

**ROLE OF PLATELET RICH PLASMA ON HEALING FOLLOWING SURGICAL EXTRACTION OF TEETH**

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**ABSTRACT**

**Objective:** To evaluate the effect of platelet rich plasma on soft tissue healing and inflammation after surgical extraction of teeth. **Subject and Methods:** This Comparative cross sectional study was conducted at Department of Oral & Maxillofacial Surgery LUMHS Jamshoro from June 2018 to December 2019. After examination, the clinical findings were recorded along with history of any habits that can interfere with healing so as to control the confounding factors. Soft tissue healing was assessed based on the criteria given by Landry. Inflammation was measured using a modification of the method described by Schultze-Mosgau. **Results:** Total 96 patients were studied. 48 of platelet rich plasma group (PRP) and 48 of platelet sans rich plasma group (control). Mean age of PRP group was 34.81+9.09 years and control 32.70+9.54 years. There was no significant difference among both groups according to age, p-value 0.638. All patients of PRP group showed best soft tissue healing and control of surgical site swelling as compared to control group p-value 0.001 **Conclusion:** Platelet rich plasma showed better outcomes in terms of soft tissue healing and control of inflammation after surgical extraction of mandibular molar teeth.

**Key Words:** Platelet Rich Plasma, Surgical Extraction, Soft tissue healing, Inflammation

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**INTRODUCTION**

The newer and latest approach to tissue regeneration is the platelet-rich plasma (PRP). As far healing is the most important factor in dealing with many surgical procedures, for this PRP is getting prime importance in dealing with many procedures related to dentistry and particularly oral surgery<sup>1</sup>.

Reduction in bleeding tendency, enhanced healing of soft tissues and regeneration of bone are the major budding outcomes which can be gained by the use of PRP in surgical setting. Researchers have noticed fruitful and promising results by the introduction of PRP in various dentistry and oral surgery related procedures that range from routine surgical extractions to newer techniques like implant placement<sup>1,2</sup>. PRP (derived form autologous whole blood) is a formulation that is formed by mixing with thrombin and calcium chloride. PRP is gel form in nature and includes a high concentration of platelets and a inhabitant concentration of fibrinogen<sup>2,3</sup>.

Following the extraction of teeth, the utilization

of platelet rich plasma may boost and accelerate

the complete healing process by providing better hemostasis, reduction of post-operative inflammation, enhance the soft tissue and bone healing. This would significantly reduce post-operative pain and infection and greatly reduces the morbidity of patient and even limit the use of anti-biotic and analgesics<sup>4,5</sup>.

Oral surgeons in any sort of surgery always wish to achieve better wound healing, satisfactory healing of bone and measures to encounter fewer complications. Complication factors like pain, alveolar osteitis and limited mouth opening always creates nightmare for oral surgeons and they are constantly searching for ways to lessen these postoperative hurdles. Right after the extraction of teeth carried out surgically particularly the wisdom tooth surgery, the incorporation of PRP in the post extraction sockets is now the most current and pioneering technique used. From controlling the hemostasis to liberate the factors of growth accountable for early and prompt wound healing along with pain

control and rapid formation of bone and trismus control are the main functions to be achieved by use of PRP in these surgical extractions<sup>6</sup>. The desirable features to be gained after third molar surgery are fewer complications occurring postoperatively, uneventful and wound healing which must be enhancing in nature, so by increasing the concentration of platelets at the site of extraction( main theory involved) socket these results could be achieved<sup>7</sup>.

By the application of PRP soft tissue healing may also be substantially enhanced, it does by escalating collagen content and monitoring key cellular processes, such as mitosis, cell differentiation and metabolism<sup>6</sup>. Masticatory muscles pain and inflammation is a repeated residuum to surgical removal of mandibular third molars (lower wisdom teeth). This inflammatory picture may get resolved by its own in almost 2 weeks period, but in this time it usually compromises the eating pattern and oral hygiene. PRP provides velocity and gear up healing process by concentrating the growth factors which are responsible for reduction in pain, inflammation and trismus.<sup>8,9,10</sup>

The aim to conduct this study is to clinically evaluate the effect of application of autologous platelet rich plasma in reducing the post operative inflammation and significantly improve the quality of repaired tissues.

**MATERIALS AND METHODS**

This is a Comparative cross sectional study with non probability convenience sampling method was conducted after approval of research ethics committee at oral and maxillofacial surgery department of Liaquat University of Medical and Health Sciences Jamshoro, Hyderabad from September 2018 to August 2019. Patients of both genders willing to participate in study having age group of 11 to 50 years were included. Patients who require surgical extraction of mandibular teeth, or who have impacted mandibular third molar with good general body health were set as inclusion criteria. Patients having any systemic disease,

presence of opposing traumatic occlusion, history of smoking and betel nut were excluded from study.

**EVALUATION:** Standard protocol was followed for both groups with respect to pre-operative, intra-operative and post-operative measures. After performing surgical extraction, soft tissue healing was assessed based on the criteria given by Landry et al<sup>15</sup>. Inflammation will be measured using a modification of the method described by Schultze-Mosgau et al<sup>16</sup>. Surgical site of both the groups was assessed on day 3, 7 and 14 for inflammation, and soft tissues healing all finding were recorded on study proforma. Data was analyzed by SPSS version 20.0

**RESULTS**

Total 96 patients were studied followed by 48 of platelet rich plasma group (PRP) and 48 of platelet sans rich plasma group (control), mean age of PRP group was 34.81+9.09 years and control 32.70+9.54 years, mean age was statistically insignificant p-value 0.272. Table No 1.

Among patients of PRP group, 24 were male and 24 were female, and in patients of control group 26 were male and 22 were females, there was no significant difference among both groups according to age, p-value 0.638. Table No 2.

