



## **A clinical study to compare coronally advanced flap with platelet rich fibrin and connective tissue as graft for the treatment of gingival recession.**

1. Dr. Sophia Jeba Priya, Assistant Professor, Department of Oral Medicine and Radiology, Tamil Nadu Government Dental College and Hospital
2. Dr. Shabbir Ahamed M, Assistant Professor, Department of Periodontics, Tamil Nadu Government Dental College and Hospital
3. Dr. Muthukumaraswamy Arunachalam, Associate Professor, Department of Periodontics, Tamil Nadu Government Dental College and Hospital
4. Dr. Vimal Raj, Periodontist, Private Practitioner, Chennai
5. Dr. S. Sujatha, Senior Assistant Surgeon, Government Hospital, Perundurai, Erode District, Tamil Nadu
6. Dr. Vidhya Banu. P, Post Graduate, Department of Periodontics, Tamil Nadu Government Dental College and Hospital

### **ABSTRACT**

**Background:** There are various surgical procedures to cover gingival deficits, amongst which sub-epithelial connective tissue graft provide promising results and is considered as the gold standard procedure for the treatment of gingival recession. Though it provides promising results, the morbidity produced as a result of second surgical site must also be considered. Recently use of platelet rich fibrin (PRF), a rich source of growth factors have been proven to enhance periodontal regeneration.

**Objective:** This study is aimed to compare and evaluate the efficacy of coronally advanced flap (CAF) with platelet rich fibrin and coronally advanced flap with connective tissue graft (CTG) clinically in Miller's class I and class II gingival recession defects.

**Materials and Method:** In this study, a total of 20 subjects of age group between 20 - 40 years with Miller's class I and class II recession defects were randomly selected. 10 subjects received coronally advanced flap with PRF as graft and 10 subjects received coronally advanced flap with sub epithelial connective tissue graft (SCTG). Percentage of root coverage, recession depth, recession width, thickness of keratinized gingiva and plaque index were assessed in all patients at base line, 1 month, 3 months, 6 months and 12 months post operatively.

**Results:** Both the groups showed significant reduction in gingival recession between the base line and 12 months. There was a mean reduction in recession depth from baseline to 12 months ( $3.50\text{mm} \pm 0.71$  vs  $0.90 \pm 0.57\text{mm}$ ) in PRF group and ( $3.60 \pm 0.84$  mm vs  $0.80 \pm 0.79$  mm) in SCTG group. Reduction in

recession width from baseline to 12 months ( $3.50 \pm 0.71\text{mm}$  vs  $0.90 \pm 0.57\text{ mm}$ ) in PRF group and ( $3.60 \pm 0.84\text{ mm}$  vs  $0.80 \pm 0.79\text{ mm}$ ) in SCTG group. Increase in mean keratinized tissue width from ( $3.13 \pm 0.62\text{ mm}$  vs  $3.07 \pm 0.60\text{ mm}$ ) to ( $3.56 \pm 0.48\text{ mm}$ ,  $3.77 \pm 0.42\text{ mm}$ ) at 12 months in test and control group respectively. The mean percentage of root coverage is  $75.16 \pm 18.27$  and  $79.50 \pm 18.12$  at 12 months in PRF and SCTG group respectively. The post operative discomfort is significantly lower in PRF group when compared with SCTG in 2 weeks.

**Conclusion:** The coverage obtained by both (CAF + PRF) and (CAF + SCTG) are comparable. Thus, this study demonstrates that platelet rich fibrin can be effectively used as an alternate for connective tissue graft in recession coverage procedures thereby avoiding second surgical site and post operative pain.

**Key words:** Coronally advanced flap, Subepithelial connective graft, Platelet rich fibrin.

**INTRODUCTION:** Increasing esthetic concerns poses high demand for periodontal mucogingival procedures. Mucogingival surgeries like root coverage procedures are indicated in individuals with gingival recession to restore function and esthetics. Gingival recession occurs in the anteriors and posteriors, more commonly on the buccal surface than the lingual surface. Common causes for gingival recession include periodontal diseases, tooth brush injury, developmental anomalies (aberrant frenal attachment), malocclusion and iatrogenic factors.<sup>1</sup>

Gingival recession causes problems like root hypersensitivity and root caries. The goals of recession coverage include complete root coverage up to CEJ and blending of tissue color between the treated and non-treated adjacent tissues.<sup>2</sup> So the search for the perfect root coverage has taken many different approaches. The ideal technique must be predictable in producing aesthetic root coverage in a wide variety of clinical situations.

