

Minimally Invasive Surgery and Zirconia Implants for a betterDental Aesthetic in Elderly Patient with Atrial Fibrillation

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1. INTRODUCTION

Todays patients' demand for healthier and more attractive implants has led to the emergence of zirconia as the material of choice. Technology is making considerable progress in improving the osseointegration and reliability of zirconia implants, but it is up to devise new operating strategies to achieve outstanding results.

The social and professional milieu of our dental practices has undergone significant changes. Patients who come to us to regain their smiles and their ability to chew through metal-free implant-prosthetic rehabilitation, belong, more often than ever, to health risk categories or have very high expectations. We are increasingly called upon to treat patients with diabetes, heart disease, allergies, autoimmune diseases or those suffering from severe osteoporosis and bone atrophy. In these situations, it is imperative to perform, brief, minimally traumatic procedures without complications of any sort. In addition, work commitments and fast-paced lives lead many patients to demand high therapeutic standards. Finally, the high costs of running dental practices and rising incidences of litigation lead many practitioners to minimize invasive treatments, reduce operating times and strive to improve clinical results.

2. THE PATIENT'S EXPECTATIONS

Whenever a patient sets foot in a dental practice, he or she makes an overt or unconscious plea for help to heal and restore an impaired function or improve his or herappearance. They share their health problems and expresses fears and desires. Implant surgery is a medical procedure that can be risky, therefore, before operating, one must always remember Hippocrates' exhortation *"primum non nocere"*, first do no harm.

The dentist must rely on techniques and devices that promote healing without damaging the tissues.

Every treatment plan must be shared and accepted by the patient. The patient must participate fully because clinical results depend on the materials used, the surgeon's work, the biology of the tissues, but also very much on the patient's collaboration.

3. ANATOMO-SURGICAL TISSUE CONTEXT

Aging, early tooth loss and concomitant metabolic disorders often lead to inflamed gingivaltissues, alveolar ridge atrophy, dental granulomas, and poor bone tissue quality. A winning therapeutic strategy requires an accurate study of the local International Dentistry Journal (IDJ) 2024 | Volume 1| Issue 1



tissues.

In case of infections (periodontitis, granulomas, or sinusitis), it is imperative to first heal the mouth with targeted periodontal treatments, extract affected teeth and cleanse infected alveoli. Ozone therapy sessions (local and systemic) and/or hyperbaric oxygen therapy will be very beneficial for patients. Moreover, nutraceuticals such as Lithothamnium Calcareum, Vitamine D, Ganoderma Lucidum and grapefruit seed extracts improve tissue quality, promote wound healing, and improve implant osseointegration.

4. IMPLANT PLANNING

In patients with health problems, minimally invasive surgery planning is particularly important. These patients are more fragile and tire quickly, so surgery must be minimallytraumatic, fast and without complications. Only a careful case study, detailed planning of surgical procedures and the best choice of materials will ensure clinical success. In large implant rehabilitations the use of prosthetic surgical guides is indispensable.

Anesthesia must be sufficient to avoid pain during surgery, without overdoing it so as to avoid undesirable side-effects. Whenever possible, flapless techniques and magneto-dynamic surgery should be thesurgeon's first choices. To limit discomfort after surgery (pain, swelling and bleeding) and promote wound healing, systemic ozone therapy sessions and platelet growth factor (i-PRF) infiltration are recommended.

5. IMPLANT SITE PREPARATION

The organism regards the implant as a foreign body, its acceptance by the host tissue must, be encouraged therefore, while avoiding excessive damage. The use of aggressivetechniques and overheating of the bone can lead to bone necrosis, intense inflammatory processes with excessive pain, scarring and even loss of the implant.

Surgery should be carried out resolutely but also gently to facilitate normal wound healing without negative outcomes.

The surgeon must create the best conditions for good implant osseointegration to take place. Careful preparation is a fundamental step to ensure clinical success.

gingival access

With optimal bone conditions, a mucosal access without flap lift (flapless technique) should be used. The muco-gingival incision is performed using circular zirconia mucotomes mounted on a micromotor contra-angle and rotated by exerting tilting movements in contact with the bony cortical to sever all connective fibers. The incised tissue flap is then removed with a scalpel.

In cases where a broader view of the surgical site is needed, or bone regeneration is required, the soft tissue incision is performed with zirconia scalpels angled at 15° or tissue trimmers mounted on a turbine and rotated quickly without irrigation

- osteotomy

Zirconia burs are used in cases where the bone tissue condition is optimal, or it is necessary to collect samples of autologous bone to be used for guided bone regeneration.

The cortical bone is interrupted using a rosette or lanceolate drill positioned initially obliquely to avoid slippage, and then vertically to drill the bone to less than the needed depth. A depth gauge is inserted and an endoral X-ray is taken to assess International Dentistry Journal (IDJ) 2024 | Volume 1| Issue 1



the angle andlength of the preparation.

