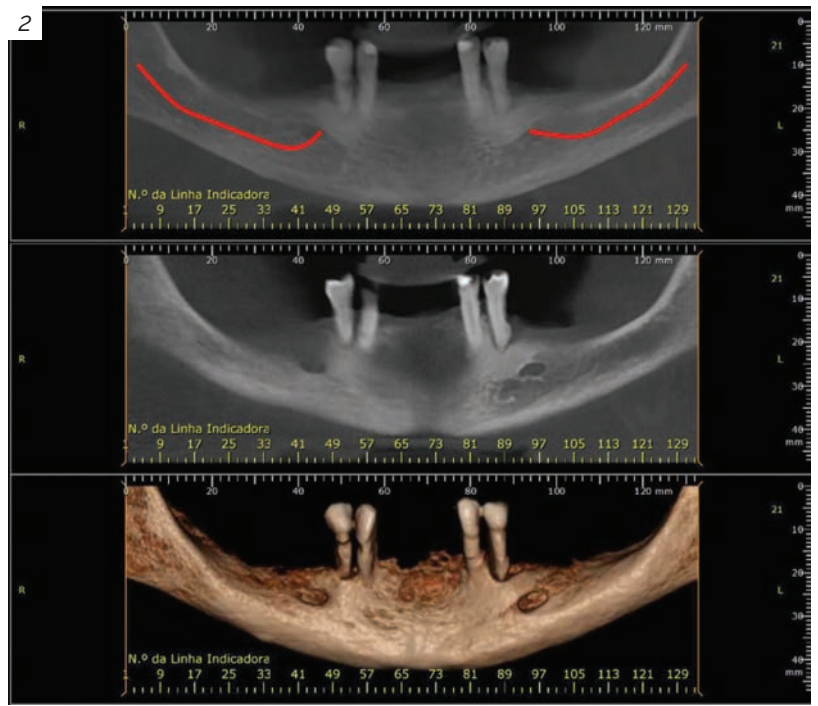
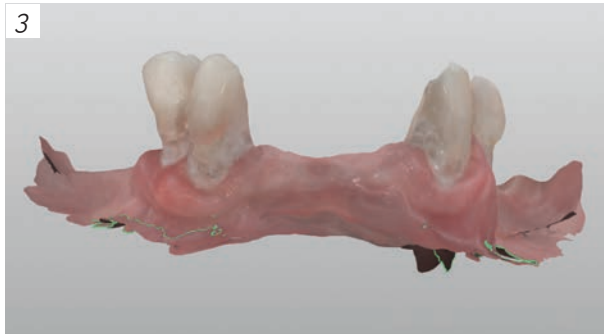


