

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Clinical Evaluation of Modified Widman Flap with or without Platelet Rich Fibrin for the Treatment of Periodontal Pockets.

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ABSTRACT

Modified Widman flap had been widely used to treat periodontal pockets with specific indications and different outcomes. Platelet Rich Fibrin contain many growth factors that play important roles in healing process in different parts of the body. To evaluate the effect of Platelet Rich Fibrin in combination with Modified Widman Flap in the treatment of periodontal pockets. Sixty patients, males and females, aged ranged (45-65) years old, with chronic periodontitis were involved in this study. All patients were subjected to evaluation of periodontal parameters (probing pocket depth, bleeding on probing), oral hygiene instructions, supra and subgingival scaling, and then root planning. After that they were divided into two groups, the control group (n=30) subjected to Modified Widman Flap only and the study group (n=30) were subjected to Modified Widman flap with Platelet Rich Fibrin. Platelet Rich Fibrin was taken from each patient in the study group. All patients were followed up for twelve months after operations. Measurement of probing pocket depth and bleeding on probing were done. The data were assessed and analyzed with SPSS 20. The results of this study show that the percentages of sites with probing pocket depth ≥ 5 mm decreased after Modified Widman flap with or without Platelet Rich Fibrin with highly significant differences between the two groups at ($p \leq 0.01$). Intragroup comparisons revealed highly significant differences after 12 months regarding bleeding on probing parameter but intergroup differences were not significant. The use of platelet-rich fibrin with open flap debridement significantly improves the clinical outcomes when compared to open flap surgery alone. The effects of Platelet Rich fibrin combined with Modified Widman flap on periodontal pockets are remarkable.

Keywords: Modified Widman Flap, Modified Widman Flap with Platelet Rich Fibrin, Platelet Rich Fibrin, periodontal pockets.

<https://doi.org/10.33887/rjpbcs/2019.10.4.15>

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INTRODUCTION

When the inflammation that present in the gingival extend into the bone(that anchor the teeth)bone resorption occur which lead to periodontal pocket formation which may lead (if not treated)to tooth mobility and eventually tooth loss⁽¹⁾ .

Flap can be defined as a piece of tissue that is partly severed from its original place for use in grafting and repair of defects ⁽²⁾. Flap had been used for three purposes .

1. Elemination of periodontal pockets ⁽³⁾.
2. To induce bone regeneration and reattachment in periodontal pockets ⁽⁴⁾.
3. To correct gingival defects and deficiencies ⁽³⁾⁽⁴⁾.

Widman used the reverse bevel scalloping type of gingival incision in 1916 as a modification of periodontal flap surgery introduced by ⁽⁵⁾⁽⁶⁾.

Modified Widman Flap (MWF) is used to provide maximum healing and reattachment of periodontal pockets with minimum loss of periodontal tissues during and after the surgery⁽⁷⁾.

Precise incisions, and untraumatic procedure are the main characteristics features of MWF, ⁽⁸⁾. Platelet-rich fibrin (PRF) or leucocyte- and platelet-rich fibrin (L-PRF) is a second-generation PRP where autologous platelets and leucocytes are present in a complex fibrin matrix ^{(9),(10)} to accelerate the healing of soft and hard tissue ⁽¹¹⁾.Platelet rich fibrin (PRF) was first described by Choukroun et al,2006 in France ⁽¹²⁾.it is defined as a second generation platelet concentrate to obtain fibrin membranes enriched with growth factors and platelets ⁽¹³⁾ This structure can be used as a vehicle for carrying cells that play important roles in tissue regeneration⁽¹¹⁾.Several growth factors, such as platelet-derived growth factor, transforming growth factor, insulin-like growth factor 1, and vascular endothelial growth factor are released from PRF ⁽¹⁰⁾.

MATERIALS AND METHODS

Sample Description: the study sample was consisted of sixty patients with age ranged from (45-65) years from both gender. Patients with chronic periodontitis who are systemically healthy and non-smoker were involved in this study. The participants recruited for the study were patients who attend Al-mammon specialized health center. All participants were informed about the aims of the study orally and by written as a written informed consent was assigned by all participants. All patients were subjected to questionnaire about their names, ages, medical history and smoking habits. For the measurement of probing pocket depth which was done for all teeth except the third molar, a scale was designed for ease of estimation:

Score 0: 1-3 mm

Score1: 4-5mm

Score 2: 6mm and greater

After that measurement of bleeding on probing was done according to ⁽¹⁴⁾, then initial periodontal therapy (instruction, motivation, scaling and root planning)were done .The participants were randomly divided into two groups. The first group, the control group, only Modified Widman flap was carried out and the study group in whom Platelet rich fibrin was used in combination with Modified Widman flap. During periodontal therapy in both groups, mucoperiosteal flaps were raised and inflammatory periodontal tissues were curetted. After that, complete debridement of the defects, with scaling and root planing were done.In the second group, human blood samples were taken from the participants were treated accordingly to PRF protocol centrifuge and collection kits . Blood samples were taken in 10ml plastic tubes without anticoagulant and centrifuged immediately at 3500 rpm for 15 minutes. Fibrin clot was formed in the middle part of the tube, while in the upper part, there was acellular plasma, and in the bottom part there were red corpuscles, then the fibrin clot was separated. The PRF clot was pressed into a thin membrane with sterile gauze.PRF were then applied into the defect and root surfaces. The flaps were repositioned to their original levels and sutured with an interrupted technique. After surgery, Systemic antibiotics were prescribed (Amoxicillin 500 mg for 3 days) and (Metronidazole, 500 mg for 3 days) with 0.12% Chlorhexidine mouth wash (twice a day). Sutures were removed after one week. All patients were followed after 12 months after operations , measurements of

probing pocket depth, bleeding on probing were assessed. Statistical analysis was done using Mean, Standard Deviation, Percentage, and Chi-square test.

