

Self-Inflating Soft Tissue Expander Outcome for Alveolar Ridge Augmentation a Randomized Controlled Clinical and Histological Study

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Abstract : Objective: Severe alveolar bone resorption is usually associated with a deficient amount of soft tissues. soft tissue expansion is introduced to provide an adequate amount of soft tissue over the grafted area. This study aimed to assess the efficacy of sub-periosteal self-inflating osmotic tissue expanders used as preparatory surgery before horizontal alveolar ridge augmentation using autogenous onlay block bone graft. Methods: A prospective randomized controlled clinical trial was performed. Sixteen partially edentulous patients demanding horizontal bone augmentation in the anterior maxilla were randomly assigned to horizontal ridge augmentation with autogenous bone block grafts harvested from the mandibular symphysis. For the test group, soft tissue expanders were placed sub-periosteally before horizontal ridge augmentation. Impressions were taken before and after STE, and the cast models were optically scanned and superimposed to be used for volumetric analysis. Horizontal ridge augmentation was carried out after STE completion. For the control group, a periosteal releasing incision was performed during bone augmentation procedures. Implants were placed in both groups at re-entry surgery after six months period. A core biopsy was taken. Histomorphometric assessment for newly formed bone surface area, mature collagen area fraction, the osteoblasts count, and blood vessel count were performed. The change in alveolar ridge width was evaluated through bone caliper and CBCT. Results: Soft tissue expander successfully provides a Surplus amount of soft tissues in 5 out of 8 patients in the test group. Complications during the expansion period were perforation through oral mucosa occurred in two patients. Infection occurred in one patient. The mean soft tissue volume gain was $393.9 \pm 322\text{mm}$. After 6 months. The mean horizontal bone gains for the test and control groups were 3.14 mm and 3.69 mm, respectively. Conclusion: STE with a sub-periosteal approach is an applicable method to achieve an additional soft tissue and to reduce bone block graft exposure and wound dehiscence.

Keywords : soft tissue expander, ridge augmentation, block graft, symphysis bone block

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