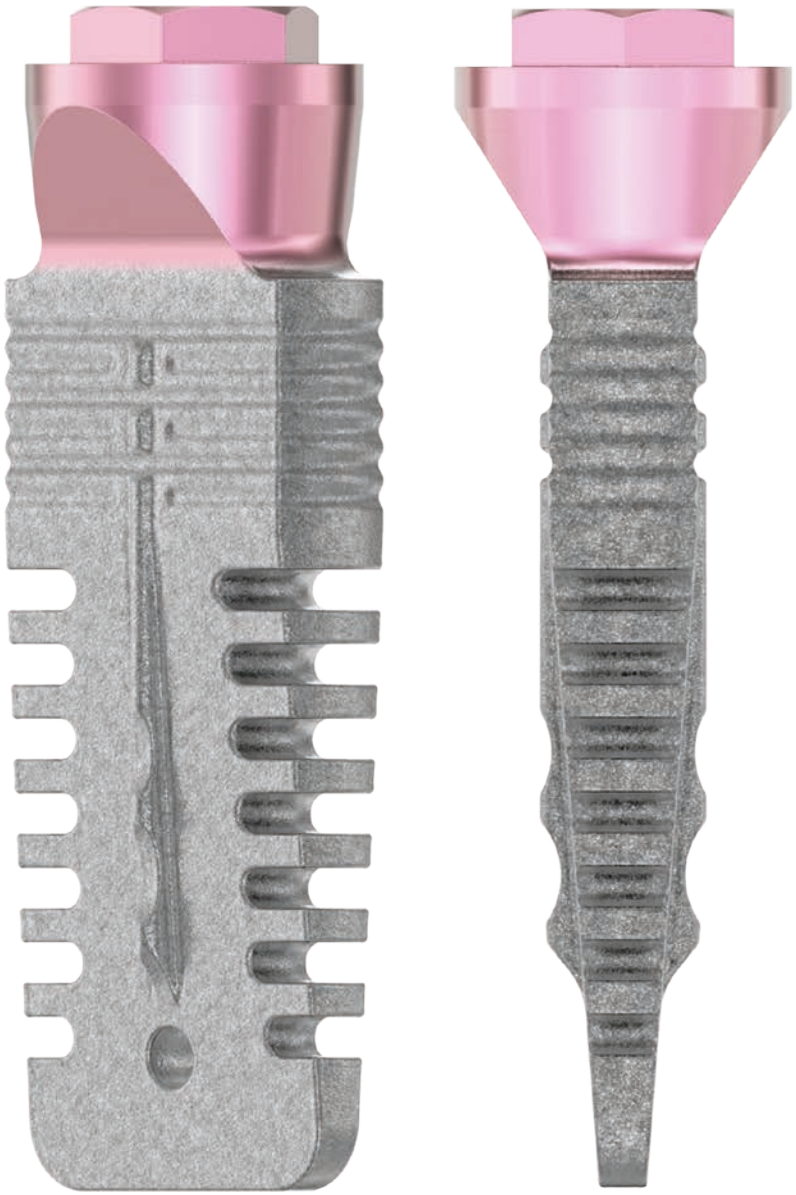
Rex Implants®
minimally invasive technology

1-2022

IMPLANT POST

REX PIEZOIMPLANT: THE NEW IMPLANT FOR NARROW RIDGES



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Dear Readers,

we know only too well how critical details are in implantology and how hard it is to rectify even the tiniest design or clinical errors.

There are still a host of problems associated with dehiscence in aesthetic areas or with peri-implantitis, which is often a natural outcome of dehiscence. It is crucial to highlight what all this means for the patient and their expectations.

It may seem impossible, but the secret to a successful implant very often lies in a minute millimetre of bone, the absolute minimum bone thickness with which an implant should be surrounded on both the vestibular and lingual faces.

We also know that this is not feasible in many cases; there is often not enough bone around the implant, making it a little too risky.

The anatomy of a narrow edentulous ridge is not very compatible with a cylindrical/conical implant section. What is more, bone volume augmentation surgery is not always sufficiently predictable or readily accepted by the patient.

And this is probably why many implantologists are turning to the new REX implant, whose wedge-shaped profile and exclusive rectangular section are ideal for the shape and reduced thickness of a narrow atrophic ridge.

Once again, this issue of Implant Post aims to provide you with interesting case reports, so that you can discover the extraordinary qualities of this implant, for more straightforward, predictable and minimally invasive implantology.

Enjoy!
Your Mectron team

In this issue

Articles

Dr Giovanni Barbieri
- Born on 13/06/1955, degree in Medicine and Surgery.
- Thoracic Surgery specialist.
- Private dentist in Scandiano (RE), Italy.
- Works in implantology, oral surgery, restoration, conservative dentistry, endodontics, laser surgery (hard and soft tissues) and laser-assisted conservative therapy.

