

# Age-friendly implants

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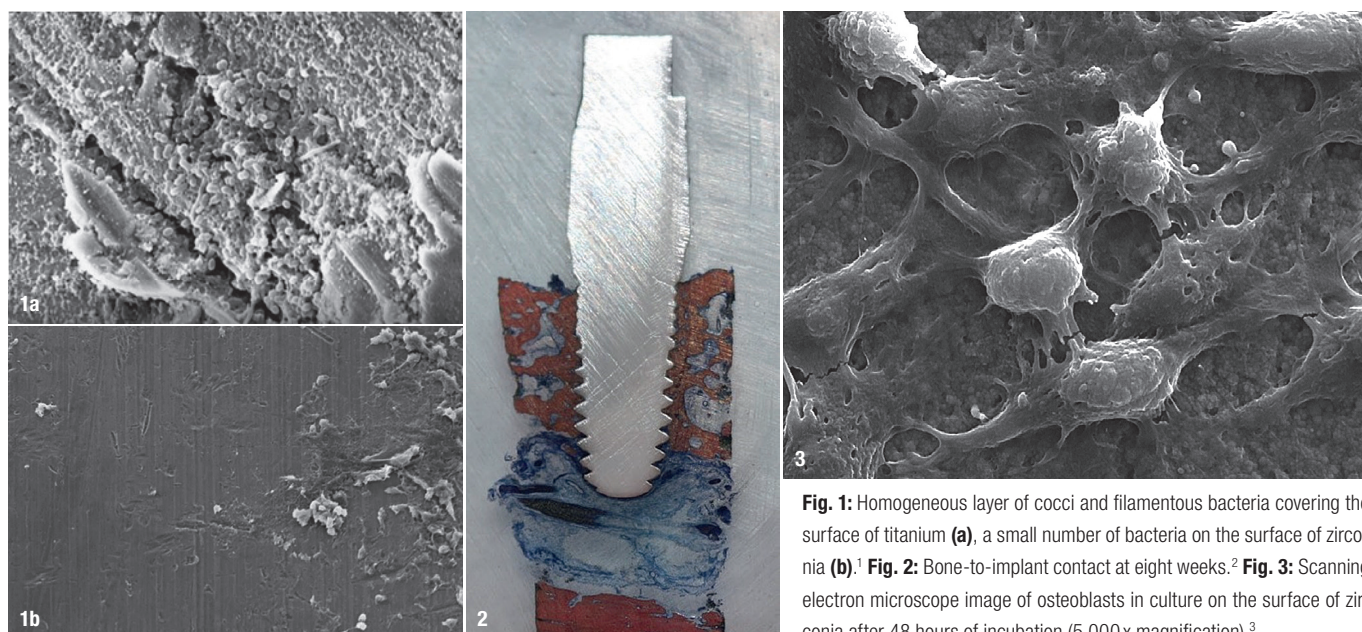
## Ageing patients—risks and opportunities

Life expectancy in the world population is gradually increasing thanks to better living conditions, more widespread healthcare and greater economic resources. The ageing of the individual is accompanied by changes in some bodily functions, such as a decrease in sensory activities, flexibility, nutrition, blood circulation and cognitive abilities. Normal tissue involution, poor hygiene and insufficient care often lead to periodontal disease with tooth loss and bone atrophy, often aggravated by osteoporosis and concomitant systemic disease. The elderly patient, despite physiological decay, wishes to remain autonomous, be socially active and enjoy life. The management of the geriatric patient requires greater caution owing to the fragility of tissue and the often compromised metabolic functions, but it represents a great opportunity for modern dentistry. Elderly patients are more motivated to recover chewing and smiling because they allow them to stay young, be more independent, have a greater self-esteem and remain socially integrated. Dental implants have allowed elderly patients a better quality of life and greater independence. Unfortunately, traditional titanium implants bring with them pitfalls, as they favour the accumulation of bacterial plaque and the release of metal particles that lead to the onset of peri-implantitis, unaesthetic greyish gingival margins, loss of

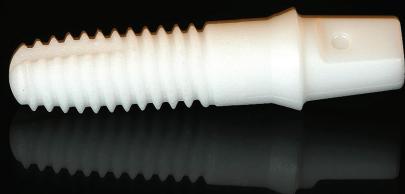
implants, unpleasant breath and debilitating systemic disease (chronic fatigue syndrome, allergies, fibromyalgia and metabolic decompensation).

