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Clinical Evaluation of Soft Tissue Closure in Alveolar Ridge Preservation Procedures: Part I

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Key Findings

The sockets that received type I bovine *Achilles*tendon collagen plug with bioactive resorbable calcium apatite crystal showed statistically significant wound closure surface when compared to the group that received cortico-cancellous allograftcovered by adense polytetrafluoroethylenemembrane at 3- and 4-weeks post-operatively.

Abstract

Background: The aim of this prospective observational randomized clinical study was to compare the percentage of wound closure surface area after using two different ridge preservation procedures. In addition, patient pain levels were registered using the Visual Analog Scale (VAS).

Materials & Methods: Twenty extraction sites were randomly allocated to either group using computer-generated randomization assignment software. The groups were: group 1, received type I bovine *Achilles*tendon Collagen Plug with Bioactive Resorbable Calcium Apatite Crystals (CPCAC); and, group II, received Cortico-Cancellous Bone Chips (CCBC) mix and a Dense Polytetrafluoroethylene(dPTFE) barrier membrane. The patients received a VAS pain rating scale to report their pain levels at 1-, 3- 5- and 7-days post-operatively (PO). Digital planimetry was used to calculate (mm^2) the wound closure surface area at baseline, 1-, 2-, 3-, 4-, 6- and 8-week PO. Paired 't' and student 't' statistical tests were employed to compare the data from both groups. Statistical significance was evaluated at $p< 0.05$.

Results: There was no statistical significance when comparing groups, I and II for 1- and 2-week time periods. However, there was statistical significance for group I which showed higher closure rate when compared to group II at the 3-week (p=0.015) and 4-week (p=0.027) PO visits. The patient pain levels evaluated by the VAS pain rating scale showed no statistical significance between the two groups.

Conclusion: The sockets that received CPCAC showed higher wound surface closure when compared to the group that received CCBC with dPTFE at 3-, and 4-weeks post-operatively.

Keywords: Ridge Preservation;Type I Bovine *Achilles* Tendon Collagen Membrane; Dense Polytetrafluoroethylene; Wound Closure; Visual Analog Scale.

Introduction

Tooth loss is accompanied by three-dimensional bone remodeling and ridge atrophy[1]. The cellular remodeling processes that occur 1 year after tooth loss result in up to 50% loss of the alveolar bony ridge width, especially in the anterior maxilla [2]. A high percentage of the alveolar bone resorption occurs within the first 3 to 6 months post-extraction[3]. If ridge preservation is not conducted at the time of extraction, 40%–60% of the total alveolar bone volume is lost during the first 2–3 months post extraction, and this phenomenon has shown to continue to occur at a rate of 0.25%–0.5% loss per year[4]. The effectiveness of alveolar ridge preservation techniques has been confirmed by many studies. A systematic review by Avila-Ortiz et al[5], which evaluated the clinical effects of tooth extraction with and without ridge preservation of non-molar teeth, found that ridge preserved sites had a mean of 1.89 mm less loss in the buccolingual ridge dimension and 2.07 mm less loss in the vertical ridge dimension.Thus, ridge preservation increases the possibility of the clinician to place the implant in a restoratively driven position. Alveolar ridge preservation can be achieved by utilizing a variety of materials and techniques. Autogenous bone