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- Co-inventor of the REX PiezoImplant.
- President of BIO.C.R.A. (Biomaterials Clinical-Histological Research Association) in Genoa.

Dr Giovanni Barbieri, Dr Alberto Rebaudi

REX IMPLANTS USED FOR MANDIBULAR RIDGE SPLITTING WITH SIMULTANEOUS BONE GRAFTING AND IMPLANT INSERTION

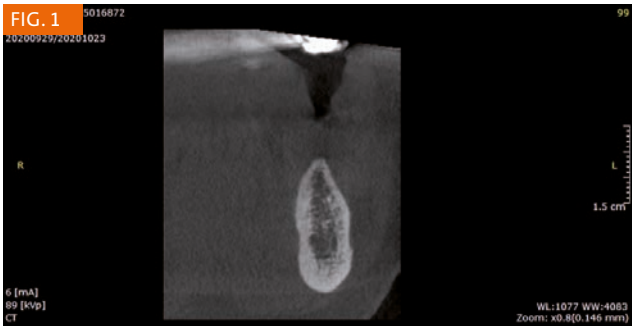
A 75-year-old female patient in good health presented at our clinic with the first and second molars missing in the posterior section of the left lower quadrant. As these molars had been missing for a long time, with the edentulous ridge appearing highly resorbed, it was decided to perform a diagnostic investigation with CBCT.

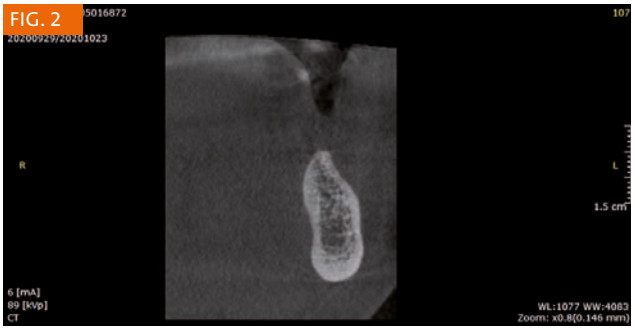
Treatment plan analysis:

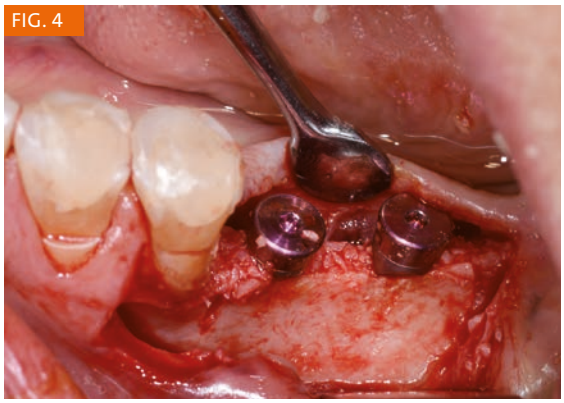
Following occlusal analysis with virtual diagnostic wax-up, implant surgery was planned, verifying horizontal and vertical bone availability and bone quality with the CBCT. The CBCT sections of the affected area, (Figures 1 and 2) showed horizontal bone atrophy that was particularly marked in the coronal area. In the bone quality test of the sections corresponding to the first and second molars, crestal cortical bone with a thickness of over one millimetre was observed, while the medullary bone was of average density. The lingual and vestibular cortical bone faces were both more than one millimetre thick in both sections. In particular, the lingual cortical bone was found to be thicker. With a bone thickness of approximately 4 mm and bone height of 14 mm in both sections, we opted for the insertion of 11-mm-long REX TL 1.8 implants. In theory, REX TL 2.9 implants would have been more suitable for supporting the molars; however, the site preparation required for these would have been trickier due to the high level of mineralisation of the mandibular bone. Also, thicker implants would have required a thicker ridge bone and/or the creation of a wider ridge split. Although the TL 1.8 implant is thinner than the TL 2.9, in this particular case it was able to count on extensive support from both the lingual and vestibular cortical bone, helping to secure initial stability and enable rapid osseointegration. With a view to ensuring adequate bone thickness to the side of the implants, we decided to use the ridge splitting technique, using Rexpanders to obtain the desired expansion. The ridge splitting technique is sometimes difficult to perform in the mandible because bone elasticity is reduced when the cortical bone is thick and highly mineralised. For this reason, bone releasing incisions were planned, two anterior and one posterior to the implants, to facilitate smoother insertion of the wedge-shaped expanders.

