Replacement of teeth through implantation and ridge expansion

A case report

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_Introduction

The use of implants with a tapered design and a short drilling sequence is an increasingly common trend, since such implants allow us to perform simple, quick and minimally invasive surgery in the bone. Working with an implant system that has a short drilling sequence also allows us to use a simple and ergonomic surgical tray, which facilitates the work of the surgeon and support staff (Fig. 1).

Moreover, the use of threaded osteotomes is a simple, predictable surgical technique that allows the dentist not only to place implants in areas with a narrow transverse diameter without bone regeneration, but also to improve bone quality in the receiving area and to reduce the drilling sequence in cases of immediate post-extraction implantation.

In the clinical case presented here, transverse bone volume was needed to place two implants in

Fig. 1_BEGO Semados® RS/RSX-Line Trayplus.
Fig. 2_Initial situation.
Fig. 3_C.B.C.T. scan study of the clinical case.
Fig. 4_Tooth 24 after preparation and beginning of the surgical procedure.

Fig. 1


Fig. 2


Fig. 3


Fig. 4


Fig. 5

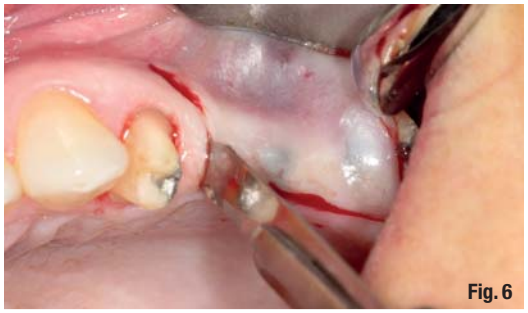


Fig. 6


Fig. 7

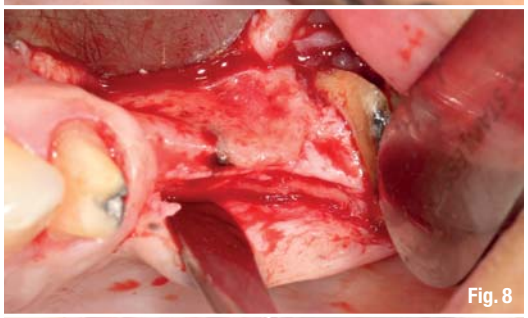


Fig. 8


Fig. 9


Fig. 10

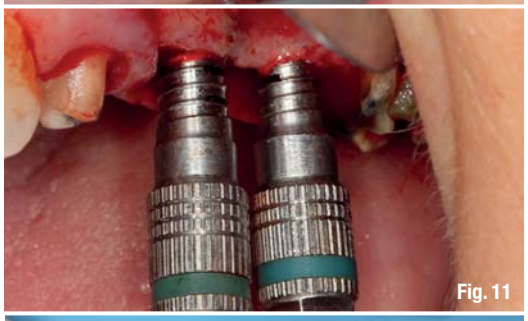


Fig. 11

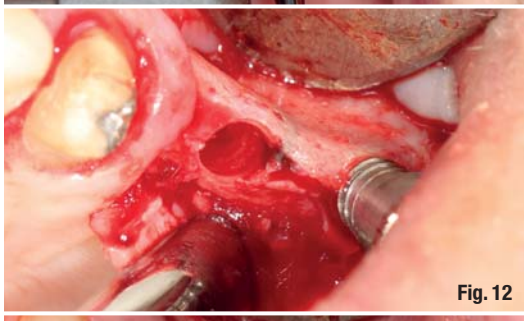


Fig. 12


Fig. 13


Fig. 14


Fig. 15

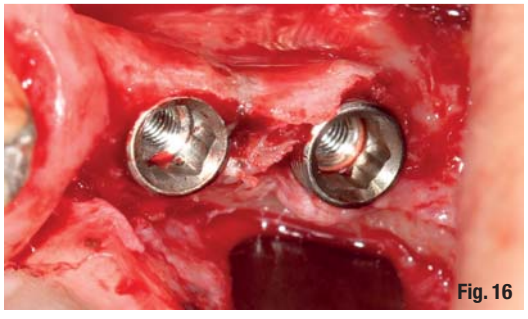
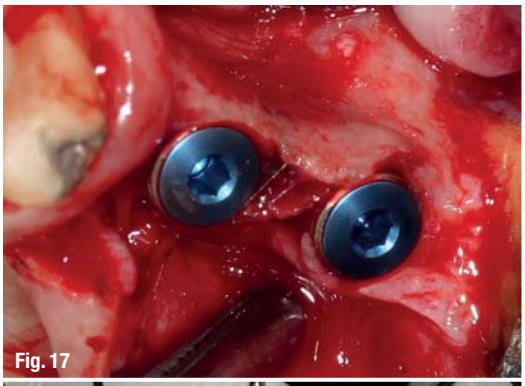


