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## OSSEODENSIFICATION AS A NOVEL IMPLANT PREPARATION TECHNIQUE THAT FACILITATES RIDGE EXPANSION BY COMPACTION AUTOGRAFTING.

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**Introduction:** Horizontal bone augmentation is often necessary in deficient alveolar ridges prior to implant placement. Various methods have been described in the literature to treat horizontal defects such as guided bone regeneration (GBR), autogenous block grafts, alveolar distraction osteogenesis, ridge expansion procedures and autologous bone or biomaterial grafts with titanium mesh are treatments that have been developed and used to treat bone volume defects. Ridge expansion, utilizing motorized rotary expanders, has been suggested as an alternative technique to expand bone by displacing it. Osseodensification is a non-excavating implant site preparation technique. It creates a densified layer of surrounding bone through compaction autografting while simultaneously plastically expanding the bony ridge at the same time. The autografting occurs along the entire length of the osteotomy through a hydrodynamic process with the use of irrigation. The result is a consistently cylindrical and densified osteotomy. Consistent osteotomies and densification are important to implant primary stability and to early loading. The purpose of this case series report is to evaluate the amount of ridge expansion achieved with osseodensification as directly measured in millimeters.

**Material and Methods:** 28 implants were placed in 21 patients. Alveolar ridge widths were broken down into 3 groups; Group 1: 3-4 mm (n=9), Group 2: 5-6 mm (n=12) and Group 3: 7-8 mm (n=7). Each ridge was measured utilizing bone calipers at 2 levels, crestal and an apical position (10 mm apical to the crestal measurement) prior to and post osteotomy preparation. Post implant placement insertion torque values were registered and ISQ values were documented.

**Results:** 15 implant were placed in the maxilla and 13 in the mandible. Crestal expansion showed greater expansion. Group 1 showed a mean ridge expansion of 75% post osseodensification (3.6 mm to 6.3 mm). Group 2 showed a mean ridge expansion of 27% post osseodensification (5.37 mm

to 6.86 mm). Group 3 showed a mean ridge expansion of 17% post osseodensification (7.0 mm to 8.2 mm). The average insertion torque was 61N/cm and ISQ value was 77.

**Discussion:** Greater bone expansion occurred at the coronal position compared to the apical. The greatest percentage of bone expansion was recorded on initially narrower ridges compared to wider ridges. All implants placed in this study had good primary stability with insertion torque values  $\geq 50$  N/cm and ISQ values  $\geq 68$ . Osseodensification is a biomechanical site preparation technique that preserves bone bulk and allows for predictable ridge expansion with enhanced primary stability with higher insertion torque values and higher ISQ values.

