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Original Research

A prospective study to evaluate post operative clinical parameters of platelet rich fibrin and platelet rich plasma in third molar extraction sockets: An original research study

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ABSTRACT:
Aim: This prospective study was attempted to evaluate post operative clinical parameters of platelet rich fibrin and platelet rich plasma in third molar extraction sockets. **Materials and Methods:** This study was conducted in the department of oral and maxillofacial surgery of the institute wherein total 20 patients studied authentically. Patients those undergone their third molar extraction, were included in the study. Moreover, authors included only bilateral mandibular third molar cases. In the fresh extraction sockets, platelet-rich fibrin (PRF) and platelet-rich plasma (PRP) were placed in the either sockets. PRF was placed in the right extraction sockets (group I) whereas PRP was placed the left extraction sockets (group II). Comprehensive case history was recorded with all photographic and radiographic records. Authors explained the methodology and other details to all participating patients. Informed consents were also obtained from all patients. **Results:** Out of 20 patients, males were 13 and females were 7. Initially, statistical assessment of postoperative pain in all 20 patients in which PRF placed in the right extraction sockets (group I) was attempted. The related mean value was 3.83 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was highly significant for this parameter (0.01). The statistical assessment of postoperative swelling in all 20 patients in which PRP placed in the left extraction sockets (group II) also showed very imperative responses. The related mean value was 2.69 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was non significant for this parameter (0.07). **Conclusion:** Authors concluded that in the fresh mandibular third molar extraction sockets, platelet-rich fibrin and platelet-rich plasma both worked well in reducing post operative pain, swelling and trismus. Authors did not notice any significant difference with PRF and PRP. Both of the studied materials are seems to have almost equal potential in osseous healing.
Keywords: Platelet-rich fibrin, Platelet-rich plasma, Third Molar, Impaction

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INTRODUCTION

Platelet-rich plasma (PRP) is defined as an autologous concentration of platelets in a small volume of plasma. Many of the researchers have shown that is also an affluent source of autologous growth factors.[1-4] Platelet-rich plasma is formed from a patient's whole blood through a two stage centrifugation procedure. The first step involves centrifugation for the separation of blood

components. The second step involves the final PRP construction. As per the data available, there are presently more than thirty commercial systems that have been developed to concentrate autologous whole blood into a platelet-rich substance. Platelet-rich plasma (PRP) is a novel approach to tissue regeneration and day by day it is becoming a precious adjunct to encourage healing in numerous procedures in maxillofacial and oral surgery, particularly in older patients.[5-9] PRP is obtained from the centrifugation of the patient's own blood and it haves growth factors that control wound healing, thus playing an significant role in tissue healing mechanisms. The use of PRP in surgical exercises might have advantageous results. These can be diminished haemorrhage and enhancing soft tissue healing and bone regeneration. Several of the pioneer workers have shown that human experiments have gained hopeful results regarding the application of PRP to many maxillofacial and oral surgical practices.[10-16] This prospective study was attempted to evaluate post operative clinical parameters of platelet rich fibrin and platelet rich plasma in third molar extraction sockets.

MATERIALS AND METHODS

This study was planned, finalized and executed in the department of oral and maxillofacial surgery of the institute wherein total 20 patients were evaluated judiciously. Patients with any kind of gross anomaly of oral and maxillofacial structure were excluded from the study. Patients who underwent their third molar extraction, were included in the study. Also, we included only bilateral mandibular third molar cases. In the fresh extraction sockets, platelet-rich fibrin (PRF) and platelet-rich plasma (PRP) were placed in the either side sockets. PRF was placed in the right extraction sockets (group I) whereas PRP was placed the left extraction sockets (group II). Detailed case history was also recorded with all photographic and radiographic records. Initially patients were originally reported for their third molar impaction treatment. Authors explained the methodology and other details to all participating patients. Informed consents were also obtained from all patients. This study was attempted to only assess post operative clinical responses of third molar sockets as affected by platelet-rich fibrin and platelet-rich plasma. Intra-operative and preoperative parameters were not assessed. Preparation of platelet-rich fibrin and platelet-rich plasma was completed by standard manner utilizing patient's intravenous blood. Ante-cubital region was the area of choice for intravenous blood withdrawal. This preparation was done well before the extraction of impacted teeth. Soon after initial cleaning of the fresh wound, platelet-rich fibrin and platelet-rich plasma was placed and sutured. Patients were recalled in their post operative follow-up visits on the first, fifth, tenth and fifteenth day. On each recall visits, patients were assesses for pain, trismus and swelling. All these three parameters were assessed by evaluating scores one to ten as responded by patients for associated pain.

