Journal of Oral Biology and Craniofacial Research 6 (2016) S29–S32

Contents lists available at ScienceDirect

Journal of Oral Biology and Craniofacial Research

journal homepage: www.elsevier.com/locate/jobcr

Original Article

Use of autologous platelet-rich fibrin in osseous regeneration after cystic enucleation: A clinical study

Manzoor Dar [a,*], Tajamul Hakim [a], Ajaz Shah [a], Latief Najar [a], Gowhar Yaqoob [b], Faiqah Lanker [a]

[a] Department of Oral and Maxillofacial Surgery, Govt. Dental College Srinagar, India
[b] Department of Oral Medicine and Radiology, Govt. Dental College Srinagar, India

ARTICLE INFO

Article history:
Received 10 March 2016
Accepted 29 April 2016
Available online 21 May 2016

Keywords:
Cystic lesions
Histogram
Osseous regeneration
Platelet-rich fibrin

ABSTRACT

Aims and objectives: The aim of this study was to evaluate the efficacy of PRF in osseous regeneration after enucleation of cystic lesions. The objectives of this study were as follows: (1) to evaluate osseous regeneration radiographically with the use of PRF in intrabony defects after cystic enucleation. (2) To evaluate the degree of bone density in intrabony defects with the use of PRF postoperatively after 1st, 3rd, and 6th months.
Subjects and methods: 20 cases of cystic lesions were treated using PRF after cystic enucleation. Follow-up radiographs (orthopantomogram) were taken 1st, 3rd, and 6th months postoperatively. Bone density was measured with grayscale histogram using Adobe Photoshop 7.0 software.
Results: The subsequent follow-up examinations revealed progressive, predictable, and significant radiographic osseous regeneration.
Conclusion: The use of PRF in management of cystic lesions seems to be a novel therapeutic approach promoting faster osseous regeneration within 6 months postoperatively; however, further study is required with larger sample size and with a control group.

1. Introduction

Maxillofacial reconstructions, oral implants, esthetic facial procedures, regenerative procedures, etc. are highly dependent on successful regeneration of tissues. Healing of both hard and soft tissues has become one of the greatest challenges faced in clinical research in the development of bioactive surgical additives responsible for regulating inflammation and increasing healing. Bone regenerative techniques, including graft materials, protein, and barrier membrane, are often used to increase the bone quality. Healing in tissue is mediated by a variety of signaling proteins. Understanding of this process at microcellular level is still not complete, but it is a proven fact that platelets do play an important role in wound healing.[1] Bone grafts and bone regenerative materials are commonly used today for treating intrabony defects in periapical surgery with varying degrees of success. Autograft is associated with high degree of donor site morbidity and allograft is associated with risk of disease transmission, which pushed the clinicians toward opting for more promising autologous material, such as platelet-rich plasma (PRP) and platelet-rich fibrin (PRF), for more predictive results.[2] Platelet-rich fibrin (PRF) represents a new step in the platelet gel therapeutic concept with simplified processing minus artificial biochemical modification. Platelet-rich fibrin (PRF) was first introduced by Choukroun et al.[3] in 2001. Platelet-rich fibrin is an immune and platelet concentrate collected on a single fibrin membrane containing all the constituents of blood favorable for healing and immunity. The fibrin matrix supports them and is responsible for angiogenesis and immunity control. The growth factors present in it are biologically active substances that are involved in tissue repair mechanisms, such as chemotaxis, cell proliferation, angiogenesis, extracellular matrix deposition, and remodeling.[4] PRF releases (through degranulation) at least seven different growth factors, as well as cytokines, that stimulate bone and soft tissue healing. Thus, PRF is an easy and cost-effective way to obtain high concentrations of growth factors for soft and hard tissue regeneration in wound healing.

2. Materials and methods

This study was conducted in the Department of Oral and Maxillofacial Surgery, Govt. Dental College and Hospital, Srinagar. 20 patients (13 male and 7 female) were diagnosed with cystic

* Corresponding author. Tel.: +91 9419075893.
E-mail address: itsdrmann@yahoo.com (M. Dar).

http://dx.doi.org/10.1016/j.jobcr.2016.04.004
2212-4268/

lesions based on clinical and radiographic findings with age groups ranging from 20 years to 55 years. Exclusion criteria involved medically compromised patients, known mentally challenged patients, patients unable to communicate, pregnant and lactating women, patients with insufficient platelet count for PRF preparation, and those having history of coagulation defect or under anticoagulant treatment. Informed consent was taken from all the patients. According to standard surgical protocol, all cystic lesions were enucleated and PRF was placed in the bony defects. 10 ml of blood is drawn into test tubes without an anticoagulant and centrifuged immediately. Blood is centrifuged using a tabletop centrifuge for 12 min at 3000 rpm. The resultant product consists of the following three layers:

