Osseodensification increases primary implant stability and maintains high ISQ values during first six weeks of healing.

INTRODUCTION

- Implant stability is critical for osseointegration
- Surgical technique, bone quantity and quality, and implant design all affect primary stability since bone-implant contact provides initial mechanical stability.  
- Maintaining bone during the osteotomy preserves bone density, leading to increased bone-implant contact, increased primary mechanical stability, and accelerated healing.
- Secondary implant stability is affected by bone modeling/remodeling, implant surface characteristics, and primary stability.
- Higher insertion torque values (ITV) result in reduced micromotion, which is indicated by higher implant stability quotients (ISQ).

SUMMARY

Osseodensification (OD) is a non-excavation osteotomy preparation method. Unlike traditional standard drilling, Osseodensification compacts and auto-grafts bone in its plastic deformation phase. Osseodensification maintains and conserves bone density and creates more bone-implant contact resulting in higher insertion torque values, higher ISQ values over six weeks, and earlier restorative loading capability.

METHODS

- 17 consecutive private practice patients consented to receive 120 implants utilizing osseodensification.
- 12 of those patients required two or more implants and consented to having one implant placed using Standard Extraction Drilling (SD) and the other placed using Osseodensification (OD).
- 28 implants of two different macro designs were placed—16 mandible, 12 maxilla (SD group 14 implants, OD group 14 implants).
- Each osteotomy was prepared to a diameter of 0.2-0.5mm less than the implant body diameter.
- Insertion torque peak values (ITV) were recorded using torque indicator.
- Implant stability quotients (ISQ) were measured at placement and weekly for 6 weeks with Osstell ISQ meter. The average value of buccal, lingual, mesial, and distal was recorded.
- OD implants were subjected to 30Ncm reverse torque test (RTT) at 4 weeks (mandible) / 6 weeks (maxilla).
- Paired T test was performed to analyze results.

RESULTS

- 28 implants osseointegrated and were successfully restored.
- OD implants subjected to reverse torque test displayed no detectable movement/rotation or patient discomfort.
- Osseodensification produced higher ITV and ISQ throughout healing (P < 0.0001) with less of a decrease in ISQ at 3 weeks when compared to standard extraction drilling.

DISCUSSION

- According to Trisi et al., immediate implant loading can be recommended when ITV is at least 45Ncm and ISQ is at least 58.
- Osseodensification technique can be recommended to enhance primary stability and possibly allow for earlier loading due to higher ITV and ISQ than standard extraction drilling.
- Further study is needed to validate the predictability of early loading using Osseodensification.

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Disclosure

Dr. Huwais is the inventor of the Densah bur system.