On patient’s distribution according to 3rd day soft tissue healing PRP group showed significantly better soft tissue healing as compared to control group p-value 0.001. Most of the cases were with good soft tissue healing, while in control group majority of the cases were with poor and very poor soft tissue healing. According on 7th day and 14th day almost all patients of PRP group showed best soft tissue as compared to control group p-value 0.001 respectively. Table No 3.

Patient of PRP group showed better outcome for surgical site swelling as compared to control group p-value 0.001. Table No 4.

**Table No 1. Patient’s distribution according to age statistic n=96**

Study group	N. of cases	Age	p-value
		Mean±Std	
PRP	48	34.81±9.09 years	0.272
Control	48	32.70±9.54 years	

**Table 2: distribution according to soft tissue**

Gender	Study groups		Total	p-value
	PRP	Control		
Male	24	26	50	0.638
Female	24	22	46	
total	48	48	96	

<b>Table no 3. Patient's distribution according to soft tissue healing n=96</b>				
<b>Soft tissue Healing day 3</b>	<b>Study group</b>		<b>Total</b>	<b>p-value</b>
	<b>PRP</b>	<b>Control</b>		
very poor	2	20	22	0.001
Poor	13	24	37	
Good	31	4	35	
very good	2	0	2	
Total	48	48	96	
<b>Soft tissue Healing day 7</b>				
very poor	0	2	2	0.001
Poor	2	23	25	
Good	24	21	45	
very good	14	2	16	
Excellent	8	0	8	
Total	48	48	96	
<b>Soft tissue Healing Day 14</b>				
Poor	0	16	16	0.001
Good	8	22	30	
very good	14	10	24	
Excellent	26	0	26	
Total	48	48	96	

<b>Table no 4. Patient's distribution according to surgical site swelling by using a modification of Schultze-Mosgaun=96</b>					
<b>Day Three</b>	<b>group</b>		<b>Total</b>	<b>p-value</b>	
	<b>PRP</b>	<b>Control</b>			
1-25%	23	11	34	0.002	
26-50%	12	15	27		
51-75%	6	13	19		
76-100%	0	7	7		
>100%	7	2	9		
Total	48	48	96		
<b>Day Seven</b>					
1-25%	2	0	2	0.001	
26-50%	39	17	56		
51-75%	5	22	27		
76-100%	0	2	2		
>100%	0	5	5		
1-25%	2	2	4	0.001	
Total	48	48	96		
<b>Day Fourteen</b>					
1-25%	12	0	12		0.001
26-50%	32	18	50		
51-75%	2	21	23		
76-100%	0	7	7		
>100%	2	0	2		
1-25%	0	2	2	0.001	
Total	48	48	96		

**DISCUSSION:**

In ascertaining quality of life after surgical extraction of teeth, fruitful and superior soft tissue healing is pleasing and significant. This will keep on attracting the concentration and priority of various clinicians and researchers. PRF is a platelet concentrate composed on a single fibrin membrane that contains all the constituents constructive for healing. This study aimed to evaluate the consequence of platelet rich plasma on soft tissue healing and inflammation after surgical extraction of teeth.

In this study mean age of PRP group was (34.81+9.09) years and control (32.70+9.54) years with insignificant difference. Near to similar age group was also reported by Hanif MA<sup>7</sup> in his study where he found mean age of 27.95 with a standard deviation of 6.05. In another study by Emeka V the age range of the patients were 19 to 42 years with a mean age of 26.7 years<sup>11</sup>.

In our study there were 24 patients in both groups with respect to gender where PRP was incorporated, while in control group males were 26 and females were 22 in number. On the other hand study of Hanif MA<sup>7</sup> showed out of 130 patients 52 were male (40.0%) and 78 were female (60.0%).

In this study soft tissue healing was assessed based on the criteria given by Landry ranging from very poor (score 1) to excellent (score 5). On 14th day assessment the PRP group showed 26 subjects out of 48 attained excellent soft tissue healing, while in control group none of the patient was in excellent healing score, while 14 patients of PRP group has very good score and 10 of control also had very good score. The study carried out by Srinivas B12 stated the mean soft tissue change assessment showed that significantly higher proportion of sites from PRF group at 7th postoperative day showed better healing index when compared to the sites from the non PRF group. The outcomes of the present research were in agreement with the results of the study performed by Moya- Villaescusa and Sanchez- Perez<sup>13</sup> which showed clinically when PRF when applied to fresh sockets of extraction stimulated soft tissue healing progression.

Surgical site swelling/inflammation was observed in this study according to Schultze-Mosgau criteria. In overall assessment there were promising results of PRP group in comparison to control group. This postoperative swelling was at peak on day 1 and then got steadily condensed in the following days when compared in percentage. Study carried out by Rutkowski JL<sup>5</sup> showed no significant difference in inflammation in both groups compared by paired t test. Hanif MA<sup>7</sup> stated that the mean percentage swelling was lower for the PRP group at all time points when compared with the control. However this difference was not statistically significant. These findings were also well supported by Simon D<sup>14,15,16</sup>

The results of the present information propose that topical application of autologous PRP gel may have an advantageous outcome on the

Healing and manage inflammation after surgical extractions. However, further researches and trials with increase subject participation in tertiary care setups are promptly required before its routine use in extraction socket can be defensible.

**CONCLUSION:**

It was well concluded that platelet rich plasma showed better outcomes in terms of soft tissue healing and control of inflammation after surgical extraction of mandibular molar teeth.

**ETHICS APPROVAL:** The ERC gave ethical review approval

**CONSENT TO PARTICIPATE:** written and verbal consent was taken from subjects and next of kin

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