

Tissue expansion improves the outcome and predictability for alveolar bone augmentation: prospective, multicenter, randomized controlled trial

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Purpose

The purpose of this study was to evaluate the effectiveness of the intraoral use of subperiosteally placed self-inflating tissue expanders for subsequent bone augmentation and implant integrity

Materials & Methods

Study design : A prospective, multicenter, randomized controlled trial

Subjects and Outcomes of the study

• **Patients :** 57 patients were assigned to three groups:

- 1) tissue expansion and tunneling graft (TET group),
- 2) tissue expansion and conventional bone graft (TEG),
- 3) control group without tissue expansion

• **Outcome Measures :** Dimensional changes of soft tissue and radiographic vertical bone gain, retention, and peri-implant marginal bone changes/clinical complications and thickness changes of expanded overlying tissue



(A) Tissue expansion and tunneling graft (TET) group: tissue expander insertion with tunneling bone graft technique.

(B) Tissue expansion and conventional bone graft (TEG) group: tissue expander and bone graft with conventional guided bone regeneration technique.

Control: full flap guided bone regeneration (GBR) without tissue expander insertion.

Results

Most patients showed uneventful soft tissue expansion without any inflammatory sign or symptoms. Ultrasonographic measurements of overlying gingiva revealed no thinning after tissue expansion ($p > 0.05$). Mean soft vertical and horizontal tissue measurements at the end of its expansion were 5.62 and 6.03 mm, respectively. Significantly higher vertical bone gain was shown in the TEG (5.71 ± 1.99 mm) compared with that in the control patients (4.32 ± 0.97 mm; $p < 0.05$). Hard tissue retention-measured by bone resorption after 6 months—showed that control group showed higher amount of vertical (2.06 ± 1.00 mm) and horizontal bone resorption (1.69 ± 0.81 mm) compared to that of the TEG group ($p < 0.05$).

Conclusion

The self-inflating tissue expander effectively augmented soft tissue volume and both conventional bone graft and tunneling techniques confirmed their effectiveness in bone augmentation. With greater amount of bone gain and better 6 month hard tissue integrity, the TEG group compared to the control group—without tissue expansion—showed that the combined modality of tissue expander use and guided bone regeneration (GBR) technique may improve the outcome and predictability of hard tissue augmentation.