Histological comparison of socket preservation with PRF or allograft: A report of three cases

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Abstract

Physiological changes after tooth extraction result in progressive bone resorption and decrease in bone height and weight. Most of the dimensional changes occur during the first 3 months after tooth extraction. There are different methods and materials used for socket preservation. Recent studies showed that PRF promotes soft tissue and bone regeneration. The first case was a 29-year-old female with a non-restorable upper first molar on the right side. The patient was treated with a socket preservation procedure with allograft. The second case was a 33-year-old female with a fractured upper right first premolar. This patient was treated with socket preservation procedure with PRF as a sole graft material. The third case was a 21-year-old female with fractured lower left second molar. The socket was left with blood clot only. All three of the sockets were closed primarily with nonresorbable sutures. A 3 mm diameter core biopsy was taken from each socket 4 months after the procedure. During the surgical re-entry an implant was placed on all three cases and its primary stability was measured. The presented clinical case showed rapid and uncomplicated patient recovery, with very good primary implant stability. The histological findings suggest that filling a fresh extraction socket either with PRF or allograft provides a relevant solution for implant site preparation.

Results

All sites healed uneventfully. In the first group- PRF, newly formed bone was 81.6%, CT – 10.5% and IB – 7.9%. The second patient, preserved with allograft revealed 76.5% NB, 17,3% CT and 6,2% RG. The histological findings from the control group (blood clot) revealed only CT formed 4 months after the socket preservaton

Histological appearance demonstrating : 1 - newly formed bone (NB); 2 – connective tissue (CT); 3 – residual graft particles (RG); 4 – immature bone (IB)

Background and Aim

The physiological changes in the alveolar ridge that occur after tooth extraction can result in up to 50% volumetric loss, which can compromise the aesthetic result of the future implant placement and prosthetic restorations.¹ Extraction sites, which are treated with socket preservation procedure show less dimensional changes as well as increased vital bone formation compared to control groups.². The primary objective of this study is to histologically evaluate and compare healing of extraction sites grafted with allograft or PRF as a sole grafting material.

Conclusion

The presented clinical case showed rapid and uncomplicated patient recovery, with very good primary implant stability. The histological findings suggest that filling a fresh extraction socket either with PRF or allograft provides a relevant solution for implant site preparation. The study provides evidence that the quality of bone is greater when ridge preservation is performed.

Methods and Materials

Tooth extraction and ridge preservation were performed on 3 patients for each treatment group (PRF, allograft, control group). Four weeks after Grafting core biopsies were obtained during implant placement. They were examined under light microscopy and digital images were acquired. The images were imported into Image J software. Specimens were analyzed for the percentage area of vital bone, residual graft particles, connective tissue. Primary stability of the implants was measured after their placement with Osstel Idx.

References

1. Munhoz E de A. Concepts and challenges of alveolar ridge preservation and augmentation. World J Stomatol.2016;5(1):8.
2. Frost N, Banjar A, Galloway P, Huynh-Ba G, Mealey BL. The decision-making process for ridge preservation procedures after tooth extraction. Clin Adv Periodontics 2014; 4:56-63