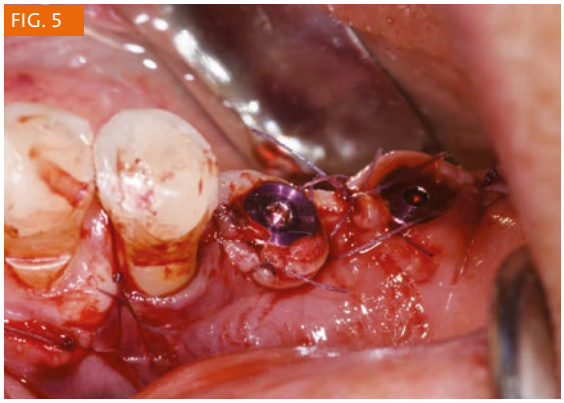
Implant and regenerative surgery

Following local anaesthetic with articaine, a flap was raised to expose the bony ridge. Using an SLC insert, the top of the ridge was reduced to obtain a flat surface, 4 mm wide. The









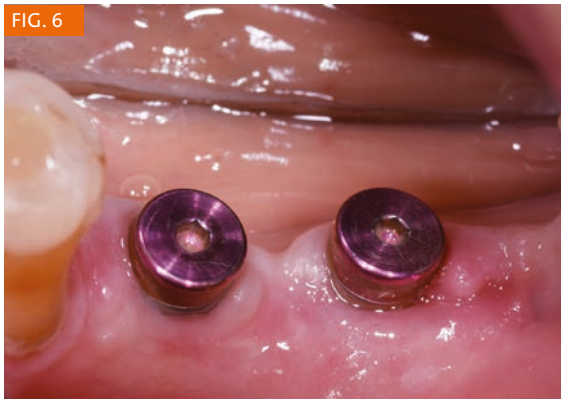


Fig. 1: Preoperative CBCT (coronal section in position 3.6).

Fig. 2: Preoperative CBCT (coronal section in position 3.7).

Fig. 3: Insertion of REX 1.8 TL H11 implants in positions 3.6 and 3.7.

Fig. 4: Gap between implants filled with autologous bone chips.

Fig. 5: Suture.

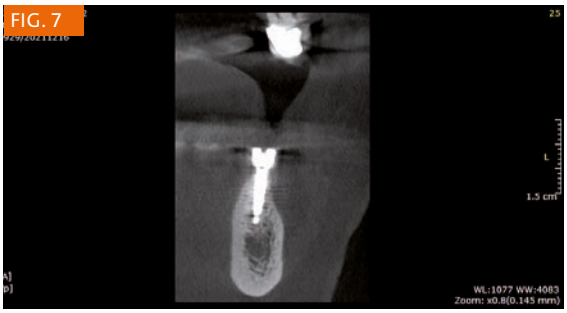
Fig. 6: Check-up after 4 months.

bone chips removed were harvested in a sterile con-tainer to be used as autologous grafting material at the end of the procedure. We used the ridge splitting technique with Rexpanders for implant site preparation. Using the surgical kit for REX implants, the initial perforation with W1 was performed at the two contiguous implant sites in positions 36 and 37, and the implant axis was verified with alignment pins. Next, a longitudinal cut was made on the ridge using the OT7S-3 with 3 teeth, to a depth of 10 mm. Two vertical releasing incisions were made to encourage lateral movement of the vestibular cortical bone during expansion.

The wedge-shaped expanders (11-mm Rexpanders) were then inserted into the prepared sites using the calibrated impulses of the IPD (Implant Placement Device), starting with the 1.6-mm expander and working up to the 2-mm expander. The expanders paved the way for the insertion of the implants (two 11-mm REX TL 1.8 implants). Both implants achieved adequate stability, measured with Osstell, as per standard practice, in two directions: vestibular-lingual and mesiodistal. The readings were 52 and 68 for the implant in position 36, and 57 and 74 for the one in position 37. At the time of inserting the implants, an increase in vestibular thickness of more than 1 mm was observed visually (Figure 3). Immediately after inserting the implants, the gap between the implants was filled with the bone chips harvested at the start of the procedure (Figure 4). Next, after stretching the flaps using a piezoelectric periosteum insert PR2, the soft tissues were sutured (Figure 5), by attaching the flap to the collar of the implants to achieve non-submerged implant healing.

Post-operative checks

4 months after insertion, the implant tissues appeared free from inflammation (Figure 6).
6 months after insertion of the implants, the Osstell readings had increased. It was therefore decided to go ahead with loading of the implants. Increased bone thickness was observed



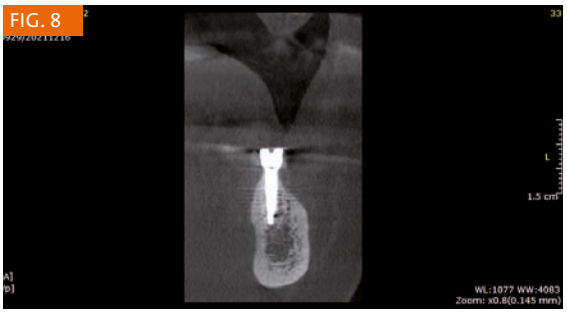


Fig. 7: CBCT after 6 months (coronal section in position 3.6).