RESULTS

The present study shows non-significant differences between the two groups regarding age parameter as shown in table(1).Regarding probing pocket depth scores,it was clearly shown that the numbers and percentages of sites with score 0increased after Modified Widman flap with or without platelet rich fibrin,while for the sites with score 1,they were increases in their numbers in control group while decreased in the study group.The numbers and percentages of sites with probing pocket depth \geq 6mm decreased in both groups after surgeries with highly significant differences between the two groups of the study.In table (5) and (6) there is a noticeable reduction in the numbers and percentages of bleeding sites after both surgeries as the numbers decreased from (1170) sites in the control group before surgery to (15)sites after Modified Widman flap only, while in the study group the numbers decreased from 1290 to 15 sites after Modified Widman flap with Platelet Rich Fibrin .There were non-significant differences between the two groups regarding bleeding on probing parameter.

The data were analyzed by using SPSS version 22 and excel 2010 with both descriptive and inferential statistics were used.

Table 1: Descriptive statistics of age parameter for the study and control groups.

Group	N	Mean	Std.Dev	t-test	P-value	Sig
M.W.F	30	54.63	6.8	1.64	0.1	Non-sig
MWF +PRF	30	57.6	7.18			

Table 2: Number and percentages of sites according to PPD for the control groups.

Group	Statistical analysis	PPD scores			Chi-square	df	P-value	Sig
		Score 0	Score 1	Score 2				
before	No.	0	510	810	1373.5	2	0.000	HS
	Percentages	0	38.6%	61.4%				
after	No.	630	660	30				
	Percentages	47.7%	50%	2.3%				

Table 3: Number and percentages of sites according to PPD for the study groups.

Group	Statistical analysis	PPD scores			Chi-square	df	P-value	Sig
		Score 0	Score 1	Score 2				
MWF +PRF	No.	135	540	825	1537.4	2	0.000	HS
	Percentages	9%	36%	55%				
before	No.	1060	435	5				
	Percentages	70.7%	29%	0.3%				

Table 4: Comparison between the groups of the study according to PPD scores

Group	Statistical analysis	PPD scores			Chi-square	df	P-value	Sig
		Score 0	Score1	Score2				
MWF	No.	630	660	30	162.7	2	0.000	HS
	Percentage	47.7%	50%	2.3%				
MWF+PRF	No.	1060	435	5				
	Percentage	70.7%	29%	0.3%				

Table 5: Number and percentages of sites according to BOP score for the control group.

Group	MWF	Statistical analysis	BOP scores		Chi-square	df	P-value	Sig
			Score 0	Score1				
before	No.	150	1170	2042.6	1	0.000	HS	
	Percentages	11.3%	88.7%					
after	No.	1305	15					
	Percentages	98.8%	1.2%					

Table 6: Number and percentages of sites according to BOP score for the study group.

Group	Statistical analysis	BOP scores		Chi-square	df	P-value	Sig
		Score 0	Score1				
before	No.	210	1290	2204.7	1	0.000	HS
	Percentages	14%	86%				
after	No.	1485	15				
	Percentages	99%	1%				

Table 7: Comparison between the groups of the study according to BOP scores

Group	Statistical analysis	BOP scores		Chi-square	df	P-value	Sig
		Score 0	Score1				
MWF	No.	1305	15	0.124	1	0.72	NS
	Percentages	98.8%	1.2%				
MWF+PRF	No.	1485	15				
	Percentages	99%	1%				

DISCUSSION

This study was planned to treat periodontal pockets using MWF alone or with PRF. After that the results of the study were assessed and compared. PRF has a well- defined three-dimensional structure ⁽¹³⁾ so it is easy to be prepared and used, inexpensive, and does not need any modifications.

The reduction in probing pocket depth could be attributed to that the main factors, such as fibroblast growth factor-basic, angiopoietin, and platelet-derived growth factor which are present in the fibrin gel are angiogenesis factors, also Fibronectin play an essential role for modulating the proliferation and migration of fibroblast cells in the wound. So PRF can thus guide epithelial cell migration and help in microvascularization and hence accelerate wound healing ⁽¹⁵⁾.

The results of this study were in agreement with ⁽¹³⁾ who found that after 12 months following PRF application that the bony defect was filled with bone-like dense tissue and radiographic density was clearly increased in furcation area and infrabony defects.

Our results disagree with ⁽¹⁶⁾ who showed that the quantity of growth factors that are involved in tissues regeneration of are eliminated by squeezing the PRF, and the compression also damage the platelets so PRF had an inferior result in periodontal regeneration. Overall, both groups of the study showed good results in reducing the pocket depths, but PRF membrane with MWF showed superior results compared to MWF alone. In addition, PRF can be used instead of connective tissue graft, which is although considered as the gold standard, is associated with increased operating time and significant patient discomfort⁽¹⁷⁾. These results specify that both surgeries are efficacious in correcting pocket depth, but PRF membrane showed better results with respect to the clinical parameters being used, namely PPD and BOP at the end of 12 months but on the same times PRF has many drawbacks such as its storage after the preparation is difficult, dehydration may occur if the membrane was not used immediately after preparation which lead to decrease in the contents of growth factors ⁽¹⁸⁾. Further studies had to be carried out with an increase in sample size and for a longer duration to further explore its roles as a membrane in the management of periodontal pockets.

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