Journal of Oral Biology and Craniofacial Research xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Oral Biology and Craniofacial Research

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

Original Article.

Versatility of platelet rich fibrin in the management of alveolar osteitis—A clinical and prospective study.

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ARTICLE INFO

Article history:
Received 11 October 2016
Received in revised form 26 April 2017
Accepted 2 May 2017
Available online xxx

Keywords:
Dry socket
Alveolar osteitis
Tooth extraction
Pain
Platelet rich fibrin

ABSTRACT

Objective: To assess the efficacy of Platelet Rich Fibrin (PRF) on the pain and healing of the extraction socket associated with Alveolar Osteitis (Dry Socket, AO) after removal of maxillary and mandibular molars.
Study design: 100 adult patients with age group ranging from 18 to 40 years along with established dry socket after maxillary and mandibular molar extractions who have not received any treatment for the same were included in the study. PRF was placed in the maxillary and mandibular molar extraction sockets after adequate irrigation of the socket. All the patients evaluated for the various study variables which include pain, degree of inflammation, and healthy granulation tissue formation at 1st, 3rd, 7th, and 14th post operative day. Data were analyzed using Shapirowilk's test, chi square test and/or student-*t* test, Friedman's test, Wilcoxson's signed rank test, and Bonferroni test, with the significance level set at $P < 0.05$.
Results: There was significant reduction in pain associated with AO at the 3rd and 7th postoperative day along with better wound healing by the end of 2nd week.
Conclusion: Use of PRF in this study illustrates the promising results in terms of reduced pain and better healing in the patients with Alveolar Osteitits.

1. Introduction

Dry socket or acute alveolar osteitis is a quite painful and debilitating condition for the patients who underwent extractions. The phrase dry socket was first formulated by Crawford1 in 1896; it has been previously described by various terminologies in the literature2,3 and it can be defined by Blum as the presence of "postoperative pain in and around the site, which extraction increases in severity at any time between 1 and 3 days after the extraction, accompanied by a partially or totally disintegrated blood clot within the alveolar socket, with or without halitosis.4

It's incidence after dental extractions is range from 1 to 30%.3 As a result, dry socket leads to stress for the dentists in managing the patient after extractions of teeth. The essential characteristic of sicca dolorosa is loss of the normal clot from the socket along with exposed bony walls and sensitive on gentle probing. Halitosis (Bad Breath) is a common complaint from the patient; fever is occasionally present.5,6 It is generally exist within 1–4 days following dental extraction of teeth commonly mandibular molars. Commonly seen in the age group of 30 years or above; females are commonly affected than males.7–9

Alveolar osteitis have been associated with various etiologies. 8,10–15 In recent past, a plethora of various researches had been done regarding the prevention and management of dry socket3,16–25; nonetheless, none of them provided the effective treatment of the AO.

Contemporary review of literature depicts that a lot of research has been done on Platelet Rich Fibrin (PRF) and numerous cases have been reported regarding the use of PRF clot and PRF

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http://dx.doi.org/10.1016/j.jobcr.2017.05.002
0976-5662/

membranes. Majority of the research has been concentrated on the use of PRF in oral surgery for bone augmentation, sinus lifts, avulsion sockets etc and its applications in periodontology and endodontics.

Studies show that PRF can be used as filling material in extraction sockets. As a filling material in extraction sockets, PRF will act as a stable blood clot for neovascularization and accelerated tissue regeneration. This can be used to improve wound healing in immunocompromised and diabetic patients.[26–31]

In lieu of the above mentioned versatility of PRF; the aim of the present study was to appraise the efficacy of PRF in the management of established alveolar osteitis consequently after the extraction of maxillary and mandibular molars (intra/trans alveolar).

2. Materials and method

A simple non-randomized observational, clinical, and prospective study was conducted with approbation of Department of Oral and Maxillofacial Surgery over a period of eighteen months from September 2014 to March 2016. All procedures performed in study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards and the regional Ethical Review Board of Institution approved the study. The procedure was explained to all the patients and informed consent was obtained from all participants included in the study. Those who were not ready and failed to report according to the set criteria were excluded from the surgery.