Numerous soft tissue augmentation procedures like free and pedicle graft with auto or allograft have been followed over the years for the treatment of gingival recession. Recently

guided tissue regeneration (GTR), and platelet rich concentrates have been employed in the treatment of mucogingival defects and to restore the gingival margins at the CEJ, and epithelial attachment with normal gingival sulcus.

There are various surgical procedures to cover gingival deficits, amongst which sub-epithelial connective tissue graft provides promising results and is considered as the gold standard procedure for the treatment of gingival recession<sup>3</sup>. A systematic review by Chambrone et al in 2008 says significant root coverage; increase in clinical attachment level and keratinized gingiva width can be obtained with sub-epithelial connective tissue graft. Though it provides promising results, the morbidity produced as a result of second surgical site must also be considered.

Proper understanding of healing and maturation of soft tissue have helped in obtaining predictable root coverage. Recently applications of growth factors have shown to enhance periodontal regeneration. Platelet rich fibrin (PRF) a second generation platelet concentrate, obtained from patient's own blood is known to potentiate the soft and hard tissue regeneration and maturation. PRF is rich in growth factors like Platelet-derived growth factors (PDGF), Insulin like growth factors(IGF), and Transforming growth factors- $\beta$  (TGF-  $\beta$ )<sup>4</sup>.

This study is aimed to compare and evaluate the efficacy of coronally advanced flap (CAF) with platelet rich fibrin and coronally advanced flap with connective tissue graft (CTG) clinically in Millers class I and class II gingival recession defects.

**AIM:** The aim of the study is to evaluate the clinical outcome of coronally advanced flap with Platelet Rich Fibrin and connective tissue as graft in the treatment of gingival recession.

**OBJECTIVES:** To obtain complete root coverage (CRC) for class I and class II gingival recession (**Miller**) with coronally advanced flap with PRF and coronally advanced flap with SCTG.

To compare and evaluate the amount of root coverage with PRF as a graft and CTG in conjunction with coronally advanced flap.

**MATERIALS AND METHODS:** Twenty subjects reporting to the outpatient department, Department of Periodontics, Tamil Nadu Government Dental College and Hospital, Chennai with esthetic concern and root sensitivity of anterior and posterior teeth due to gingival recession were chosen for the study.

**Subject selection:** Twenty subjects from the outpatient unit from the Department of Periodontics, Tamil Nadu Government Dental College & Hospital with Miller's class I & II gingival recession defects were selected for the study, and were randomly assigned into test and control groups.

**SAMPLE SIZE:**

**10 subjects** for CAF with PRF (test group)

**10 subjects** for CAF with CTG (control group)

**CRITERIA FOR SELECTION:**

**Inclusion criteria:**

1. Subjects conscious of oral hygiene and aesthetics, willing to undergo a minor surgical procedure for recession coverage

2. Subjects with in the age group of 20 and 40 years among both the gender
3. Systemically healthy individuals
4. Isolated recession in maxillary and mandibular teeth (Miller's I & II i.e, **MTR** marginal tissue recession not extending beyond the muco-gingival junction, intact interdental bone and papilla)
5. Periodontally healthy individuals
6. Thick biotype and adequate width of attached gingiva.

**Exclusion criteria:**

1. Acute and chronic local and systemic infections,
2. Poor oral hygiene,
3. Lactation and pregnancy,
4. Smoking and substance abuse,
5. Root caries and cervical abrasion,
6. Previous surgical attempt to correct gingival recession,
7. High frenal attachment,
8. Molar and premolar teeth with furcation involvement,
9. Medically compromised patients (uncontrolled diabetes mellitus, bleeding and coagulation disorders or current anti-coagulation treatment, psychiatric disorder).

**PREOPERATIVE ASSESSMENT:**

1. Thorough medical history and clinical examination of periodontal parameters like probing depth, clinical attachment level, recession depth & width and width of attached gingiva.