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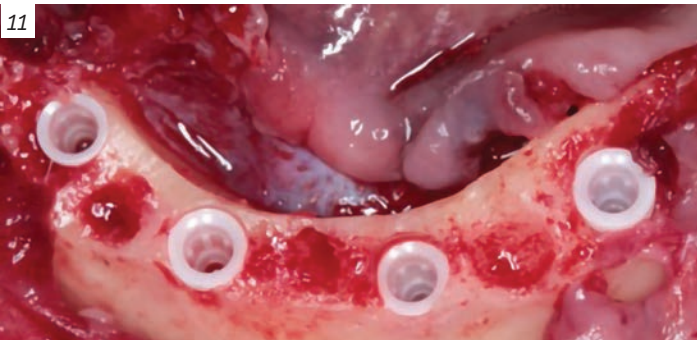
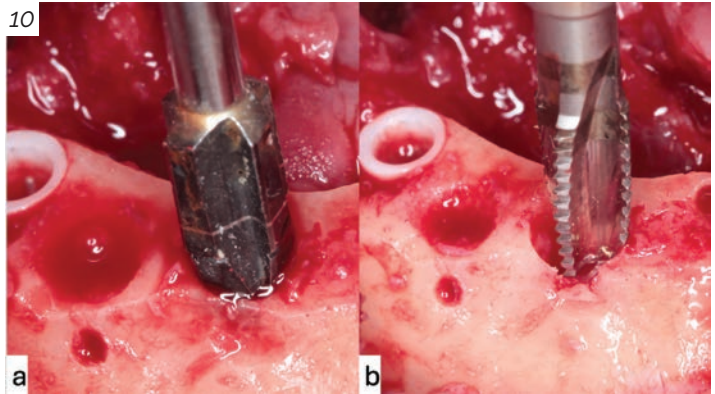
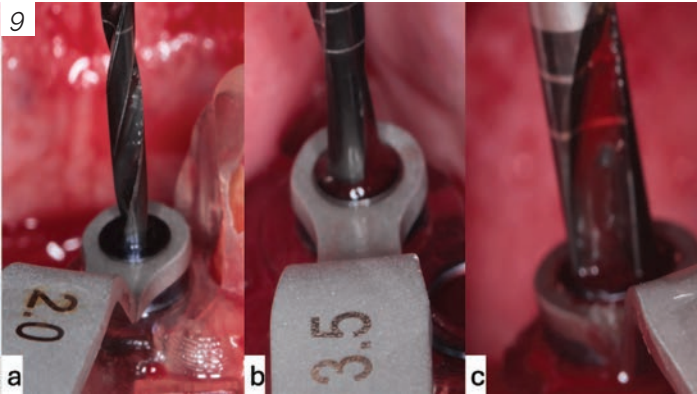
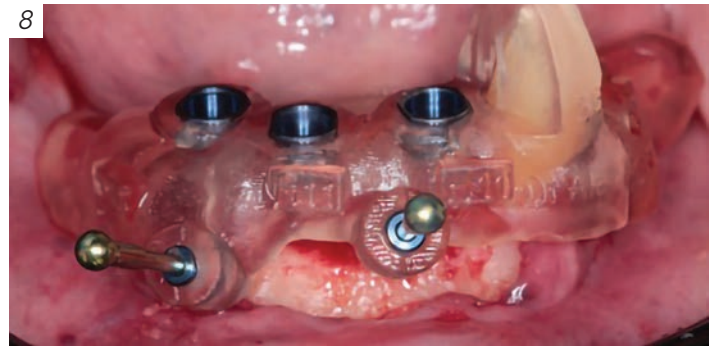
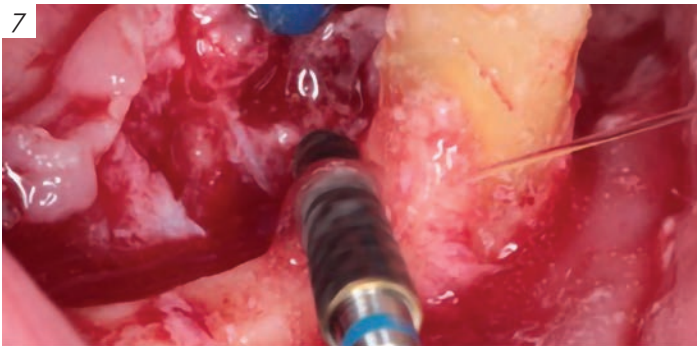
Upon clinical examination it was possible to observe the presence of four remaining teeth (canines and lower premolars) with advanced bone loss and active periodontal disease which, according to her generated a bad taste in his mouth (figure 1). In the upper arch, the patient had a fixed prosthesis (Branemark Protocol) on titanium implants with a metal framework and acrylic teeth. There was large accumulation of plaque on the maxillary fixed bridge as well as inflamed soft tissue below the framework. She specifically requested to have the least amount of metal possible this time around. Additionally, it was also observed that she had sufficient keratinized tissue thickness and width. She was offered the option of ceramic implants, which she

accepted. She was in good general health (ASA I) and as part of the diagnosis and treatment plan process was submitted to a complete computed tomography 3D scan of the lower jaw. This was to assess anatomy, bone volume, plan the placement of ceramic implants with the aim of supporting a fixed complete denture.

The computerized tomography allowed us to observe the location and path of the inferior alveolar nerve as well as the position of the mental foramen. In addition to revealing a partially toothless mandibular ridge, there was a satisfactory amount of bone tissue for implantation (figure 2). The decision for a fixed prosthesis was made after several

conversations with the patient who reported that she no longer wanted to use any type of removable prosthesis.