Fig. 8: CBCT after 6 months (coronal section in position 3.7).

Fig. 9: Intraoral X-ray after 6 months.

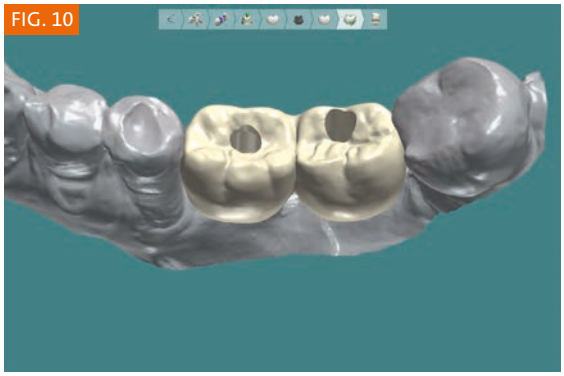
Fig. 10: Prosthetic design (hole for through screw).

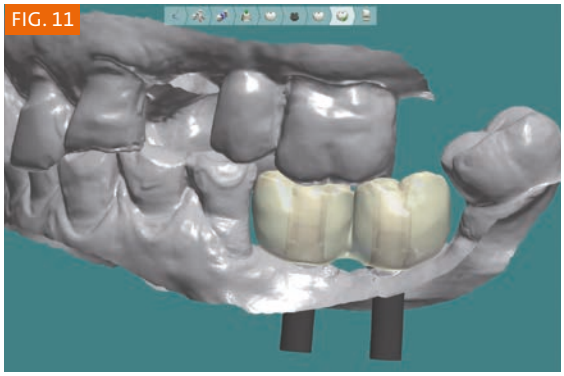
Fig. 11: Prosthetic design in occlusion.

Fig. 12: Prosthesis on prototyped model.

Fig. 13: Prosthetic finalisation (zirconia screw-retained crowns).

Fig. 14: Intraoral X-ray 6 months after loading.





during the follow-up X-ray examination with intraoral radiograph and CBCT (Figures 7, 8 and 9), confirming the visual observations.

Prosthetic phase

A digital impression was carried out using scan-markers, and the prosthesis was planned in line with the prosthetic design. The digital design involved screw-retained zirconia crowns. We decided to combine the prosthetic crowns to form a single structure for improved distribution of the occlusal forces. Prosthetic design (Figures 10 and 11), prosthesis (Figure 12) finalisation of the prosthesis (Figure 13) Intraoral radiograph 6 months after loading (Figure 14).

Dr Daniele Pio Urbano

MINIMALLY INVASIVE IMPLANT-PROSTHETIC REHABILITATION OF AN ATROPHIC RIDGE USING GUIDED SURGERY

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- Second-level Master's in Surgery and Oral Pathology. Parma
- Second-level Master's in Prosthetic Rehabilitation and Dental Implant Prosthesis. Bologna
- Master's Degree in Dentistry ad Prosthodontics 110/110. Parma
- Private practitioner at his own practice in Parma
- Collaborates with other practices, focusing on oral surgery.
- Speaker at the annual course by Dr Fiamminghi and Dr Urbano.
- Speaker at the Implantology and Regenerative Surgery cadaver course
- Active member of T.I.De. (Trending Italian Dentistry)
- Active member of DI&RA (Digital Implant and Restorative Academy)

Based on the data reported in the literature, adequate bone availability is required in order to insert an implant correctly. It is strongly advisable to have at least 1.5 mm of bone available, on both the vestibular and lingual sides. Placement of a traditional implant is not recommended where there is insufficient bone thickness, unless it is preceded or accompanied by an effective bone regeneration procedure. REX PiezoImplant has been designed to overcome this problem. The implant is instantly recognisable due to its exclusive wedge shape and rectangular section. This macrogeometry was specifically chosen to match these new implants perfectly to the anatomy of the residual crestal bone, drastically reducing the risk of vestibular dehiscence and peri-implantitis as a result. The REX PiezoImplant TL, with a thickness of 1.8 mm, was devised to enable the correct management of narrow ridges from 4 mm width, using the PIEZOSURGERY® perforation technique.

This preparation technique has made it possible to maintain a bone thickness of more than one millimetre on both the vestibular and lingual sides. The bar has now been raised even higher. With the Rexpander® technique, it is even possible, simple and safe to place implants in ridges measuring 3 mm. Rather than removing large volumes of bone from an already very narrow ridge, the Rexpander® technique involves dislocation of the walls, preserving vestibular and lingual bone thicknesses thanks to an osteotomy performed with an insert just 0.35 mm thick.