Fig. 16

Fig. 5_Digital image made with CEREC Omnicam camera.
Figs. 6–8_Mucoperiosteal full thickness flap with mesial vent for papillary preservation.
Fig. 9_Drill Pilot Marker RS/RSX-Line 1.6.
Fig. 10_Depth drill RS/RSX Line 2.5 and paralleling post RS/RSX-Line.
Fig. 11_Threaded osteotome.
Fig. 12_Implant bed after preparation.
Fig. 13_BEGO Semados® RSX Implant.
Fig. 14_Insertion of the implants.
Fig. 15_Implants after placement, presenting a colour coded insertion post, optimal parallelism and preservation of the buccal wall.
Fig. 16_Occlusal view of the internal connection of the BEGO Semados® RSX implant.



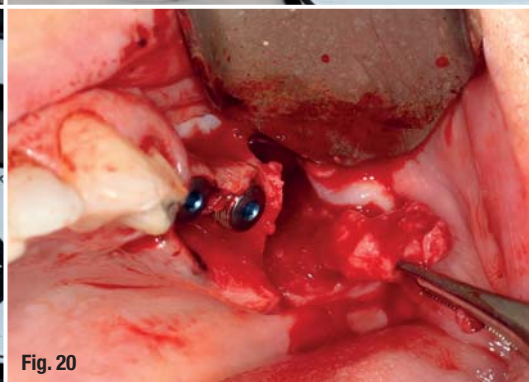


Fig. 17_Implants connection area covered with a colour coded cover screw.
Figs. 18 & 19_ISQ measures.
Fig. 20_Removal of fractured tooth (27) and the surrounding granulation tissue.

positions 25 and 26. Instead of guided bone regeneration with an autogenous bone block or xenogeneic bone substitute material covered with a collagen membrane, a crestal expansion with threaded osteotomes was proposed. Also, it was decided to use BEGO Semados RSX implants (BEGO Implant Systems) because of their macroscopic tapered design and high self-tapping property.

_Clinical case

A 60-year-old non-smoking female patient without any noteworthy clinical pathology or current drug treatment came to our clinic reporting pain and swelling in tooth 27, which was a supporting element of a bridge on teeth 24–27 (Fig. 2). A root fracture with a large apical cyst affecting the three roots of the molar was observed on a CBCT scan (Fig. 3). Based on this finding, the following treatment plan was proposed to the patient:

1) extraction of tooth 27 with cyst removal;
2) bone regeneration of the area using a xenograft particulate bone substitute material (BEGO OSS, BEGO Implant Systems), covered with a resorbable collagen membrane (BEGO Collagen Membrane, BEGO Implant Systems);
3) replacement of teeth 25 and 26 using two implants (BEGO Semados RSX) and bone expansion;
4) seating of a full lithium disilicate ceramic crown (IPS e.max, Ivoclar Vivadent) on tooth 24 fabricated with the CEREC system (Sirona Dental) in the clinic on the same day of the surgery;
5) seating of full lithium disilicate ceramic crowns (also IPS e.max) on the implants placed in regions 25 and 26 three months after the surgery.

After removal of the old fixed prosthesis, and before starting the surgery, tooth 24 was prepared (Fig. 4) and a digital image captured (Fig. 5). Thus, the lithium disilicate ceramic crown could be designed and fabricated with the CEREC system while the implant surgery was performed. Finally, the crown could be cemented at the end of surgery. In order to start the surgery, a full-thickness mucoperiosteal flap with a mesial vent for papilla preservation was raised (Figs. 6–8).

Threaded osteotomes were used after the initial drilling (Figs. 9–11), taking into account the transverse bone loss that existed in the area, as well as the emergence profile of the implant and the future prosthesis. This step had two aims: good 3-D location of the implant and bone condensation, which would improve the bone quality in the receiving area (Fig. 12).

