Combined Osteotome-Induced Ridge Expansion and Guided Bone Regeneration Simultaneous with Implant Placement: A Biometric Study

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Purpose
To evaluate the long-term outcome of a single-step ridge expansion osteotome procedure and implant placement combined with guided bone regeneration in patients presenting narrow maxillary alveolar ridges.

Materials and Methods
During the period 1999 to 2010, 41 patients aged 19 to 77 years (18 males; 23 females) suffering from partial or full edentulism associated with horizontal resorption of the maxillary ridges (2.5–5 mm) were treated using the combined ridge expansion and guided bone-regeneration techniques to obtain an improved bony base for implant placement. Implant survival, bone width measurements, clinical and radiologic implant success, and clinical complications were recorded and analyzed.

Results
Achievement of primary stability of the implant was impossible at six sites; these were recorded as failures. In the remaining 35 patients, one hundred sixteen endosseous titanium implants were simultaneously placed. Follow-up time varied between 6 and 144 months (mean 52.4); of these, 36% were followed up for periods of time longer than 60 months. Implant diameter and lengths varied between 3.3 to 4.8 and 12 to 16 mm, respectively. In the 35 successful procedures (one hundred sixteen implants), the overall implant survival rate was 100%. An average gain in ridge width was 3.5 ± 0.93 (p < .0001) and an average enlargement of the buccal bone was 1.91 ± 0.6 (p < .0001). The mean vertical mesial bone loss was 1.81 mm ± 1.07 (ranging from 0.3 to 4.2 mm), and the mean vertical distal bone loss was 1.74 mm ± 1.12 (ranging from 0.4 to 4.5 mm). In eight patients (32%), at least one implant presented bone loss of >3 mm.

Conclusions
Within the limitations of this study, we suggest that the combined osteotome-induced ridge expansion and guided bone regeneration simultaneous with implant placement is a reliable procedure with reduced morbidity and may offer an alternative in suitable situations.