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NON-SURGICAL MANAGEMENT OF GINGIVAL RECESSION BY PLATELET-RICH PLASMA

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Abstract:

Introduction: *The gum recession is one of the most important aesthetic problems of dental patients. Various methods have been used to treat gingival recession and to cover the exposed root. Most of these techniques are surgical. The use of platelet-rich plasma (PRP) to cover the exposed root is a new non-surgical technique.*

Aim: *The aim of the study was to evaluate the healing of soft tissues using platelet-rich plasma (PRP).*

Place and Duration: *The study is conducted in Dental Section of Allied Hospital, Faisalabad for duration of one year from February 2019 to January 2020.*

Methods: *Fifty patients were divided into two groups: Group 1 (Miller Class I) with 195 recession sites and Group 2 (Miller Class II) with 223 recession sites. Platelet-rich plasma was injected at the recession site three times for three months with an interval of one month between each injection. Thereafter, the Miller grading for each site was recorded at each visit.*

Results: *In Group 1 and after the three injections, only 6 sites remained as Miller Class I with a percentage reduction of 96.92% from Miller Class I to zero. In Group 2, only 28 sites became Miller Class zero and 90 sites remained unchanged as Miller Class II with 105 sites became Miller Class I.*

Conclusions: *Miller Grades I and II gingival recession could be treated non-surgically with platelets rich plasma. It is safe, cheaper, easy to prepare and apply without any complications.*

Key words: *PRP, gingival recession, platelets, plasma, non-surgical.*

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INTRODUCTION:

Gingival recession consists in exposing the root surface caused by apical migration of the gingival margin to the cement-o-enamel junction[1-2]. The recession can be localized or generalized. Various causes can be associated with gum recession, such as periodontal disease, aggressive and abnormal brushing, traumatic closure or dominant roots[3-4]. Gingival recession causes functional and aesthetic problems because it can increase the incidence of dentine hypersensitivity, root caries and loss of periodontal adhesion. The aesthetic problem associated with gingival recession is still a major problem for dental patients seeking treatment[5-6]. Surgical methods were used to cover the root and treat gingival recession, such as subepithelial connective tissue transplant, free gingival autograft, lateral lobe position change, double nipple flap, controlled tissue regeneration techniques, coronary flap placement and pinhole surgery[7-8]. In this article, we tried with a more conservative technique by injecting PRP. Platelet-rich plasma is a developing adaptive component of regenerative dentistry, providing a concentrated growth factor cocktail that facilitates healing. In 1998, Marx first reported the clinical uses and benefits of using PRP. He stated that "PRP is the volume of autologous plasma at which platelet concentration exceeds baseline." Platelet-rich plasma has many growth factors such as platelet-derived growth factor (PDGF), platelet-derived angiogenesis factor (PDAF), platelet-derived endothelial growth factor (PDECG), transforming growth factor beta (TGF-β), insulin-like to growth factor (IGF) and vascular endothelial growth factor (VEGF). Supra-physiological doses of growth factor concentration can be achieved by centrifugation from whole blood[9]. Platelet-derived growth factor is capable of modulating tissue healing. Previous studies have found that high levels of PDGF are found in PRP compared to whole blood. Some researchers have hypothesized that bone healing could be improved by the effects of PRP on cell differentiation and proliferation. A study published on the impact of PRP on the behavior of human gingival fibroblasts and periodontal ligaments suggests that PRP may induce strong soft tissue regeneration potential through a significant increase in proliferation, migration, release of growth factors and collagen synthesis[10]. The purpose of this study was to evaluate the improvement in soft tissue healing with PRP.

PATIENTS AND METHODS:

The study consisted of 50 intended (27 men and 23 women) who were healthier, non-smokers and sought treatment for gum recession, especially for aesthetic reasons. All participants were informed about the advantages and disadvantages of PRP and could withdraw at any time. Approval has been signed from all patients in respect of the contract to be registered in this clinical trial. The Ethics Committee of the Faculty of Dentistry approved the study. According to Miller's classification, the issues are divided into two groups. Group 1- Miller Class I (mucogingival intersections stretching into recession): 25 patients from 195 recession sites. Group 2- Miller Class II (recession that extends beyond the mucogingival junction with no periodontal attachment loss): 25 patients with 223 sites of recession.