Nowadays, computer-guided implantology allows planning of the procedure, creating a surgical template that guides implant insertion by the operator. This will enable practitioners to make the best possible use of available bone in relation to prosthetic needs. A special surgical template is developed for implant site preparation. The template has a rectangular section, adapted to the shape of the specific site preparation perfomed with PIEZOSURGERY® inserts.

A 53-year-old female patient presented at our clinic for observation, with grade 2 mobility of the 35-x-x-38 prosthesis. Root resorption of element 35 was noticed on the X-ray. A cone beam was

FIG. 1

Fig. 1: OPT radiograph

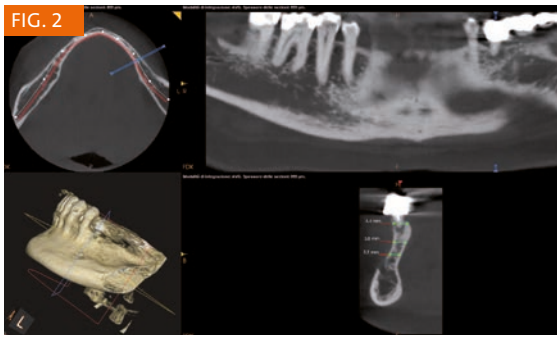
Fig. 2: Measurements in site 35.

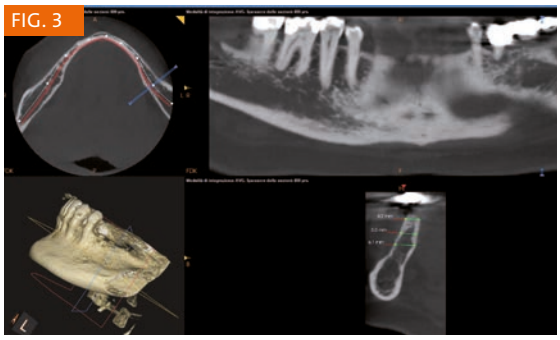
Fig. 3: Measurements in site 37.

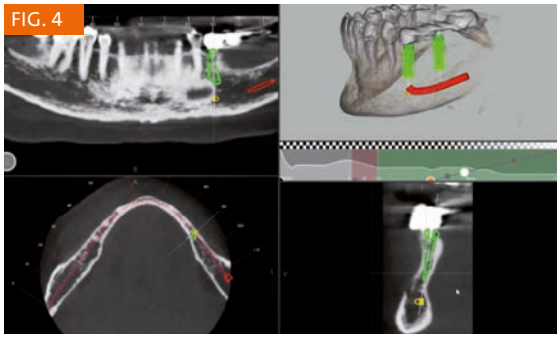
Fig. 4: Implant planning 35.

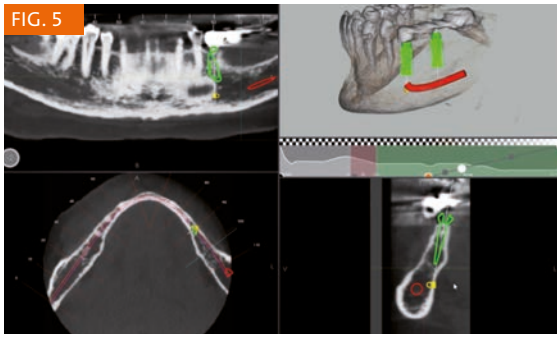
Fig. 5: Implant planning 37.

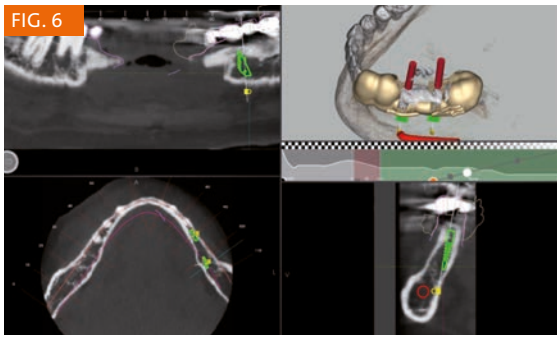
Fig. 6: Surgical template design.











performed to evaluate the implant-prosthetic replacement of elements 35-36-37. The ridge bone was found to be anatomically unfavourable on the CBCT. The proposed treatment plan was as follows:

- extraction of element 35
- following extraction, wait 3 months for suitable tissue
- horizontal GBR
- wait 9 months before removal of the non-resorbable membrane and implant insertion
- wait another 3 months before exposing the implants, epithelial-connective tissue graft and repositioning of the fornix
- wait 3 months and implant-prosthetic rehabilitation