2. Clinical photograph.
3. Intraoral periapical radiograph (IOPA).
4. Total hemogram.

The clinical parameters evaluated before and after phase I periodontal therapy and 12 months post surgically included:

1. Plaque index
2. Probing pocket depth in mm (PPD)
3. Width of attached gingiva

***Plaque Index (Silness and Loe ) 1964***

All teeth were examined at 4 sites each (disto-facial, facial, mesio-facial lingual/palatal) and were scored as follows:

**Criteria for Scoring:**

**Score 0** No plaque

**Score 1** Plaque not visible to the naked eye, detected only by running the explorer or by using a disclosing agent.

**Score 2** Thin to moderate accumulation of soft deposits within the gingival pocket or on tooth and gingival margin, visible to the naked eye.

**Score 3** Abundance of soft matter within gingival pocket and/or on tooth surface and margin, inter-dental area stuffed with soft debris.

**Calculation:**

Plaque index per tooth = total score/4

Plaque index per individual = 
$$\frac{\text{Total PI per tooth}}{\text{Total number of teeth examined}}$$

**Interpretation:**        Score 0 - Excellent oral hygiene  
                                  0.1 to 0.9 - Good oral hygiene  
                                  1.0 to 1.9 - Fair oral hygiene  
                                  2.0 to 3.0 - Poor oral hygiene

***Stent Preparation:***

Acrylic occlusal stent was fabricated over the study models. Self cured pink acrylic was used for this purpose. The stent covered the occlusal and coronal 1/3rd of the labial and lingual surfaces of the teeth. It involved one tooth mesially and one distally to the study tooth. Vertical grooves were made to guide the placement of the probe in the same plane and direction during repeated measurements to avoid any variation. The recordings were made using a Williams's periodontal probe.

***Probing Pocket Depth (PPD) (in mm):*** Probing Pocket Depth was measured from the gingival margin to the base of the pocket in millimeters using William's Periodontal Probe. The probe was walked within the gingival sulcus along the circumference of the tooth. Keeping the probe parallel to the long axis of the selected tooth, measurements were made.

***PRE-SURGICAL EVALUATION:***

Subjects to be included in the study were selected according to the above defined criteria. All the selected subjects were given oral hygiene instructions and were subjected to phase I periodontal therapy. After 3-4 weeks of phase I therapy, re-evaluation of the clinical status was performed

and patients with acceptable oral hygiene ( $PI \leq 1$ ) were selected. After correlating with radiographic findings surgical procedure was planned. The subjects were randomly assigned into test group and control group.

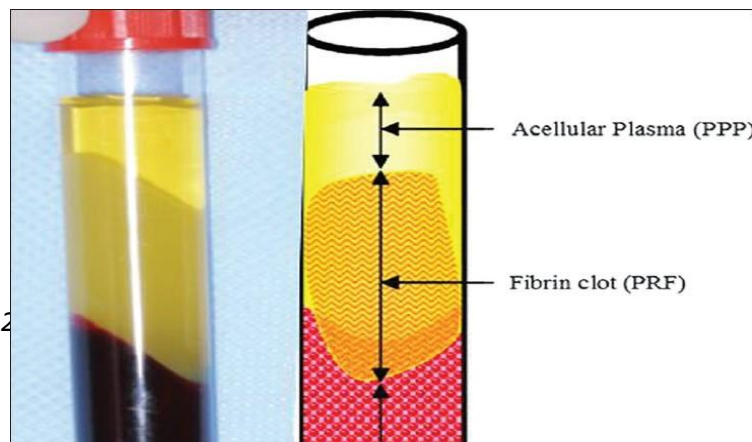
## **METHODOLOGY:**

**SURGICAL PROCEDURE:** Intra-oral antiseptis and extraoral antiseptis was performed with 0.2% chlorhexidine digluconate rinse and 5% povidone iodine solution respectively. The operative site was anaesthetized with 2% Lignocaine HCl with adrenaline (1:80,000) using infiltration technique.

**PREPARATION OF PLATELET RICH FIBRIN:** Just prior to surgery approximately 5-6 ml of intravenous blood was drawn from the cubital vein of the patient. Whole blood was collected in two 5-ml sterile glass tube without anticoagulant and immediately centrifuged at 3000 rpm for 10 minutes.

The blood centrifugation resulted in separation of blood into a structured fibrin clot in the middle of the tube, just between the red corpuscles at the bottom and acellular plasma (Platelet-poor plasma) at the top. After removal of PPP, PRF was easily separated from red corpuscles base [preserving a small red blood cell (RBC) layer] using sterile tweezers and scissors.