RESULTS

In the present study, all obvious findings and data were sent for statistical analysis using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). The resultant data was subjected to appropriate statistical tests to obtain p values, mean, standard deviation, chi- square test, standard error and 95% CI. Table 1 and graph 1 shows age & gender wise allocation of patients. Table 1 and Graph 1 showed that out of 20 patients, males were 13 and females were 7. Accordingly in the arbitrary selection of the patients showed clear male predilection. All participating patients were separated into 4 age groups. 5 patients were falling in the age range of 21-27 years. 9 patients were falling in the age range of 28-34 years. Therefore we can presume that approximately more than half of the studied patients were of first two age groups. P value was found to be significant in group II of age range 28-34 years. The calculated p value was 0.02. Table 2 illustrated statistical assessment of postoperative pain in all 20 patients in which PRF placed in the right extraction sockets (group I). The related mean value was 3.83 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was highly significant for this parameter (0.01). Table 3 demonstrated statistical estimation of postoperative pain in all 20 patients in which PRP placed in the left extraction sockets (group II). The related mean value was 3.42 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was very significant for this parameter (0.02). Table 4 showed statistical assessment of postoperative trismus in all 20 patients in which PRF placed in the right extraction sockets (group I). The related mean value was 7.98 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was non significant for this parameter (0.08). Table 5 demonstrated statistical estimation of postoperative trismus in all 20 patients in which PRP placed in the left extraction sockets (group II). The related mean value was 8.04 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was non significant for this parameter (0.50). Table 6 illustrated statistical appraisal of postoperative swelling in all 20 patients in which PRF placed in the right extraction sockets (group I). The related mean value was 2.82 for all studied four follow up days (1^{th}, 5^{th}, 10^{th} and 15^{th} day). P value was non significant for this parameter (0.08). Table 7 illustrated statistical assessment of postoperative swelling in all 20 patients in which PRP placed in the left extraction sockets (group II). The related mean

value was 2.69 for all studied four follow up days (1th, 5th, 10th and 15th day). P value was non significant for this parameter (0.07).

Table 1: Age & gender wise allocation of patients

Age Group (Yrs)	Male	Female	Total	P value
21-27	3	2	5	0.09
28-34	6	3	9	0.02*
35-41	3	1	4	0.50
42-48	1	1	2	0.08
Total	13	7	20	*Significant

***p<0.05 significant**

Table 2: Statistical evaluation of postoperative pain in all 20 patients in which PRF placed in the right extraction sockets (group I)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Pain	20	3.83	0.456	0.963	1.96	1.733	1.0	0.01*

***p<0.05 significant**

Table 3: Statistical evaluation of postoperative pain in all 20 patients in which PRP placed in the left extraction sockets (group II)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Pain	20	3.42	0.536	0.530	1.96	1.933	1.0	0.02*

***p<0.05 significant**

Table 4: Statistical evaluation of postoperative trismus in all 20 patients in which PRF placed in the right extraction sockets (group I)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Trismus	20	7.98	0.625	0.925	1.96	1.948	1.0	0.08

***p<0.05 significant**

Table 5: Statistical evaluation of postoperative trismus in all 20 patients in which PRP placed in the left extraction sockets (group II)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Trismus	20	8.04	0.453	0.990	1.96	1.423	1.0	0.50

***p<0.05 significant**

Table 6: Statistical evaluation of postoperative swelling in all 20 patients in which PRF placed in the right extraction sockets (group I)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Swelling	20	2.82	0.482	0.923	1.54	1.992	1.0	0.08

