

Histomorphometric Results After Postextraction Socket Healing with Different Biomaterials: A Systematic Review of the Literature and Meta-Analysis

ABSTRACT

In this article, the authors present a systematic review of the literature with data about histomorphometric outcomes after alveolar socket healing following tooth extraction with or without the placement of a bone substitute material. The primary outcome was the percentage of new bone formation. Secondary outcomes were percentage of biomaterial, connective tissue and non-mineralized tissue still present as measured through histomorphometric analysis of samples.

A total of 802 papers were screened and after the application of the inclusion and exclusion criteria, 40 articles were included in the quantitative synthesis and 11 were included in the meta-analysis of comparative studies. In 16 studies, no bone substitute material was used. Bovine bone (BB) was used in 14 studies; allograft (AG) was used in 5 studies; porcine bone (PB) was used in 4 studies; hydroxyapatite (HA), was used in 6 studies and HA enriched with magnesium in 4 studies; freeze-dried bone allograft (FDBA) was used in 4 studies; calcium sulphate (CS) was used in 4 studies, beta-tricalcium phosphate (β -TCP) was used in 2 studies and other biomaterials were used in 7 studies.

The meta-analysis of the results showed that the use of BB is associated with a lower proportion of vital bone compared to ungrafted sockets, while PB and magnesium-enriched HA seemed to enhance bone formation. Sites grafted with AG showed a proportion of new bone comparable to that of sites that did not receive any bone substitute.

CONCLUSIONS

Within the limits of this review, from the result it is possible to conclude that there is no evidence for the superiority of a given biomaterial over the others in terms of new bone formation. With reference to new bone volume, comparative studies reported that BB caused a reduced proportion of new bone volume (NBV), while PB and magnesium-enriched HA induced a significantly higher amount of NBV, compared to sites healed without bone substitutes.

ALVEOLAR REGENERATION

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