- Top most layer consisting of acellular plasma
- PRF clot in the middle
- Red blood cells at the bottom

Because of the absence of an anticoagulant, the blood begins to coagulate as soon as it comes in contact with the glass surface. Therefore, for successful preparation of PRF, speedy blood collection and immediate centrifugation, before the clotting cascade is initiated, are absolutely essential. Periapical radiographs and orthopantomograms (OPG) were taken preoperatively and on 1st, 3rd, and 6th months postoperatively to access radiographic bone density at the site of PRF placement. Bone density was measured with the help of grayscale histogram study of OPG images of bony defects obtained through Adobe Photoshop 7.0 software (By Adobe systems incorporated in United States. Copyright 1990–2002).

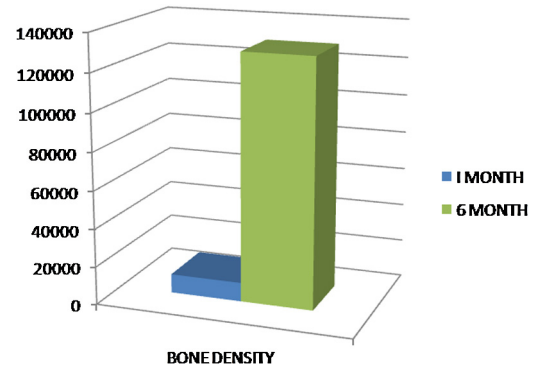

Fig. 1. Average bone density after PRF.

2.1. Overall density score

+2 = Severe increase in radiographic density
+1 = Mild to moderate increase in radiographic density
0 = Within normal limits
−1 = Mild to moderate decrease in radiographic density
−2 = Severe decrease in radiographic density

2.2. Trabecular pattern scores

+2 = All trabeculae substantially coarser
+1 = Some coarser trabeculae; milder degrees
0 = Within normal limits

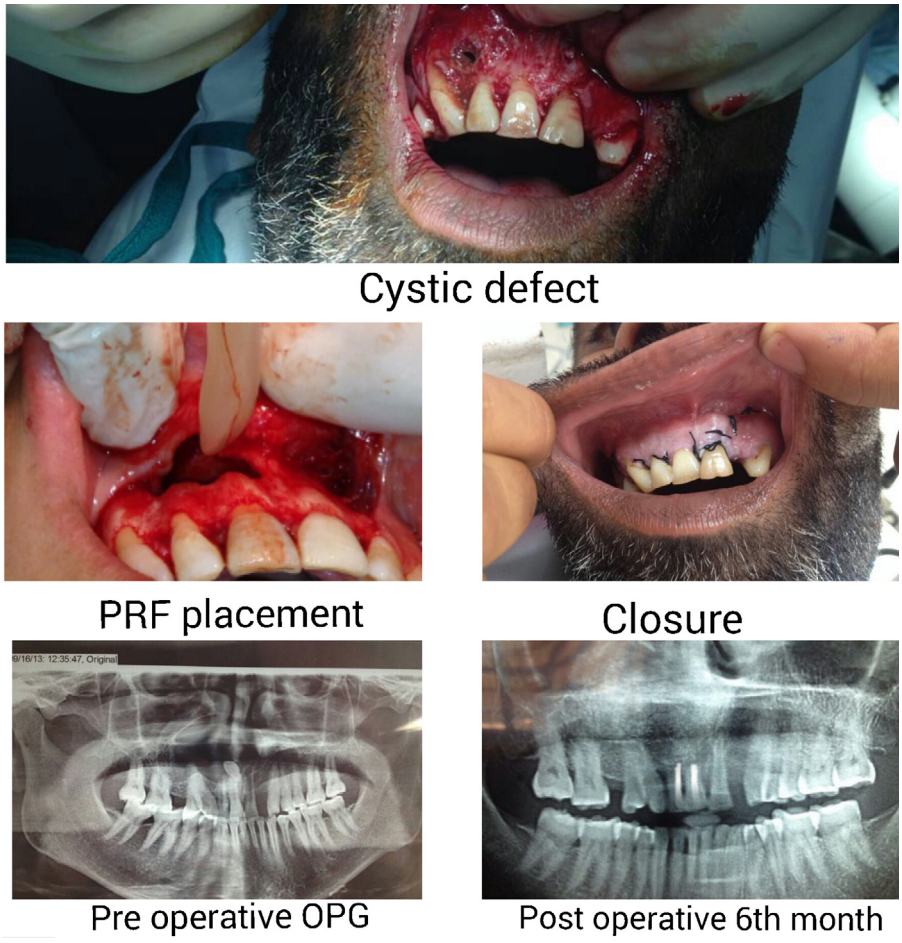

Fig. 2. Preparation of PRF.