## Zirconia as a medical prescription

Zirconia, unlike titanium, has poor bacterial adhesion and fewer inflammatory phenomena; therefore, the breath is always pleasant and the gingival tissue well adhered to the implant collar. In elderly patients, mouth hygiene is easier and more effective in the presence of zirconia crowns and implants. The simple use of a toothbrush, implant brushes and rinses with mildly aggressive washes (grapefruit seed or calendula extracts), the mouth is always clean and healthy (Figs. 1a & b). Zirconia is osteoconductive and it allows calcium to deposit on its surface, thus favouring excellent implant osseointegration, and the calcium tends to consolidate over time even in the presence of osteoporosis (Fig. 2). Furthermore, zirconia is an inert material; it does not irritate the immune system and does not disturb the metabolism, which is often already compromised owing to the patient's age or systemic disease (Fig. 3). The new-generation zirconia implants now make it possible to rehabilitate any clinical situation with a fixed prosthesis. In the elderly patient, even if not self-sufficient, it is therefore possible to guarantee good oral hygiene and health and no pres-



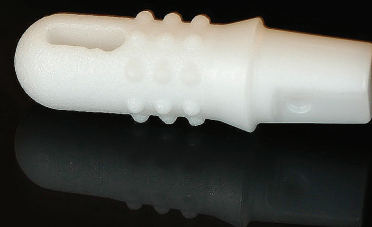
**Fig. 1:** Homogeneous layer of cocci and filamentous bacteria covering the surface of titanium (a), a small number of bacteria on the surface of zirconia (b).<sup>1</sup> **Fig. 2:** Bone-to-implant contact at eight weeks.<sup>2</sup> **Fig. 3:** Scanning electron microscope image of osteoblasts in culture on the surface of zirconia after 48 hours of incubation (5,000x magnification).<sup>3</sup>



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**Fig. 4:** Features of the standard ZIBone implant. **Fig. 5:** Features of the Zircasso implant. **Fig. 6:** Features of the ZBI Ceramica.

sure sores or accidental ingestion of removable prostheses. Any informed and conscientious dentist who wants to help their elderly patient to maintain or restore health should prescribe zirconia implants, as they are healthier and safer.

## Biology-driven implantology

The approach to the elderly patient requires not only highly biocompatible and immune-compatible materials but also multidisciplinary management. First of all, it is necessary to analyse the sociocultural context and the expectations of the patient or of the family members who take care of him or her. It is advisable to know the general health conditions and diseases that the patient suffers from and, in agreement with the specialist, to provide for any precautions or changes to the therapeutic prescriptions. It must always be remembered that the elderly patient is more delicate, is more easily decompensated and has longer healing times; therefore, treatment must be less traumatic and must not require too much cooperation. Implant planning must be very accurate and include essential, fast and safe steps. It is desirable to prefer flapless techniques and placement of monobloc implants in areas of sufficient bone quantity and quality. Excessive trauma with lifting of mucosal flaps, delayed two-piece implant placement and complex techniques for bone augmentation could expose the patient to complications that are difficult to manage, such as bleeding, metabolic decompensation or bacterial infection.