The option for guided surgery was made so that the implants could have an adequate three-dimensional positioning, parallelism, in order to be able to install a screw-retained fixed prosthesis. An intraoral scan (figures 3) and the planning was carried out with the aid of the software (Nemo Scan) to perform a guided surgery (figure 4). A surgical guide was made (figures 5) and a fixed temporary total prosthesis was made with milled resin (PMMA) (figures 6) to be used as an immediate temporary prosthesis. The implants planned for the case were 4 two-

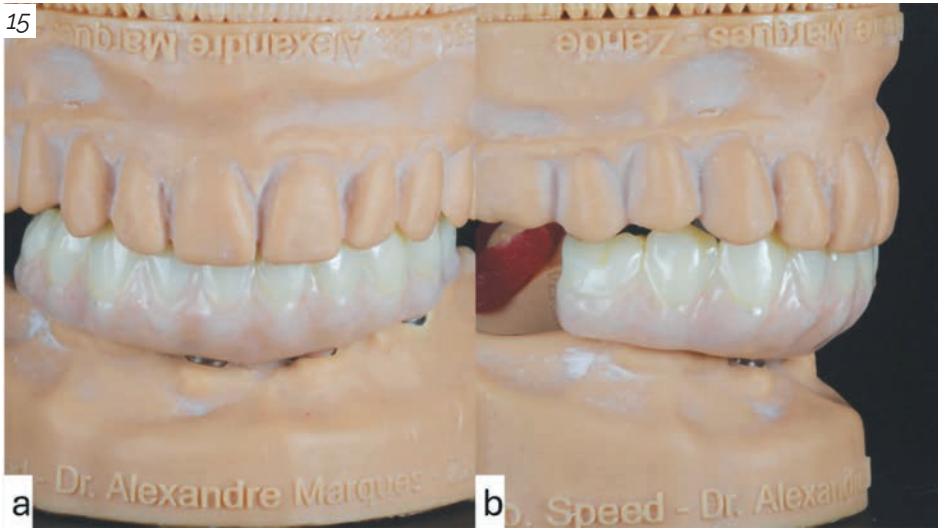


piece ceramic implants (Neodent Zi) all of the same dimension of 4.3 x 11.5 mm.

The surgical procedure was performed according to da Silva AMP (2024)⁽¹⁷⁾, that is, after local anesthesia (4% Articaine with 1:100,000 epinephrine, DFL), tooth extraction was performed using a minimally invasive surgical approach and the sockets were completely curetted to remove any inflammatory tissue and abundantly irrigated. After exodontia of the remaining

teeth a 15c scalpel blade was used to make incision and a milling cutter was used for alveoplasty (figure 7) and the lower canine was maintained until the end of the surgery to help stabilize the surgical guide (figure 8). The osteotomy was performed following the manufacturer's recommendation under profuse irrigation with the aim of achieving optimal primary stability (Neodent - Curitiba - Brazil) (figures, 9a, 9b, 9c, 10a, 10b). Upon completion of all the osteotomies, the selected implants were installed in the surgical site

using a contra-angle previously adjusted to 24 RPM and 30 Ncm (figure 11) and a torquemeter was used on all 4 implants so that the implants could be installed manually in their final positions. Four abutments were selected (CR Abutment - Neodent - Curitiba - Brazil) (figure 12) to support the provisional fixed prosthesis. After sutures were placed, the provisional prosthesis was relined to the abutments using self-cured resin and the immediate temporization was completed (figure 13).



15,16,17). The patient was put on a visual analogue scale regarding her degree of satisfaction with the prosthesis used and reported being "very satisfied" with the stability and aesthetics of her fixed prosthesis, as well as her ability to chew food better.

After 18 months, the patient was advised to undergo a panoramic x-ray again with the aim of observing the maintenance of hard tissues, revealing satisfactory bone stability, with the absence of marginal bone loss in all 4 lower implants (figure 18).

Conclusion

The two-piece ceramic implant system used in the present study is promising, reliable

The patient was prescribed antibiotics (Amoxicillin 500mg) for 7 days and anti-inflammatory for 3 days (Nimesulide 100mg) with an analgesic (Dipyron 1 G) for pain. After 14 days, she returned to remove the sutures.

Four months later, she returned for the fabrication of the definitive prosthesis in

monolithic zirconia and for this the digital flow was followed by scanning the positioning of the implants in the patient's mouth using the Virtuo Vivo intraoral scanner (figure 14).

The fixed prosthesis was then milled and screwed into the patient's implants at a maximum torque of 20 N.cm as per manufacturers recommendations (figures

and with outcomes similar to those found in titanium implants after the same follow-up period. The patient in the present study was advised to continue with follow-up consultations and updates of this clinical report will be published in the future. ■

References available upon request

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