Next, drilling sequences with drills of increasing diameters are performed until the right size for the chosen implant is achieved. The drills must be used without excessive pressure, in a back-and-forth motion and without lateral inclination to avoid damaging theinstrument.

In cases of spongiosa and osteoporotic bone (upper jaw) it is advisable to make an undersized preparation, while a compact lamellar bone (lower jaw) requires an additionalround with tappers to widen the implant bed and avoid excessive tension.

6. CASE REPORT

Seventy-four-year-old patient suffering from atrial fibrillation required toxigenic remediation of the mouth and cosmetic improvement of the anterior teeth. The clinical evaluation disclosed the presence of numerous mercury amalgam crown restorations, periodontal pockets prone to bleeding on probing, and generalized gingival recession. Areas of gingival dyschromia were also present at the upper frontal incisors. The X-ray study showed devitalized teeth with apical granulomas and signs of periodontitis.



Fig. 1> Clinical situation before surgery.



Fig. 2> Initial orthopantomography.

International Dentistry Journal (IDJ) 2024 | Volume 1 | Issue 1





Fig. 3> Detail of the affected teeth. Gingival metallosis and infiltration of dental crowns.

Given the patient's age and risky health conditions, an atraumatic extraction of the affected teeth was carried out using the magneto-dynamic technique, the implant sites were prepared, and zirconia monobloc implants were placed immediately protected by an acetaldevice anchored to the adjacent teeth.

The buccal bone wall of the incisor area is thin and tends to be easily reabsorbed following surgical therapy. This could compromise the aesthetic result. Therefore, the compromised teeth are extracted through the use of the magnetic dynamic technique. Initially, the EXTR1 flat insert at intensity 1 is used positioned along the mesial and distal walls and then proceeds with the concave EXTR2 insert for the dislocation of the teeth.



Fig. 4> Luxation of teeth with magneto-dynamic technique with EXT-1 insert. International Dentistry Journal (IDJ) 2024 | Volume 1| Issue 1









Fig. 5> Image of well-preserved alveoli after avulsion of affected teeth.

Fig. 6> Vestibular image of the extracted infected tooth (#21)







Fig. 7> Palatal view of the removed devitalized tooth (#21).

The post-extractive socket is then cleaned with a curved alveolar spoon and disinfected with insufflation of ozone gas at a concentration of 20 mcg / ml.

We proceed with the preparation of the implant site first with the pilot drill positioned on the palatal wall of the alveolus and then with drills of increasing size until the desired diameter is obtained.

Zirconia burs are used slowly and without irrigation to avoid overheating and bacterial contamination of the bone that could delay healing processes.







Fig. 8> Site preparation by pilot drill after curettage and alveolus reclamation.



Fig. 9> Initial osteotomy with 2.3 mm diameter zirconia drill.





Fig. 10> Subsequent preparation with 3.4-mm-diameter drill.

After the osteotomy were placed two monobloc Zibone implants of 5x10 mm size (Zr-I5010) mounted on a rotating adapter with a maximum torque of 35 Ncm.



Fig. 11> Slow and progressive screwing of implants.

International Dentistry Journal (IDJ) 2024 | Volume 1| Issue 1



The day after the surgery, the implants were modeled by using fine-grained diamond burs turned at high speed with abundant irrigation.



Fig. 12> Clinical tissue situation one day after the positioning of the Ziboneimplants.



Fig. 13> Implant abutments properly shaped using diamond burs and copious irrigation.

In order to avoid any trauma, the implants were protected by an acetal device anchored to the adjacent teeth.





Fig. 14>Frontal image of the protective device anchored to the adjacentteeth.



Fig. 15>Post-surgery dental orthopantomography.







Fig. 16>Cosmetic evaluation of the smile line.



Fig. 17>Lateral view of the prepared implants.



Clinical and radiological control after one year reveal an excellent osseointegration of theimplants, therefore we proceed to take precision impressions and create a fixed prosthesis.

Finally, two all-ceramic joined crowns are cemented on PEEK caps to give a goodelasticity to the structure and an excellent aesthetic result to the smile.



Fig. 18> Final clinical situation before cementing the crowns (one year after).





Fig. 19> Metal-free crowns.



Fig. 20> Final cementing of the metal-free composite crowns.





Fig. 21> Frontal view of the smile line.



Fig. 22> Lateral view of the smile line.

3.6.6.7. CONCLUSION

The zirconia implants on the market today have reached very high standards of reliability. Thanks to improvements in production processes and surface treatment, bioceramic implants are very resistant and integrate well with the surrounding bone.

Placing a two-piece Zirconia implant in healthy patients with ideal bone conditions is quite simple. The challenge of the next few years is to be able to rehabilitate successfully even at-risk subjects in a less traumatic way in respect of the tissues and the patient.