

Assessment of Healing with the use of Platelet-Rich Fibrin after Periapical Surgery: A clinical study

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ABSTRACT

Background: Among periapical lesions, apical periodontitis, periapical cyst, periapical abscess and periapical granuloma is common one. The present study was conducted to assess healing with the use of PRF after periapical surgery.

Materials & Methods: The present study was conducted in the department of Endodontics. It comprised of 40 patients' age ranged 18- 50 years of both genders with periapical lesions. Patients were randomly divided into 2 groups of 20 each. Group I patients were treated with PRF and group II patients were control. All patients were assessed for healing on 3rd and 6th month. Surgical site was assessed clinically and radiographically for healing of periapical defect.

Results: The mean size of lesions (cm²) at baseline in group I was 0.62, at 3 months was 0.21 and at 6 months was 0.09. In group II at baseline was 0.78, at 3 months was 0.42 and at 6 months was 0.14. The difference was significant ($P < 0.05$).

Conclusion: Authors found that with PRF there is significantly faster bone regeneration. This can be considered as one of the bone graft material in periapical lesions.

Keywords: Bone formation, Periapical defect, Platelet rich fibrin.

INTRODUCTION

Periapical lesion is a commonly encountered in day today life. Most of the patients visiting the dental clinic or hospital complain of pain and most of the patients have periapical lesions. Among periapical lesions, apical periodontitis, periapical cyst, periapical abscess and periapical granuloma is common one.¹ All periapical lesions are due to sequel of endodontic infection. Destruction of periapical tissue results due to encounter between microbial factors and host defense forces at the interface between necrotic root canal and periodontal tissue; this results in inflammation and resorption of mineralized tissues.²

Bone formation in periapical region following endodontic therapy is matter of concern. Cases with through-and-through lesions and with large bony defects pose great challenge to endodontist.³ Endodontic surgery is only possible when root canal treatment failure occurs. It takes significant time for periapical region healing. In periapical surgery, numerous regenerative materials and bone graft have been tried.⁴ It is suggested that any bone replacement material should be biocompatible, non-carcinogenic, and dimensionally stable. It should induce new bone formation significantly. The tissue engineering approach to bone regeneration combines three elements which include stem cells

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or progenitor cells, conductive scaffolds or extracellular matrix, and signaling molecules.⁵

Platelet-rich fibrin (PRF) is a one of the best material frequently and effectively used in regeneration and repair. It is considered as second-generation platelet concentrate which is rich source of growth factors. PRF preparation generates a fibrin network similar to natural process; such network helps in more efficient cell migration and proliferation.⁶ The present study was conducted to assess healing with the use of PRF after periapical surgery.

MATERIALS & METHODS

The present study was conducted in the Deptt of Conservative Dentistry and Endodontics, Institute of Dental Sciences Sehora, Jammu. It comprised of 40 patients' age ranged 18- 50 years of both genders with periapical lesions. Patients with periapical lesions with >10 mm and with failed endodontic treatment were recruited. All patients were informed regarding the study and written consent was obtained. Ethical clearance was obtained.

Information such as name, age, gender etc. was recorded. Patients were randomly divided into 2 groups of 20 each. Group I patients were treated with PRF and group II patients were control. In all cases, conventional root canal therapy was done. PRF gel was inserted into the cavity in group I patients. In Group III patients, the defect was not replaced with any substitutes.

The mucoperiosteal flap was repositioned and simple interrupted sutures were given using 3-0 nonabsorbable black silk suture. All patients were assessed on 3rd and 6th month. Surgical site was assessed clinically and radiographically for healing of periapical defect. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant ($P < 0.05$).