For this clinical case, it was necessary to use an implant that could be easily and atraumatically inserted in order to prevent a greenstick fracture of the buccal cortical wall. Owing to their tapered body design and high self-tapping property, two BEGO Semados RSX implants were selected (Figs. 13–15). This implant was also selected because of

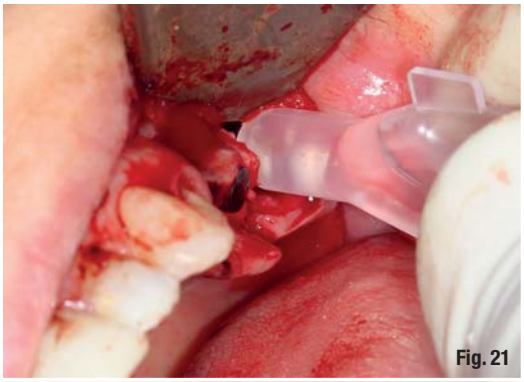


Fig. 21

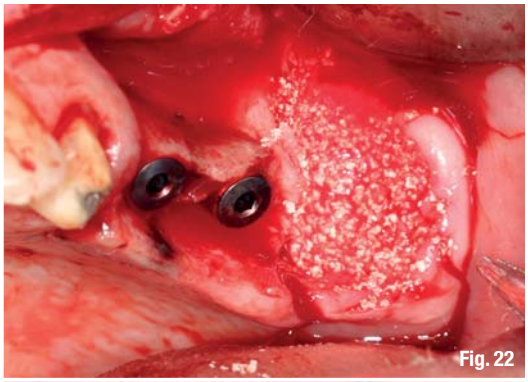


Fig. 22

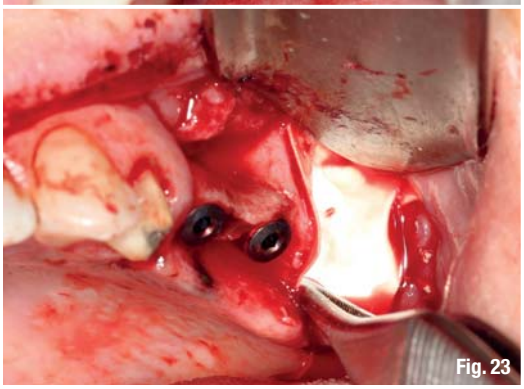


Fig. 23


Fig. 24

Fig. 21_Alveolar cleaning with saline solution and antibiotic.
Fig. 22_Cavity filling with BEGO OSS.
Fig. 23_Graft area covered with a resorbable collagen membrane (BEGO Collagen Membrane).
Fig. 24_Sutured operated region and tooth 24 restored with a full lithium disilicate ceramic crown.

its shoulder design and type of connection, which can influence the long-term success of treatment with regard to the maintenance of bone and gingival tissue. With respect to the design, the implant presents a shoulder with bionic microgrooves for enlargement of the implant surface and reduction of stress peaks in crestal bone. The 45-degree internal connection has an anti-rotational hexagon and platform switching (Fig. 16).

In accordance with the clinical case planning, which anticipated a three-month osseointegration period after implantation, the implant connection areas were covered with cover screws (Fig. 17). The primary stability of the implants was measured by resonance frequency analysis (Osstell ISQ, Osstell). The values obtained were more than acceptable: implant stability quotient (ISQ) values of 71 and 68 (Figs. 18 & 19).

In the sequence, fractured tooth 27 was extracted and the surrounding granulation tissue was removed (Fig. 20), followed by our clinical protocol for cystic cavity treatment before immediate post-extraction implantation and/or bone regeneration. This entailed surgical alveolar cleaning with a saline solution and antibiotic (ciprofloxacin; Fig. 21) prior to filling of the cavity with a bovine bone substitute material (BEGO OSS; Fig. 22) hydrated with a saline solution and blood from the area. The graft area was then covered with a resorbable collagen membrane (BEGO Collagen Membrane; Fig. 23). Finally, the operated region was sutured and tooth 24 was restored with a full lithium disilicate ceramic crown (Fig. 24).

_Conclusion

As the presented case has demonstrated, an implant system with a short drilling sequence allows the surgeon to use a simple and ergonomic surgical tray, which facilitates the work of the surgeon and support staff. Using threaded osteotomes, the dentist can place implants in areas with a narrow transverse diameter without bone regeneration. Furthermore, he or she can improve bone quality in the receiving area and reduce the drilling sequence in cases of immediate post-extraction implantation._

_contact implants

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