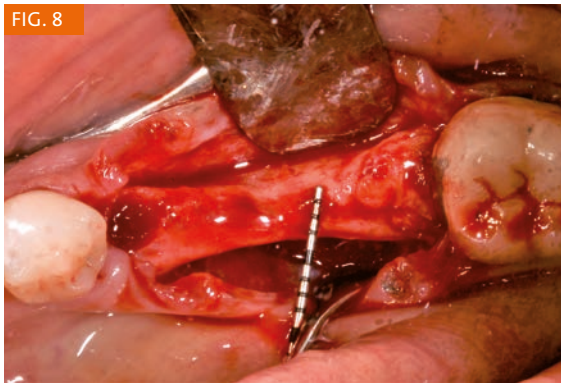
Alongside this proposed treatment plan, the following was proposed to the patient:

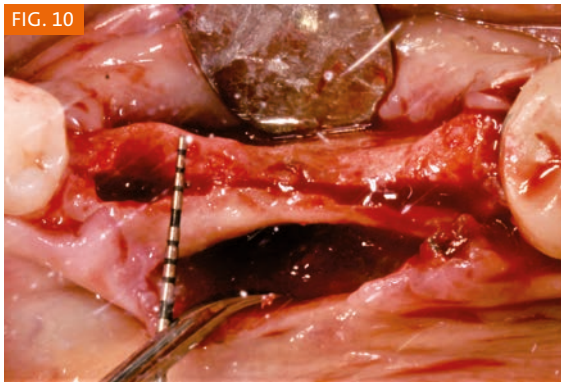
- extraction of element 35, with simultaneous insertion of two REX implants in positions 35 and 37 and a vestibular GBR for purely aesthetic purposes during a single visit
- wait 6 months and implant-prosthetic rehabilitation.

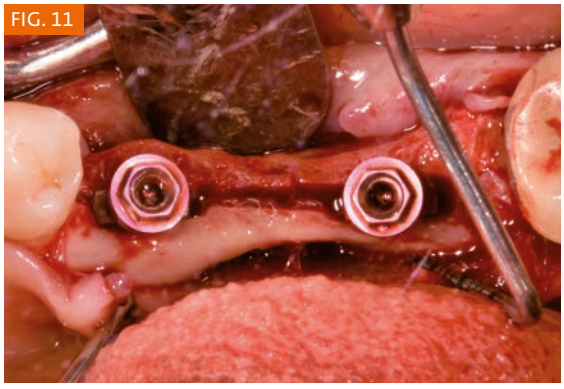
After weighing up all the pros and cons with the patient, we decided to opt for REX PiezoImplants. A digital impression was carried out and matched with the three-dimensional X-ray examination using the design software. Two REX PiezoImplants 1.8 x 11 were selected. We were able to use the digital impression of the patient's situation before the procedure (as a diagnostic wax-up) to plan implant placement in a prosthetically-guided manner. The software-based planning of the surgical phase and the use of a template to ensure correct "implant-prosthetic axis" placement of the implant, enabled us not only to achieve implant positioning in relation to available bone thickness ("anatomical axis"), but also to seek out the best screw-retained prosthetic solution ("prosthetic axis"), thereby significantly reducing the risk of error. A surgical template was created, allowing us to reproduce the virtually-planned implant insertion inside the oral cavity. The Rex method allows the use of a sleeve, enabling guided surgery with the Pilot system using the W2 insert. The two preparations were joined together and expanded with the OT7S-3 insert, which allowed us to achieve greater bone

elasticity. We then moved onto the ridge expansion phase. We used 1.6-mm Rexpanders, followed by 2-mm Rexpanders. We verified site preparation at each stage using a fit-gauge before placing the two implants. The osteotomy gaps created by the expansion were filled with heterologous biomaterial. Further biomaterial was added with fibrin glue and resorbable membrane on the vestibular face so as to induce bone regeneration that was purely for aesthetic purposes, as the implant site preparation only sacrificed 0.75 mm of bone, thanks to the Rexpander technique, guaranteeing 1.5 mm of bone on both the vestibular and lingual sides.

After 6 months, we performed follow-up X-rays and measured the ISQ value once again. Having observed positive values, we unscrewed the healing screws and screwed the specific REX-markers directly onto the REX PiezoImplants. We then performed a digital impression using a Carestream 3600 digital scanner. By exporting the STL files, we were able to create a screw-retained prosthesis designed with Exocad***, which features REX PiezoImplant libraries. The final prosthesis was then delivered and screwed in at 25 N after checking radiographically that it was a correct match.







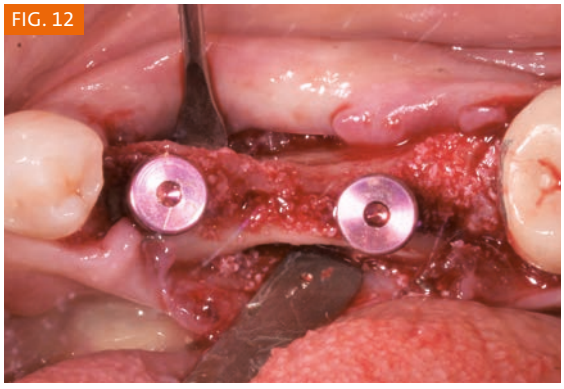


Fig. 7: Prosthesis removal.

