Comparative assessment of anterior maxillary alveolar ridge preservation with and without adjunctive use of enamel matrix derivative: a randomized clinical trial

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Abstract

Radiographic and clinical analyses showed no significant differences in horizontal and vertical bone dimensional changes and soft tissue wound healing outcomes (including spontaneous bleeding, persistent swelling, and ulceration) between the two groups. There were no significant differences in the severity of pain and swelling between the two groups, but the durations of pain (Df=1.20, 95% CI=0.33–2.06; $P = 0.008$) and swelling (Df=1.06, 95% CI=0.11–2.01; $P = 0.029$) were significantly reduced in the test group.

Results

CBCT measurements: (a) and (b) Relative bone loss in width (%) over 3 and 5 months, respectively, measured at a horizontal width change of 1, 3, and 5 mm apically below the alveolar ridge crest (HW1, HW3, and HW5); (c) and (d) Relative bone loss in height (%) over 3 and 5 months, respectively, measured at a vertical height change in the buccal, mid, and palatal alveolar ridge crests (VHB, VHM, and VHP). Horizontal and vertical bone dimensional changes did not show a significant difference between the two groups using two tailed independent t tests ($P > 0.05$)

Comparison of early postoperative discomfort between test and control groups during the 2 weeks after ARP. (a) and (b) show the severity of pain and swelling, respectively; (c) and (d) show the durations of pain and swelling, respectively. Statistically significant differences between the two groups were determined (*, $P < 0.01$; **, $P < 0.05$). Data are presented using as Box-Whisker plots (25th and 75th percentile [green box], 5th and 95th percentile [red line], mean [red dot], median [black line], and outliers)

Background and Aim

The aim of this randomized, controlled, parallel-arm study was to evaluate the (1) radiographic bone dimensional changes, (2) postoperative discomfort, and (3) early soft tissue wound healing outcomes, following extraction of maxillary anterior teeth (central and lateral incisors) and treatment with alveolar ridge preservation (ARP) with and without the adjunctive use of enamel matrix derivative (EMD).

Conclusion

Our results demonstrated no significant differences in radiological bone dimensional changes and wound healing outcomes between test and control groups, but the durations of postoperative pain and swelling were significantly reduced in the test group.

Methods and Materials

Thirty extraction sockets (with <50% bone loss in the buccal bone plate) were randomly assigned to two groups: deproteinized bovine bone mineral with 10% collagen covered with two layers of a native bilayer collagen membrane with the adjunctive use of EMD (test group) and without EMD (control group). Bone dimensional changes were measured using cone beam computed tomography at 3 and 5 months after ARP. The severity and duration of pain and swelling were evaluated using self-reported questionnaires and soft tissue wound healing outcomes were assessed clinically. Chi-square tests, t -tests, and Mann-Whitney U tests were conducted to compare differences between the two groups.

References