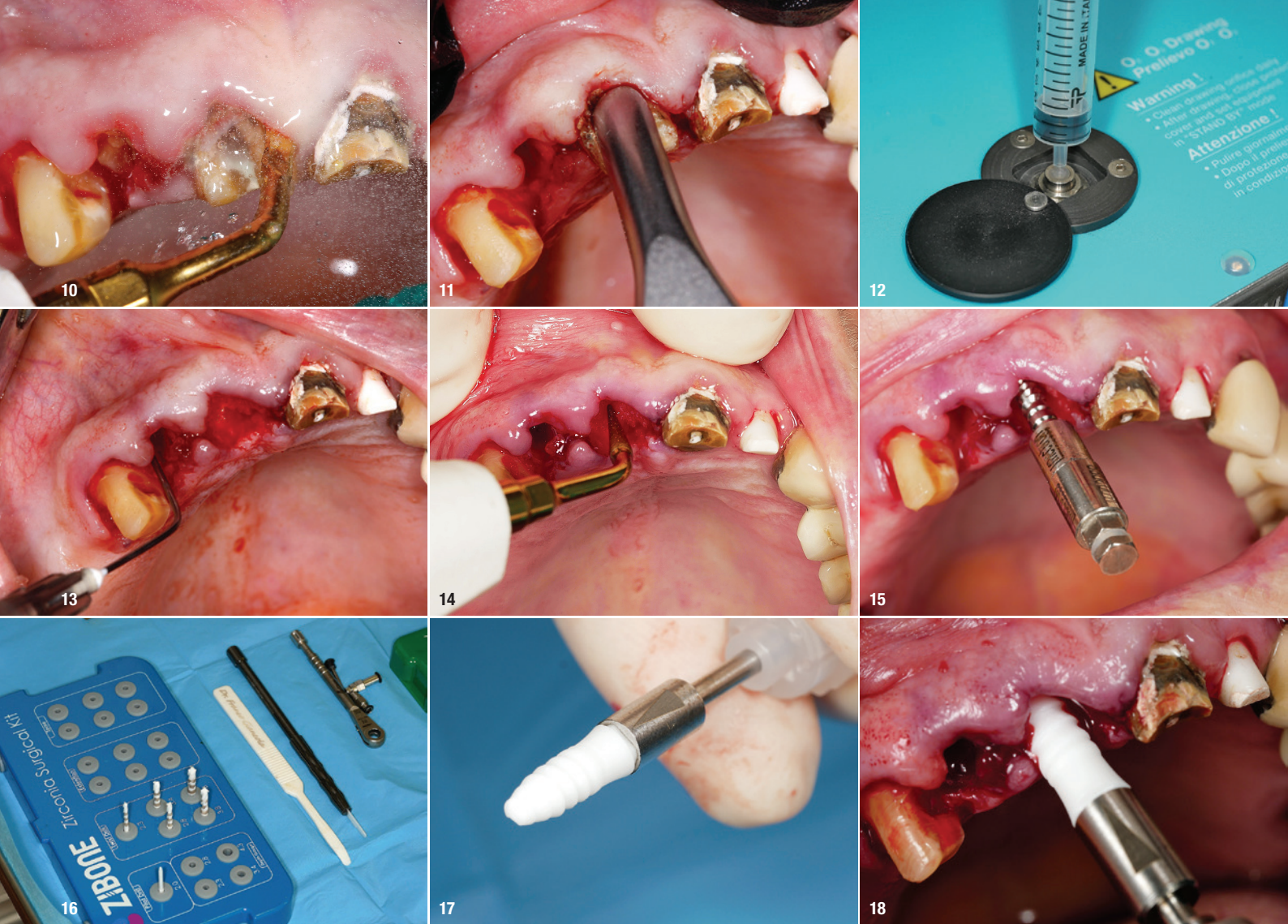
## One-piece ZIBone implants

The ZIBone implant system (COHO Biomedical Technology) has different types and sizes of one-piece implants, ideal for single-session rehabilitation of the alveolar ridge for elderly patients. The manufacturer produces three types of one-piece implants: the standard ZIBone implant, the Zircasso implant and the ZBI (Zirconia Bioactive Implant) Ceramica. The standard ZIBone implant is cylindrical in the coronal portion and conical at the apex, which has vertical grooves that act as a bone reserve (Fig. 4). The orientation of the threads allows easy screwing in of the implant without excessively damaging the surrounding bone. The Zircasso implant, marketed by Zircosol, has regular V-shaped coils and a pointed apex that favours screwing (Fig. 5). The implant is ideal for post-extraction positioning and immediate loading. The

roughness and depressions of the surface of the fixture favour its osseointegration. The ZBI Ceramica, unlike the other two implants, was designed to be inserted by impact without screwing in in compliance with the bone microarchitecture (Fig. 6). The ZBI Ceramica has coronal protrusions for immediate mechanical retention and an



**Fig. 7:** Frontal view of the arches at the dental examination. **Fig. 8:** Clinical situation after removal of the prosthesis. **Fig. 9:** Dental radiograph four years after the placement of a zirconia implant (ZIBone; 4 x 14 mm).