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Agent	PRF	Control
Number	20	20

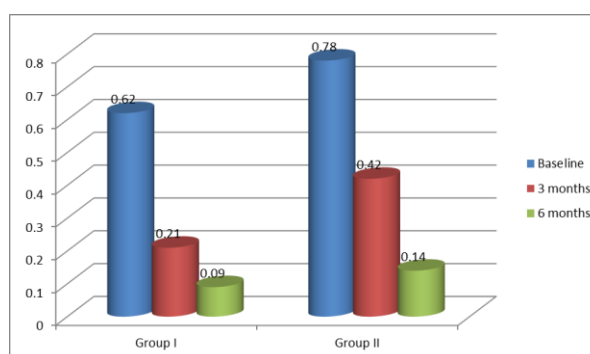
Table I shows that group I patients were treated with PRF and group II patients were control. Each group had 20 patients.

Table II Comparison of lesion in cm^2 in both groups.

Groups	Baseline	3 months	6 months	P value
Group I	0.62	0.21	0.09	0.01
Group II	0.78	0.42	0.14	0.05
P value	0.13	0.02	0.01	

Table II shows that mean size of lesions (cm^2) at baseline in group I was 0.62, at 3 months was 0.21 and at 6 months was 0.09. In group II at baseline was 0.78, at 3 months was 0.42 and at 6 months was 0.14. The difference was significant ($P < 0.05$).

Graph I Comparison of lesion in cm^2 in both groups



DISCUSSION

The aim of periapical surgery is repair of the osseous defects and regeneration of periapical tissues. Bone grafts have been extensively used in large periapical lesions. Ideal wound healing would achieve maximum regeneration and minimal repair so that the biological function of the injured tissue would not be jeopardized.⁷ Lesions that require periapical surgery are large apical cystic lesions, through-and-through ("tunnel") lesions, and apicomarginal lesions. In large periapical lesions, periapical wound healing requires recruitment and differentiation of progenitor cells/stem cells into osteoblasts, cementoblasts, and periodontal ligament cells.⁸ The present study was conducted to assess healing with the use of PRF after periapical surgery.

In this study, we included 40 patients with large periapical lesions. Patients with periapical lesions

with >10 mm and with failed endodontic treatment were recruited. Group I patients were treated with PRF and group II patients were control. Each group had 20 patients. Thanikasalam et al⁹ conducted a study on 14 patients who were divided into three groups. Group I patients were treated with PRF, group II with PRF and NcHA with collagen bone graft and Group III were control. In all the three groups, patient recall visits were scheduled after 1-, 3-, and 6-month time interval for clinical and radiological examination. A significantly higher rate of healing was observed after 6 months in Group II (100%) followed by Group I (92%) and Group III (86%).

We observed that mean size of lesions (cm²) at baseline in group I was 0.62, at 3 months was 0.21 and at 6 months was 0.09. In group II at baseline was 0.78, at 3 months was 0.42 and at 6 months was 0.14. Platelets are small, irregularly shaped clear cell fragments, which are derived from fragmentation of precursor megakaryocytes. They are a natural source of growth factors such as transforming growth factor, vascular endothelial growth factor, and platelet-derived growth factor. The use of platelet concentrates, such as PRP and platelet rich fibrin (PRF) is a current treatment approach in endodontics. The use of PRP is to enhance the speed of healing of the soft and hard tissue.¹⁰

Vaishnavi et al¹¹ divided patients of periapical lesions into various groups such as group I — replacement with Hydroxyapatite, group II — replacement with PRP, Group III — replacement with PRP and Hydroxyapatite, and group IV — control group with no substitutes. The patients were evaluated both clinically and radiographically for healing and reduction in size of the lesion. Group I patients had complete bone regeneration with evidence of a trabecular pattern, at the end of one year, Group II patients showed complete bone regeneration at the end of nine months, Group III patients showed complete bone regeneration at the end of six months, and Group IV patients showed bone regeneration, which was not satisfactory even after one year.

The advantages of PRP include improved tissue healing, early and fastest mineralization of collagen in bone repair, stability of grafts, provision of cytokines and growth factors to the site, formation

of a firm nonfriable clot and there is no potential for disease transmission. It is found to be less thrombogenic than untreated graft material.¹²

CONCLUSION

Authors found that with PRF there is significantly faster bone regeneration. This can be considered as one of the bone graft material in periapical lesions.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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