

# LOW DENSITY BONE MANIPULATION USING OSSEODENSIFICATION APPROACH: A CASE REPORT

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**Abstract:** Low density regions such as Maxillary posterior region still may pose certain challenges for rehabilitation using implant supported prosthesis. It is difficult to achieve high primary stability in such areas due to the low density of the bone and thus also prevent immediate loading in such areas. Various techniques have been utilised to increase the primary stability in low density bone areas. Bone manipulation approaches such as osseodensification have shown optimum results in cases where there is deficient bone. This case report describes the use of osseodensification drilling approach to achieve high primary stability to ensure successful immediate loading of the implant.

**Key words:** Implants, Osseodensification, Primary stability, Immediate Loading

## Introduction

With new emerging trends and concepts, the field of oral implantology is an evolving branch of dentistry. A vital feature to achieve osseointegration of implants is high implant primary stability, which is correlated to surgical technique, density of bone, implant surface texture. Bone density being one of the major factors affecting it. [1] In desire to achieve osseointegration with a higher primary stability of the implant, a technique has been introduced called as Osseodensification. Osseodensification is a technique of preparing an implant site by condensing or densifying the bone, which is in contrast to the normal osteotomy preparation. The non cutting, condensing action of this technique results in a higher density bone. [2] This case report aims to describe the technique of osseodensification using specifically designed burs to achieve a prerequisite primary stability.

## Case Report

A 45 year old female reported to the Department of Oral Implantology with a chief complaint of missing upper posterior tooth. A

thorough examination of the patient and the area of interest was done. Relevant medical and dental history along with required blood investigations were recorded. A thorough treatment planning was done. It was concluded according to various factors to place an implant in the area of interest.

Maxillary posterior region comprises of D3/D4 bone (Misch Classification of bone) which is highly porous and of poor quality. To enhance the primary stability of the implant placed, it was decided to follow the osseodensification technique. Specially designed Densah burs by the Versah company were used for implant site preparation. Densah burs are multi -fluted tapered burs which help in preserving the bone by condensing the bone, accomplished by their counterclockwise rotation.

The patient received prophylactic antibiotic therapy consisting of Amoxicillin 500 mg combined with Clavulanate 125 mg, administered the night before and on the day of the procedure. The surgery took place in a sterile minor operation theater. Preoperative preparation involved applying a Povidone-

Iodine solution (Betadine) as a disinfectant. Local infiltration anesthesia was achieved using Lignospan Special (2% Lidocaine with 1:80,000 Adrenaline) before the surgery commenced.

After administration of local anaesthesia, mid crestal incision was placed and full thickness mucoperiosteal flap was elevated. Sequential osteotomy preparation using Densah burs was performed. Implant (Ankylos) of 3.5mm diameter and 14mm length was placed. Resonance frequency analysis using Ostell Mentor unit was done to assess the implant stability quotient, which gave a reading of 78 ISQ. Standard abutment of diameter 3mm and gingival height of 4mm was placed and torqued manually followed by immediate loading of the implant with a temporary prosthesis (3 M ESPE, Protemp 4). Post operative instructions were given and patient was recalled after 7 days for suture removal.

At the three- and six-month follow-up appointments, the abutments were untorqued, and the Smartpeg was reinserted to reassess implant stability. Radiographic evaluations were conducted at each follow-up visit. After six months, a closed-tray, abutment-level impression was made using Aquasil putty and light body (Dentsply India). The impression, along with the laboratory analogue, was sent to the laboratory for crown fabrication. Metal-ceramic crowns were designed in physiologic occlusion and securely cemented using Zinc Phosphate Cement (De Tray® Zinc).



## Discussion

Osteotomy preparation for the dental implant site preparation can greatly influence the primary and secondary stability of the implant. Primary stability is the biometric stability achieved immediately after implant insertion. It can be influenced by various factors such as bone quality and quantity, implant geometry, implant surface. [3] Various techniques have been previously used to achieve a greater primary stability include undersizing of the osteotomy, bone condensation using osteotomes. Surgical instrumentation using specially designed Densah burs to increase bone density while extending an osteotomy. They work by compacting the wall around the implant site preparation and by forming an 'implant lamina dura'. [4] Higher resonance frequency values were reported after implant placement using the osseodensification technique in the above clinical report, suggestive of higher primary stability achieved. As the prerequisites were attained, immediate loading of

the implant was followed. Immediate loading of the implants has been associated with better patient comfort and reduced treatment time.

In poor density bone such as maxillary posterior region, osseodensification can be used to achieve a greater primary stability. A higher primary stability has been associated with faster osseointegration of the implants in the literature by preventing any micromotion. [5]

A systematic review conducted by Pereira et al. in 2023 highlighted that the OD technique offers significant advantages over the SD and osteotome techniques, particularly in achieving superior primary implant stability, bone density, bone-to-implant contact (BIC), and overall clinical success of implants. [6]

The OD technique also enables procedures like maxillary sinus elevation, expansion of narrow alveolar ridges, and immediate placement of implants after tooth extraction. The patient comfort is also a consideration for selection of Densah burs, rather than the usual mallet and osteotome technique. Patients are more accepting and calm with these burs. Various studies have shown that the risk of tinnitus is comparatively lower when using this method.[7]

## Conclusion

This case report suggests that when used in low-

density bone, maxillary posterior area, Densah burs have shown positive outcomes by increasing primary stability, bone-implant contact, and clinical success. However, the studies must be conducted to evaluate the limitations and biases.

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