**Fig. 10:** Detachment of the dental root from the bone by means of a piezosurgical technique. **Fig. 11:** Atraumatic tooth extraction. **Fig. 12:** Withdrawal of oxygen–ozone gas mixture (MEDICAL 99 IR, Multiossigen). **Fig. 13:** Disinfection of the extraction socket by local application of ozone. **Fig. 14:** Initial preparation of the implant site with a pointed diamond piezoelectric insert. **Fig. 15:** Screw for non-traumatic bone expansion before implant placement in region #11. **Fig. 16:** Surgical kit of the ZIBONE implant system. **Fig. 17:** Zircasso implant mounted on automatic adapter. **Fig. 18:** Screwing in of the Zircasso implant.

apical through slot for better biological integration (secondary retention). The preparation of the implant site is performed with the piezoelectric technique (or zirconia burs with slow rotation and without irrigation) and the implant positioned with light taps with an osteotome and hammer. The ZBI Ceramica is ideal for the rehabilitation of the upper jaw in bone of D3 or D4 density according to the Misch classification, as is often found in elderly patients with osteoporosis.

### Clinical case

The 88-year-old female patient, apparently in good health, presented owing to the appearance of mobility of the maxillary fixed prosthesis and discomfort in the area corresponding to the maxillary incisors. The removal of the prosthesis revealed a softening of the dentine of the affected teeth, and the examination of the radiograph showed periapical infection (Figs. 7–9). The patient, satisfied with the result obtained from the placement of a zirconia implant four years earlier, asked for removal and replacement of her damaged teeth with bioceramic im-

plants. In consideration of the patient's advanced age, it was decided to perform atraumatic extraction of the affected teeth and immediate implant placement.

Dislocation of the tooth roots was performed with dedicated piezoelectric inserts (PIEZOSURGERY, mectron) and appropriate forceps (Figs. 10 & 11). The extraction sockets were suitably cleaned with alveolar excavators and disinfected with local application of medical ozone at a concentration of 20 mg/ml (Figs. 12 & 13). The preparation of the implant sites was performed initially with a diamond piezoelectric insert and subsequently with different techniques depending on the implant to be placed (Fig. 14). For the socket of tooth #11, bone condensation was initially carried out using the Dr Sentineri's technique bone expander kit (mectron; Fig. 15) and subsequently with slow screwing in of the Zircasso implant (4.1 x 10.0 mm; Figs. 16–18). For the socket of tooth #12, however, the preparation was carried out using slowly rotating zirconia burs (250 rpm) without irrigation and a ZBI Ceramica (4 x 9 mm; Figs. 19–24) was subsequently positioned using impact. At the end of the operation, the



**Fig. 19:** Preparation of implant site #12 using zirconia burs. **Fig. 20:** ZBI (Zirconia Bioactive Implant) Ceramica. **Fig. 21:** Placement of the ZBI Ceramica into the prepared socket. **Fig. 22:** Compaction of the implant using an osteotome and hammer. **Fig. 23:** Final position of the implants. **Fig. 24:** Adaptation of the prosthesis immediately after surgery. **Fig. 25:** Clinical situation after one week. **Fig. 26:** Condition of the peri-implant tissue after two months. **Fig. 27:** Radiographic control of the implants.

implants were protected by means of a temporary resin prosthetic product previously prepared in the laboratory and relined in the office. At the check-up after seven days, the patient reported that she was very satisfied and had no pain, swelling or bleeding but only slight tenderness (Fig. 25).

## Conclusion

Dentists are often afraid of treating elderly patients, as they often think that treating these patients might be riskier and that implant failure would be more likely to occur. However, clinical experiences show that, if elderly patients are managed well, treating them is rewarding and satisfying to dentist and patient alike. Monobloc zirconia implants (such as those of the ZiBone implant system) and minimally invasive techniques reduce intervention times and post-surgery discomfort significantly and lead to good periodontal integration and implant stability (Figs. 26 & 27).

Literature



## about the author



**Dr Franco Giancola** is a Rome-based dentist who specialises in implantology. He organised the first Italian congress of ceramic implantology, held in Pescara, Italy, in 2016. He is also the director of the first International Master Class of Ceramic Implantology, which is set to take place in Rome in Italy at the beginning of next year. Dr Giancola is the author of the book *Impianti Ceramica: La Sfida Vincente*.

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