Fig. 8: Bone exposure.

Fig. 9: Surgical template housing.

Fig. 10: Ridge expansion.

Fig. 11: Implant insertion.

Fig. 12: Filling the gap with heterologous bone.

Fig. 13: Post-operative X-ray.

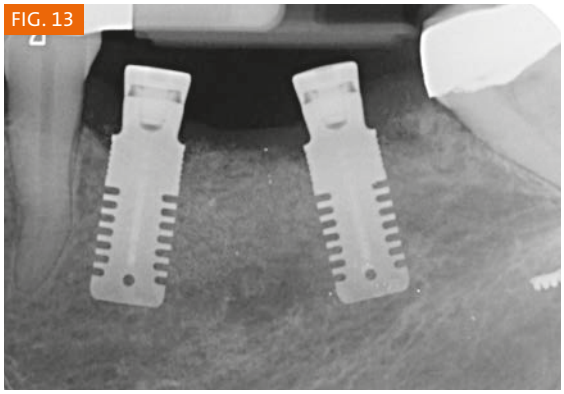
Fig. 14: View of the peri-implant soft tissues after 6 months.

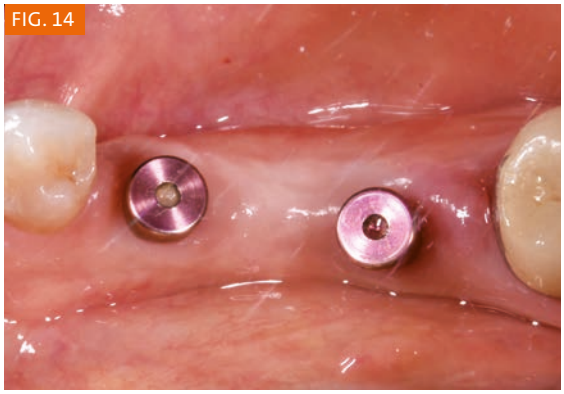
Fig. 15: Digital impressions.

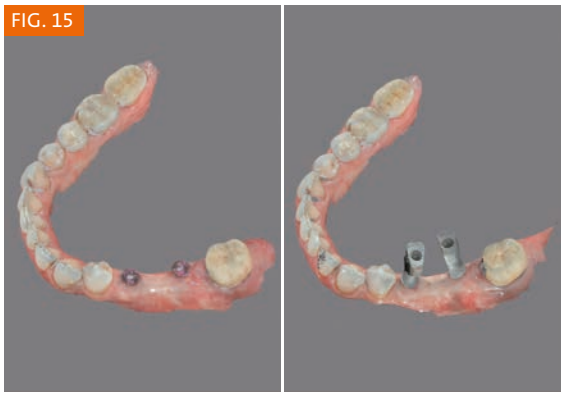
Fig. 16: X-ray for matching.

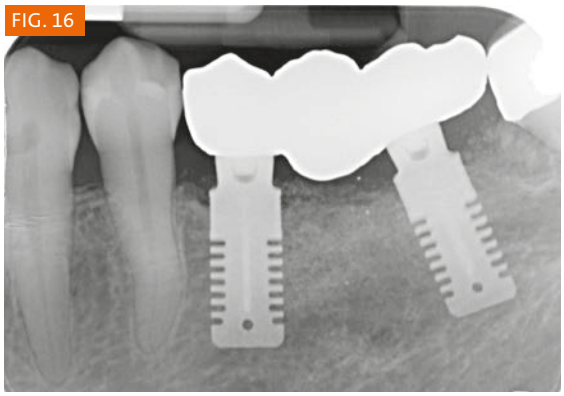
Fig. 17: Delivery of the prosthesis.

Fig. 18: Vestibular view of the prosthesis and vestibular regeneration carried out for aesthetic purposes.









Conclusions

By means of computer-guided surgery and the Rexpander technique, we were able to deal with an atrophic ridge:

- in a single, minimally invasive procedure
- in line with prosthetically-guided positioning
- by preserving the bone compartment with an osteotomy of just 0.75 mm
- ensuring 1.5 mm of bone to both the vestibular and lingual sides of the implants, guaranteeing a long implant lifetime by reducing perforation-induced overheating

The benefits of using this technique are considerable. However, practitioners need to understand, through courses and a natural learning curve, that not all atrophic ridges can be dealt with in this way. Therefore, whether they are using REX PiezoImplants or traditional implants, a careful pre-surgical study is required, not only of the macro-anatomy but also of the micro-anatomy, of the thicknesses of the cortical bone and quality of the medullary bone.

