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Surface Topographical Changes

Vandewalle S*

Department of Prosthodontics, University of Cincinnati, Cincinnati, Ohio, USA

***Corresponding author: Vandewalle S**, Department of Prosthodontics, University of Cincinnati, Cincinnati, Ohio, USA, Tel: +1 513-556-600; E-mail: kraig.vandewalle.2.ctr@us.af.mil

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Abstract

The aim of this study was to evaluate a new surgical technique for implant site preparation that could allow enhancing bone density, ridge width, and implanting secondary stability.

Keywords: Bone volume; Osseo densification; Osseo integration; Bone expansion; Poor bone

Introduction

There is no question that over the last two decades dental implants have revolutionized tooth replacement and the practice of dentistry. The concept of dental implants is not new; the earliest recorded attempts of their use were discovered in the Mayan civilization dating back to 600 A.D. Today's highly successful dental implants consist of root replacement for a natural tooth, to which a crown is attached, just like the teeth in your mouth when you smile, there is no visible difference. In addition they do not decay and are relatively free from developing gum disease. As with most

Treatment modalities in dentistry today, this not only involves scientific discovery, research and understanding, but application in clinical practice [1]. The practice of implant dentistry requires expertise in planning, surgical placement and crown fabrication; it is as much about art and experience as it is about science. It also requires teamwork between you, the patient, your dentist, an implant surgeon and dental technician.

The mechanical friction between Implant surface and bone walls of the osteotomy site gives primary implant stability. The Osseo integration process leads to new bone apposition on the implant surface and allows reaching the implant secondary stability that is the functional contact between alive bone and titanium dental implant. In case of poor bone density, such as upper human jaw, the insufficient bone amount around the implants could negatively influence the histomorphometric parameters (such as %BIC and bone volume percentage [%BV]) and, consequently, both primary and secondary implant stabilities. Undersized implant site preparation and the use of osteotomies to condense bone [2] are surgical techniques proposed to increase primary implant stability and %BIC in poor density bone. Different healing patterns and per implant bone remodeling models were also observed [3] between standard sites.

Materials and Methods

The edges of the iliac crests of 2 sheep were exposed and ten 3.8 3 10 mm dynamics implants (Cortex) were inserted in the left sides using the conventional drilling method (control group). Ten 5 3 10 mm Dynamics implants (Cortex) were inserted in the right sides (test group) using the Osseo densification procedure. After 2 months of healing, the sheep were killed, and biomechanical and histological examinations were performed.

Results

No implant failures were observed after 2 months of healing. A significant increase of ridge width and bone volume percentage (%BV) (approximately 30% higher) was detected in the test group. Significantly better removal torque values and micro motion under lateral forces (value of actual micro motion) were recorded for the test group in respect with the control group.

Conclusion

Osseo densification technique used in the present in vivo study was demonstrated to be able to increase the %BV around dental implants inserted in low-density bone in respect to conventional implant drilling techniques, which may play a role in enhancing implant stability and reduce micro motion. Density New Osseo densification Implant Site preparation and undersized implant site preparation. Specifically designed implants for low-density bone were also developed testifying the hardness of the challenge to reach a sufficient implant stability in poor bone density [4,5]. The use of the osteotomies in poor density bone allows fracturing and condensing of bone trabecular, but this technique does not improve per implant bone density (%BV) or implant stability. It is demonstrated that fractured trabecular in peri implant bone, caused using the osteotomy technique, induce a delayed secondary stability with respect to conventional drilling procedures during healing. Besides, tooth loss, old age, and removable or unsuitable removable dentures inevitably lead to alveolar bone resorptions both in height and width. It was reported that bone reduction in a width of approximately 25% after 1 year of tooth extraction and the mandible showed a bone loss rate 4 times higher than the upper maxilla [6]. Narrow alveolar bone ridges are common in edentulous patients needing dental implant restoration, and many surgical techniques have been developed, over the years, to perform bone expansion or augmentation. The alveolar ridge splitting/expansion technique in 1-stage was proposed as a valid alternative to the 2-stage Guided Bone Regeneration (GBR). The predictability of horizontal and vertical augmentation techniques by bone regeneration, using bone substitutes or autogenously bone, is still not clear, and surgical complications are common. However, osteodistraction

ontogenesis and ridge splitting technique are considered efficient to increase bone width with lesser complication incidence.

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