Blood Collection and Preparation of PRP

Platelet-derived growth factor is capable of modulating tissue healing. Previous studies have found that high levels of PDGF are found in PRP compared to whole blood. Some researchers have hypothesized that bone healing can be improved by the effect of PRP on cell differentiation and proliferation. A study published on the effects of PRP on the behavior of human gingival fibroblasts and periodontal ligaments suggests that PRP may induce strong soft tissue regeneration potential through marked increases in proliferation, migration, growth factor release, and collagen synthesis. The purpose of this study was to evaluate the improvement in soft tissue healing with PR. Four ml of blood was collected in a glass tube with sodium citrate as an anticoagulant. Tubes were gently rocked back and forth eight times to introduce all blood with the anticoagulant. The tubes were placed in the centrifuge in a balanced position. Two turns were made to separate the PRP. The first centrifugation was performed for five minutes at 3000 rpm to separate red blood cells (RBC) from the rest of the whole blood. Using a micropipette, the entire upper part was pipetted and transferred to another regular tube without anticoagulant. The tube was then allowed to rest for 10 minutes, followed by a second centrifugation at 3500 rpm for 15 minutes. A second centrifugation was carried out to split white blood cells, a small number of residual erythrocytes and platelets from clear straw-yellow fluid. The top two-thirds of this fluid was discarded and discarded to leave a residual fluid. This residual fluid is PRP. Platelet-rich plasma injections were made at five points, 0.2 ml in each mesal and distal papillae, 0.1 ml in the attached gingiva, submucosa, and supraperitoneal in the mesothelium, cheek and buccal area. Platelet-rich plasma was injected with a 30G X1 / 2 single-use insulin needle at the recession site three times for three months with an interval of one month between each injection, and the Miller grade was recorded for each site at each visit.

RESULTS:

In Group 1 and after the first PRP injection, the total number of Miller class I sites was reduced from 195 to 145, and 50 sites became Miller class

zero, with a percentage decrease of 25.64% from Miller class I to zero. In the second PRP injection, the Miller I class was reduced to 100 places and the zero-class changed to 95, with a 48.72% drop from Miller I to zero. After the third PRP injection, only 6 sites remained in Miller Class I, while 189 sites were upgraded to class zero with a 96.92% reduction from Miller class I to zero (Tables 1 and 2).

Table 1 Descriptive statistics for Group 1 (Miller Class I)

Miller Class 1		**1st PRP**		**2nd PRP**		**3rd PRP**	
		CL I	CL Zero	CL I	CL Zero	CL I	CL Zero
No. of sites	195	145	50	100	95	6	189
Percentage	100%	74.36%	25.64%	51.28%	48.72%	3.08%	96.92%

Table 2 Percentage decrease from Miller Class I to zero in Group 1

1st Month	0.2564
2nd Month	0.4872
3rd Month	0.9692

In group 2 and after the first injection of PRP, the total number of Miller Grade II sites was reduced from 223 to 160, and 63 sites became Miller Grade I and the percentage drop decreased by 28.25% from Miller Grade II to Grade I. After the second injection PRP, Miller class II was reduced to 100 places and class I became 123 with a percentage decrease of 55.16% from Miller class II to class I. After the third injection of PRP, only 28 places changed to Miller Class zero and 90 places was left unchanged as Miller Class II and 105 facilities became Miller Class I with a percentage reduction of 59.64% from Miller Class II to Class I and 14.6% from Miller Class II to Class Zero (Tables 3 and 4).

Table 3 Descriptive statistics for Group 2 (Miller Class II)

Miller Class II		**1st PRP**		**2nd PRP**		**3rd PRP**		
		CL II	**CL I**	**CL II**	**CL I**	**CL II**	**CL I**	**CL Zero**
No. of sites	223	160	63	100	123	90	105	28
Percentage	1	71.75%	28.25%	44.84%	55.16%	40.36%	47.09%	12.56%

Table 4 Percentage decrease of Miller Classes in Group 2

1st PRP	From Miller Class II to Class I	28.25%
2nd PRP	From Miller Class II to Class I	55.16%
3rd PRP	From Miller Class II to Class I	59.64%
	From Miller Class II to Zero	14.60%

Using Chi-square, a significant difference was found in the change from class II to class I and class I to zero in two groups (Table 5).

Table 5 Chi-square for change in Miller's Classification in both Groups

	Start	**1st month**	**2nd month**	**3rd month**	**Total**
Miller Class II	223	160	100	90	573
Miller Class I	195	145	100	6	446
Total	418	305	200	96	
Chi-square	61.2362				
P-value	<0.001 HS**				
** Highly significant					

DISCUSSION:

In this study, the gum recess for Miller Class I and II showed the effect of non-surgical PRP treatment[9-10]. PRP " to promote stem cell replication to improve, promote endothelial cell replication, promote peri-enliven healing migration, and modulate the impact of other growth factors[11-12]. Therefore, soft tissue healing was

developed using PRP by significantly increasing collagen content, promoting angiogenesis and increasing the strength of the early wound[13]. The transition from Class II to Class I to zero may be due to an increase in soft tissue of the combined rubber, which is described by the proliferation of fibroblasts in many folds[14]. This is appropriate in many studies that have shown that PRP significantly increases cell migration of all cell types up to four times. In addition, PRP increased the proliferation of fibroblast cells in the gums for 3 and 5 days[15].

Conclusion

Platelet-rich plasma can be used to treat some cases of gingival recession instead of surgery. It is autologous in nature, is considered free of cross contamination, is less costly to the patient, is not associated with pain or postoperative complications, and is easy to prepare and apply.

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