2.1. Inclusion and exclusion criteria

100 patients ranging from 18 to 40 years of age group, with established dry socket after maxillary and mandibular molar extraction, usually reporting on 3rd–5th post-operative day, who have not received any treatment for the same were included. Patients free from any systemic diseases and without any signs of active infection in extracted socket were included. Exclusion Criteria were pregnant and lactating women or patients on oral contraceptives, previous history of antibiotic and anti-inflammatory therapy for the treatment of dry socket, subjects with any underlying systemic disease or compromised immunity, patients who were unable to provide informed consent to the maxillofacial surgeon at the time of procedure. Patients who have already received treatment for dry socket e.g. local dressing with Zinc oxide eugenol pack, honey etc. were also excluded.

2.2. Study process

PRF was placed in the molar extraction sites with established localized osteitis, 100 sites total and in 100 consecutive patients was treated. The patients were managed with standard surgical techniques, and without any postoperative analgesic and antibiotic coverage. All patients were re-evaluated after 1st, 3rd, 7th, and 14th post-operative day. In order to control the bias, a single operator had treated all the patients.

2.3. Method of preparation of platelet rich fibrin

The platelet rich fibrin (PRF) was prepared according to the protocol of Choukroun J. et al.[23] which is as follows: the Institutional Review Board has approved the study, according to PRF protocol blood samples were treated with a table centrifuge and collection kits provided by REMI, MUMBAI, INDIA (R-8C BL, Remi Labs, India). In short, samples were retreated from the patient without an anticoagulant in 10-ml glass-coated plastic tubes (Poly Medicure Ltd, New Dehli, India) and subjected to centrifugation at 3000 rpm for 12 min. A fibrin clot was formed in the middle part, acellular plasma present in the upper part of the tube, and the red corpuscles in the bottom part. The fibrin clot was abstracted comfortably from the basal part of the tube. The segregated PRF was placed into the dry socket, and stabilized with the help of figure of eight suture.

2.4. Clinical parameters

Various parameters were used to appraise the study subjects (Tables 1 and 2).

2.4.1. Pain

It was assessed using 10 point Visual Analogue Scale, with a score of “0” equals “no pain” and “10” equals “very severe pain” (Fig. 1).

Pain was evaluated pre-operatively and post-operative 1st, 3rd and 7th day.

Moreover, all the patients were asked not to take any pain killers i.e. NSAID’s for the post-operative pain in order to assess the anti-nociceptive property of PRF. Furthermore, the time required achieve clinical healing were also noted.

2.4.2. Degree of inflammation

It was evaluated using gingival severity index[32] for inflammation from 0 to 3 which comprised of 0- Normal gingiva; 1- mild inflammation- slight change in color, slight oedema. No bleeding on probing; 2- moderate inflammation- redness, oedema and glazing. Bleeding on probing; 3- severe inflammation- marked redness and oedema, ulceration and tendency to spontaneous bleeding on 1st, 3rd, and 7th day post-operatively. Inflammation was assessed clinically by gentle probing of the extraction socket to ensure presence or absence of gingival bleeding.

2.4.3. Granulation tissue formation

Granulation tissue formation at the molar extraction site treated with PRF was assessed clinically. This is evident clinically by the coverage of the exposed bone at the site of alveolar osteitis by soft granulation tissue. The granulation tissue was divided into healthy (pink in colour and does not bleed on probing) and unhealthy granulation tissue (dark red in colour and often bleeds on probing). Granulation tissue formation was evaluated on 1st, 3rd, 7th, and 14th postoperative day.

Table 1
Pre-operative evaluation criteria.

	Pain	Degree of inflammation	Exposed bone
Method	Visual analogue scale	Clinical assessment	Number of socket walls exposed
Score	1–10	1- 1- Mild 2- 2- Moderate 3- Severe	1- one wall 2- two walls 3-three walls 4-four walls

Please cite this article in press as: S. Rastogi, et al., Versatility of platelet rich fibrin in the management of alveolar osteitis—A clinical and prospective study., J Oral Biol Craniofac Res. (2017), http://dx.doi.org/10.1016/j.jobcr.2017.05.002