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BASIC RESEARCH

OSSEODENSIFICATION FOR IMPLANT SITE PREPARATION IN THE MAXILLA: A PROSPECTIVE STUDY OF 97 IMPLANTS

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BACKGROUND: Osseodensification (OD) is an innovative surgical technique for implant site preparation that avoids bone sacrifice, contrary to the conventional drilling protocols. This is possible because of special burs (Fig. 1) designed to rotate in counter-clockwise direction. It is a nonextraction technique that creates a layer of compacted bone along the surface of an osteotomy, while simultaneously plastically expanding the bony ridge (Fig. 2), which can bring many advantages in clinical practice.

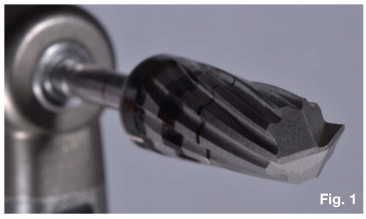
Fig. 1

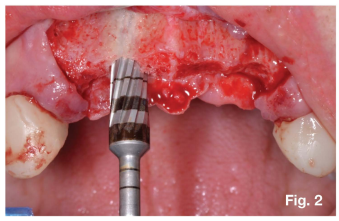
Fig. 2

AIM: To investigate the outcome of osseodensification technique for implant site preparation in the maxilla in different clinical situations.

MATERIALS AND METHODS: 97 implants were placed in 41 patients (all of them in the maxilla with OD technique for implant site preparation, except the first pilot drill which was used in clockwise rotation). The implants placed were divided into four different groups. In group A, 60 implants were placed in 24 patients (10 males and 14 females) with reduced bone ridge width (range 3.2-5.1 mm) - in all cases, after expanding the ridge with OD, guided bone regeneration procedure was performed for contour augmentation. In group B, 15 implants were placed in 14 patients (6 males and 8 females) simultaneously with sinus augmentation by crestal approach (initial bone height ranging from 2.9-6.1 mm) (Figs. 5 and 6).

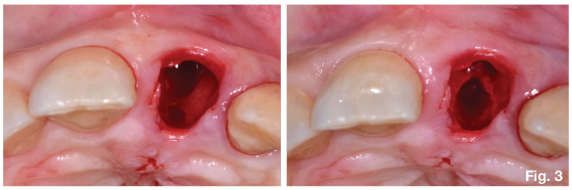
Fig. 3

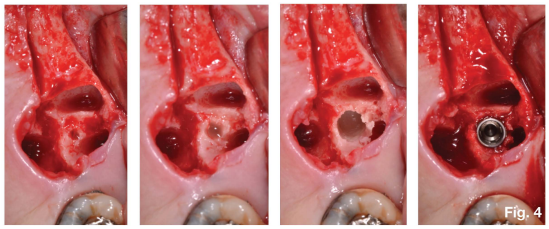
Fig. 4

In group C, 3 implants were placed in 3 male patients immediately after single tooth extraction (Figs. 3 and 4). In group D, 19 implants were placed in 3 female patients with immediate loading for full-arch rehabilitation (Figs. 7 and 8). Outcome measures were success rate of osseointegration and gain in bone width and height after site preparation.

RESULTS: The success rate of osseointegration was 96.9%. Three implants (2 from group A and 1 from group D) in three patients were removed before final impressions because of non-integration. All implants placed had insertion torque values ≥ 45 N/cm at the time of placement. Greater bone expansion occurred at the coronal position compared to the apical. Group A showed a mean ridge expansion of 1.6 mm (range from 1.1-2.4 mm). The greatest amount of bone expansion was recorded on initially narrower ridges compared to wider ridges. In group B (sinus lift group), the mean gain in bone height was 5.8 mm (range from 4.2-7.6 mm).

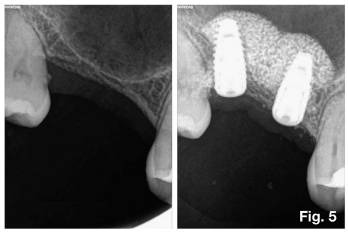
Fig. 5

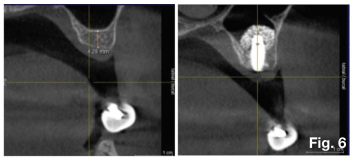
Fig. 6

Osseodensification clearly helped to optimize the site for the immediate post-extraction implants (group C) and to achieve great values of implant stability and insertion torque for the immediate loading full-arch cases from group D (Figs 7 and 8).

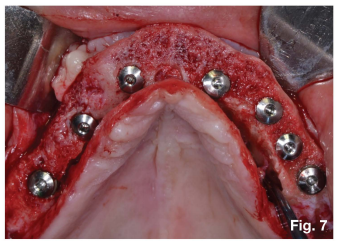
Fig. 7

Fig. 8

CONCLUSIONS AND CLINICAL IMPLICATIONS: Osseodensification is a biomechanical site preparation technique that preserves bone bulk and allows to avoid bone sacrifice. This study validated the bone expansion capacity of OD for predictable ridge expansion with enhanced primary stability and higher insertion torque values. This may be clinically relevant in minimizing implant dehiscences or fenestrations, as was noted in this study. OD can also be used for crestal sinus lift in a simple, safe and predictable way with reduced morbidity.

SOURCES:

1. Huwais S, Meyer EG. A Novel Osseous Densification Approach in Implant Osteotomy Preparation to Increase Biomechanical Primary Stability, Bone Mineral Density, and Bone-to-Implant Contact. Int J Oral Maxillofac Implants. 2017 Jan/Feb;32(1):27-36. doi: 10.11607/jomi.4817. Epub 2016 Oct 14.
2. Lahens B, et al. Biomechanical and histologic basis of osseodensification drilling for endosteal implant placement in low density bone. An experimental study in sheep. J Mech Behav Biomed Mater. 2016 Oct;63:56-65. doi: 10.1016/j.jmbbm.2016.06.007. Epub 2016 Jun 10
3. Trisi P, Berardini M, Falco A, Vulpiani MP. New Osseodensification Implant Site Preparation to increase Bone density in low-density bone: in vivo evaluation in sheep. Implant Dent. 2016 Feb; 25(1):24-31.
4. Pai UY, Rodrigues SH, Talreja K, Mundathaje M. Osseodensification – a novel approach in implant dentistry. J Indian Prosthodont Soc. 2018 Jul-Sep; 18(3): 196-200.
5. Lopez CD, et al. Osseodensification for enhancement of spinal surgical hardware fixation. J Mech Behav Biomed Mater. 2017 May;69:275-281. doi: 10.1016/j.jmbbm.2017.01.020. Epub 2017 Jan 13.

Presented at EAO CONGRESS Vienna 2018