Cone-beam computed tomography radiographic evaluation of dimensional hard tissue changes following alveolar ridge preservation techniques: A systematic review and meta-analysis

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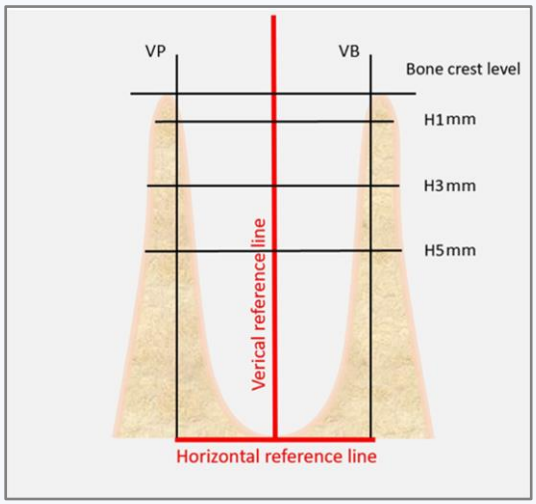
Purpose:

- To evaluate and compare the effects of different graft materials used in alveolar ridge preservation on dimensional hard tissue changes of the alveolar ridge using CBCT scans.

Materials and methods:

- A systematic electronic search in MEDLINE databases and the Cochrane Central Register of Controlled Trials (CENTRAL) as well as a manual search were conducted from November 2019 until January 2020.
- Randomized controlled trials assessing at least one variable for vertical or horizontal hard tissue change with CBCT scans were included.



- Subgroups were formed according to the graft material used, and metanalyses were performed for 5 outcome variables:

➢ Changes in vertical alveolar bone height at 2 points; midbuccal *(VB)* and midpalatal/midlingual *(VP)*

➢ Changes in horizontal (buccolingual) alveolar bone width at 3 different levels to the initial crest height; *(H1mm)*, *(H3mm)*, and *(H5mm)*.

Results:

- 16 studies were selected for qualitative analysis and 9 for quantitative analysis.
- The meta-analyses showed a statistically significant ($p<0.05$) reduction of alveolar ridge dimensions for the subgroup *xenogenic*; compared with the subgroup *allogenic*, both vertically at the midbuccal aspect as well as horizontally at 1 mm and 3 mm to the initial crest height.
- No statistical analysis could be performed for the subgroup *autogenic* because it was not reported in sufficient numbers.

 Xenogenic	 Allogenic
VB: -0,20 ± 0,26*	VB: -0,90 ± 0,22*
VP: -0,31 ± 0,14	VP: -0,71 ± 0,32
H1: -1,32 ± 0,07*	H1: -2,99 ± 0,96*
H3: -0,78 ± 0,11*	H3: - 1,63 ± 0,40*
H5: -0,41 ± 0,12	H5: -1,84 ± 1,28

Weighted Mean Difference ± Standard Deviation ❙ * p< 0,05

Conclusion:

- Less vertical and horizontal bone reduction was observed when xenogenic graft materials were used compared with allogenic graft materials.
- More homogenous research protocols with standardized outcome variables and follow-up times are needed to thoroughly assess and compare the application of different graft materials in alveolar ridge preservation.

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