Clinical evaluation of particulate allogeneic with and without autogenous bone grafts and resorbable collagen membranes for bone augmentation of atrophic alveolar ridges

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Objectives
To evaluate the clinical outcome of bone augmentation with the use of particulate mineralized freeze-dried bone allograft (FDBA) with or without the addition of autogeneous bone chips, applied in a bi-layered (BL) technique, covered by a resorbable cross-linked collagen membrane.

Materials and methods
Fifty patients presenting with a vertical and/or lateral ridge deficiency of at least 3mm were included: Group FDBA, N=27 patients, particulate FDBA was the only graft; and Group BL, N=23 patients, a BL bone grafting procedure where autogenous bone chips were the inner layer and FDBA the outer. Bone graft was covered with a ribose cross-linked collagen barrier membrane. Ridge dimensions were clinically or radiographically (computerized tomography scan) measured at the time of the bone augmentation procedure and at implant placement or uncovering and the maximum linear vertical or horizontal calcified tissue gain was calculated. Statistical analysis consisted of linear regression analysis, with maximum bone gain being the dependent variable.

Results
In the FDBA group, mean vertical bone gain was 3.47mm (SD 1.25) and the horizontal, 5mm (SD 1.28), while in the BL values were 3.5mm (SD 1.2) and 3.6mm (SD 1.72), respectively. Addition of autogenous bone does not appear to statistically significantly enhance the results. Spontaneous membrane exposure occurred in 24% of the cases and was the only variant that significantly influenced results (P<0.001).

Conclusions
Large vertical and/or horizontal ridge deficiencies may be treated with FDBA and ribose cross-linked collagen barrier membranes with good clinical outcome. No added effect of the application of a layer of autogenous bone in these bone augmentation procedures could be demonstrated. Spontaneous membrane exposure was the only parameter to affect the degree of new calcified tissue formation.