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REX PIEZOIMPLANT: CLINICAL EQUIPMENT

NEW SURGICAL KIT

COMPLETE SURGICAL KIT

- the REX Implants surgical kit contains the complete sequence of PIEZOSURGERY® inserts for the preparation of the REX PiezoImplant site
- it also contains all necessary implant fit gauges to verify the precision of the preparation, the strikers for press-fit positioning of the implants, and all necessary drivers

Equipment:
- surgical radel tray - empty
- inserts W1, W2, W3, W4, W4H
- 2 alignment PIN IM1S
- 2 fit gauges W2-W3
- 1 fit gauge W4
- 1 fit gauge W4-H
- 1 tapered driver S
- 1 tapered driver L
- 1 hand driver
- 1 remover carrier TL 1.8
- 1 remover carrier TL 2.9
- 1 thumb knob wheel (assembly)
- 1 anterior striker ST0
- 1 posterior striker ST20
- 1 remover CR2

REX IPD (IMPLANT PLACEMENT DEVICE)

- magnetic driver for the insertion of REX PiezoImplants into the implant site
- calibrated strikes are atraumatic, for maximum respect of bone tissue
- with REX IPD, even removal of any poorly positioned implant is a simple task

Equipment:
- machine body
- handpiece
- handpiece support
- pedal
- WR1 key

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11 mm series

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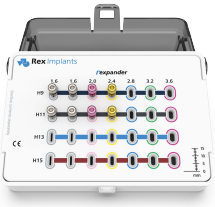

REXPANDER Surgical Kit A

REX IPD Complete

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- LOAN - REX IPD Complete

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- LOAN - REX IPD Complete

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- 15 x REX Implants - Full Assembly
- 1 x REX Surgical Kit - Complete
- 1 x REXPANDER Sugical Kit A
- REX IPD Complete

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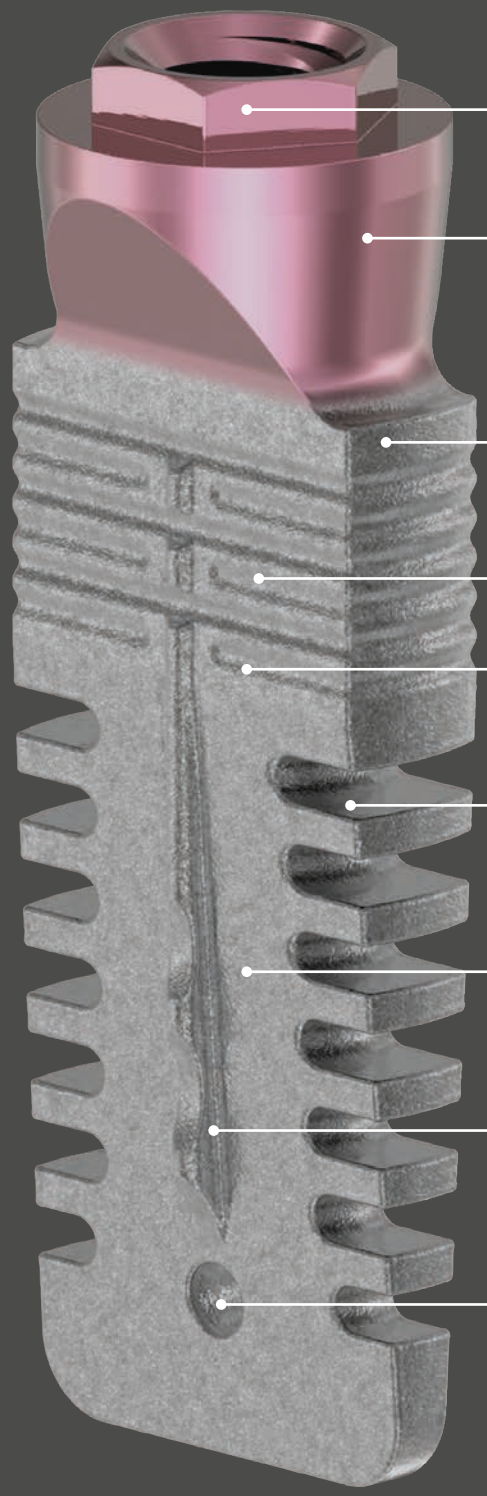

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Width of 1.8 or 2.9 mm.

Transcortical region surface treated with Resorbable Blast Media (RBM) to promote osteointegration.

Micro grooves to promote osteointegration in cortical bone.

Macro grooves to promote osteointegration in cancellous bone.

Resorbable Blast Media (RBM) Surface Treatment: REX PiezoImplants are grit-blasted with hydroxylapatite and acid-passivated to increase the roughness of the surface and promote osteointegration.

Sagittal Fin for improved press-fit and initial stability.

Identification Port for verifying osteointegration radiographically.

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