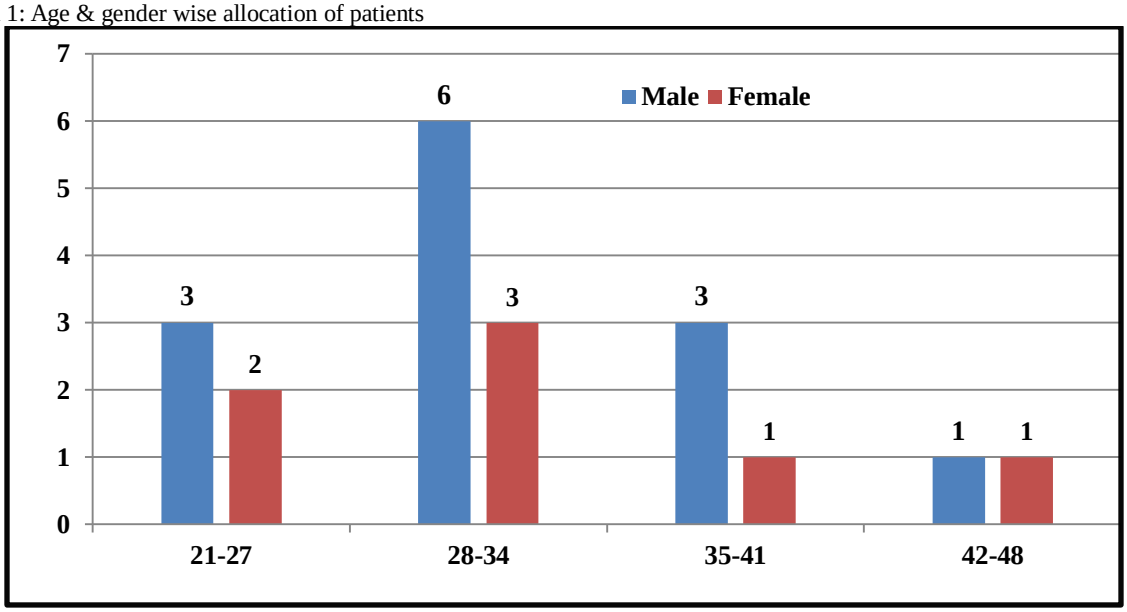
***p<0.05 significant**

Table 7: Statistical evaluation of postoperative swelling in all 20 patients in which PRP placed in the left extraction sockets (group II)

Parameters	n	Statistical Mean (Assessed at 1th, 5th, 10th and 15th day)	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Swelling	20	2.69	0.637	0.039	1.32	1.028	1.0	0.07

***p<0.05 significant**

Graph 1: Age & gender wise allocation of patients



DISCUSSION

Literature has well evidenced that that Platelet rich plasma (PRP) is an innovative way to tissue rejuvenation. Platelet rich plasma it is extensively utilized in different surgical procedures, including head and neck surgery, otolaryngology, cardio-vascular surgery, and maxillofacial surgery.[17-24] Normally, Platelet rich plasma is utilized in a gel preparation, which is formed by mixing Platelet rich plasma (derived from the centrifugation of autologous whole blood) with thrombin and calcium chloride. Platelet rich plasma gel includes a high concentration of platelets and a inhabitant solution of fibrinogen.[25-30] Throughout the wound healing phase, platelets are amongst the first cells to react at a wound site. Therefore it is very critical in the initiation of these processes. In addition to their prominent pro coagulant effects, platelet creates a thick source of imperative growth factors.[31-34] These growth factors are predominantly platelet-derived growth factor (PDGF), transforming growth factor-b (TGF-b) 1 and 2, and vascular endothelial growth factor (VEGF). All of these growth factors are actively occupied in the angiogenic mechanisms which aid in hard and soft tissue wound healing. Quality research works in maxillofacial and oral surgery usually involves materials and processes which are competent of improving clinical responses.[35-38] These are especially in terms of relative percentages of success. The ultimate aim of the present study was to evaluate post operative clinical parameters of platelet rich fibrin and platelet rich plasma in third molar extraction sockets. Three most common clinical complications were studied i.e; pain, swelling, trismus. There are several researches have already been done to find a perfect treatment approach which can diminish bleeding, promote effective bone regeneration and rapid soft tissue healing by utilizing resources those are simple to perform at a lowest cost.[39,40] Recently, PRP has become a precious adjunct to induce healing in several procedures in oral surgery. They predominantly include ablative surgical procedures, mandibular reform, surgical restoration of the alveolar cleft, management of infra bony periodontal defects and periodontal plastic surgery.

CONCLUSION

Authors concluded that in the fresh mandibular third molar extraction sockets, platelet-rich fibrin and platelet-rich plasma both are responding well in reducing post operative pain, swelling and trismus. Authors did not notice any significant difference with PRF and PRP. Both of the studied materials are seems to have almost equal potential in osseous healing processes. However, PRF is comparatively less complicated to prepare and therefore it is cost effective

too. Our study's outcomes must only be considered as indicative for estimating prognosis for similar clinical conditions. Nonetheless, we expect some other large scale studies to be conducted that can further establish few genuine norms in these perspectives.

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