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Effect of Densah Bur versus Magnetic Mallet Device on Osseodensification of Narrow Alveolar Ridge for Implant Placement

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In Oral & Maxillofacial Surgery

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A proposal

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Introduction

Implant therapy has become an integral part of clinical dentistry, with ever-increasing numbers of patients seeking such treatment. Several factors contribute to implant success and can be objectively evaluated. These include the patient's healing capabilities, the level and condition of the existing soft and hard tissues, and the provisional and final restorations. In particular, hard tissue defects may lead to functional, structural, or esthetic compromises in the final prosthesis [(1)].

Alveolar bone resorption after tooth extraction or avulsion occurs more rapidly during the first years. The loss is predicted to be 40-60% for the first 3 years then decreases to 0.25-0.5% gross annual loss thereafter. Extraction of maxillary teeth usually results in a progressive loss of bone mainly from the labial side. Furthermore, the presence of bone fenestration or dehiscence during extraction may accelerate the post-extraction alveolar remodeling, leading to more severe buccal concavity after healing [(2)].

Many techniques have been suggested for ridge widening, including guided bone regeneration (GBR), autogenous bone graft, alveolar ridge splitting and alveolar ridge expansion [(3,4)]. It was observed that alveolar ridge augmentation procedures may be more technique-and operator-experience sensitive, whereas implant survival may be a affected by the residual bone supporting the dental implant rather than the grafted bone [(5)].

As a result, assessment of the jawbone quality provides crucial information to assisst clinician in choosing the most appropriate implant planning. According to macroscopic cortical and trabecular bone characteristics, as well as tactile analogues, bone density of the

edentulous regions of the jaws was classified into four categories (D1-D4). Recently, these data were used to compare with anatomical location and radiographic images [6].

Nowadays, bone density according to this classification can be measured using CBCT cross sectional views. D3 and D4 bone is frequently found in the anterior maxilla and posterior regions of both maxilla and mandible. This type of bone is weaker than D2 type. Moreover, the bone-implant contact is also less favorable and increases the risk of implant failure [6, 7].

Ridge expansion techniques allow implant placement in narrow alveolar ridges (bone types 3 and 4). By increasing bone volume using the native bone. This technique has shown to be a safe and effective procedure, with high percentage of survival rate following implant placement [8, 9]. However, limitations of this technique include surgical trauma and unintentional fracture or displacement of bone, which affect implant insertion stability [9].

A new concept for osteotomy called Osseodensification (OD), technique, was which has been developed in 2013. This relatively new concept uses universally compatible drills, Densah Burs, [10-12] to provide better osteotomy site preparation and bone expansion at different sites of varying bone densities. These burs combine advantages of osteotomes with the speed and tactile control of the drilling procedures. Densah burs can create a densified layer of surrounding bone through compaction autografting, while simultaneously expanding the bony ridge, thus increasing the peri-implant bone density, and the implant mechanical stability [12].The autografting occurs along the entire length of the osteotomy through a hydrodynamic process with copious irrigation. As a

result, the osteotomy is uniformly cylindrical and densified. This technique seems to be promising in cases where the autologous bone is poor in quality and quantity [12, 13].

The magnetic mallet (MM) is a novel instrument that can be used to provide osseo-densification in case of soft bone (D3 and D4), the bone socket can be formed exclusively by MM, no rotary tools are required. In a significant number of cases there is no bone loss at all, and in a lesser rate, there is minimal bone loss, which is just a small part of that compared to the bone loss made by traditional drills [15, 16]. Therefore, it is considered a minimally invasive technique capable of providing a safe, predictable, and comfortable surgical procedure that does not result in bone injury or overheating. Furthermore, it provides better visibility and maximal bone preservation, which significantly contributes to a reduction or absence of postoperative complaints [15(.

Therefore, this study will be implemented to compare between the effect of Densah bur and MM Device on Osseodensification and expansion of type 3 and type 4 narrow alveolar ridges.

Aim of the study

The present study will be performed to assess clinically and radiographically the efficacy of Densah bur and Magnetic Mallet on osseodensification and expansion of narrow alveolar ridge for implant placement.

Subjects and Methods

The present study will be conducted on 12 implants that will be inserted in type 3 and type 4 narrow edentulous alveolar ridges. The patients which will be selected from the outpatient clinic of the oral and maxillofacial surgery department in Faculty of Dental Medicine for Girls, Al-Azhar University and Deraya University.

All patients will be properly selected according to defined inclusion and exclusion criteria as follows:

Inclusion Criteria [8]**:**

1- Patients with partial edentulous alveolar ridges with adequate alveolar bone height and deficient width and density.
2- Patients with good state of health and free from systemic or local pathosis that may influence the outcome of the therapy.
3- Good oral hygiene.
4- Age above 18 years.
5- Agreement to participate in the study and also have to be able to attend postoperative clinical and radiological follow-up schedule.

Exclusion Criteria [8]**:**

1- Patients with para-functional habits such as bruxism and clenching or abnormal occlusal relationship that may complicate the future restoration.
2- Patients with bad oral hygiene or smokers.
3- Patients with uncontrolled systemic disease.