### **Parts of PRF as seen on a test tube after centrifuge**





**Test group:**

The operative site will be anaesthetized with 2% Lignocaine with adrenaline (1:80,000). A trapezoidal flap was designed using three incisions.

A no.15 blade was used to make a horizontal incision right angle at the level of CEJ in the mesial and distal papilla adjacent to the recession area. From the mesial line angle of the distal tooth and the distal line of the mesial tooth vertical incisions are made extending beyond the mucogingival junction, from the first made horizontal incisions. Sulcular incisions are made connecting the horizontal incision. A partial thickness flap was raised 3-4 mm above the bone and a full thickness flap was raised, which is then followed by a partial thickness flap enabling coronal displacement. Following root planing, the papillae were de-epithelialized to create a connective tissue bed.

The two fibrin clots prepared previously were placed in layers in opposite directions over the recession defect. The flap was repositioned with its margin located on enamel 2 to 3 mm above the cemento-enamel junction on the test site and held in position with suspensory sutures (catgut) around the contact point. Stabilization of clot will be achieved by gentle pressure for three minutes. The surgical site is then secured with non-eugenol pack (Coe-Pak).

**CONTROL GROUP:**

**CONNECTIVE TISSUE GRAFT HARVESTING:** The operative site will be anaesthetized with 2% Lignocaine with adrenaline (1:80,000).

Using trapdoor technique connective tissue graft will be harvested according to the requirement of the recipient site. The CTG was harvested, from the distal of canine to the mesial of the palatal root of 1<sup>st</sup> molar. The horizontal incision was made approximately 3-4 mm from the gingival margin. Vertical incisions were made on either sides of the horizontal incision. A partial thickness flap was dissected within the confines of the incisions. The incisions were deepened up to the bone and the CTG is separated from the underlying bone. The donor site was then compressed to achieve hemostasis and then sutured.

The harvested graft will be positioned over the recession defect just below the CEJ and stabilized with 5-0 resorbable suture, gingival flap repositioned with its margin located on enamel on the control site and held in position with horizontal suspensory suture around the contact point. Stabilization of clot will be achieved by gentle pressure for three minutes. The CTG is sutured around the neck of the tooth. The flap was repositioned with its margin located on enamel on the control site and held in position with suspensory sutures (catgut) around the contact point. Stabilization of clot will be achieved by gentle pressure for three minutes. The recipient and the donor sites were given non-eugenol pack (Coe-Pak) dressing.

#### **POST-SURGICAL PROTOCOL:**

All the subjects were given analgesics for 3 to 4 days and antibiotics for 5 days. Subjects were advised not to brush in the surgical site until suture removal (2 weeks). They are instructed to rinse their mouth with 0.12% chlorhexidine solution, 3 times a day for 1 minute for 3 weeks.

After 2 weeks, subjects were advised to do mechanical cleansing using a soft tooth brush. All patients were assessed at 1, 3, 6 and 12 months.

**PARAMETERS TO BE ASSESSED IN TEST AND CONTROL GROUP POST SURGICALLY:**

**1 Month:** Percentage of root coverage, recession depth & recession width.

**3 Months:** Percentage of root coverage, recession height, recession width, probing depth, and width of attached gingiva.

**6 Months:** Percentage of root coverage, recession depth, recession width, probing depth, and width of attached gingiva.

**12 Months:** Percentage of root coverage, recession depth, recession width, probing depth, width of attached gingiva.

## **RESULTS**

The study compared the use of coronally advanced flap with PRF and coronally advanced flap with connective tissue graft in the treatment of gingival recession. A total of 20 subjects within the age group of 20 and 40 years with Miller's class I and class II recession defects were randomly selected and assigned into test (PRF) and control (CTG) group.

Test group received coronally advanced flap with PRF as graft.

Control group received coronally advanced flap with subepithelial connective tissue graft (SCTG).

All patients showed good compliance and healing period was uneventful for both the groups, without any signs of infections and complications, indicating biocompatibility of both grafting modalities.

The observations and results of various parameters are summarized in the tables and figures.

### **CLINICAL PARAMETERS:**

#### **PLAQUE INDEX:**

The mean plaque score for the study group were  $0.62 \pm 0.08$ ,  $0.47 \pm 0.1$ ,  $0.43 \pm 0.07$  and  $0.46 \pm 0.08$  at the preoperative, 1 month, 3 months, 6 months and 12 months respectively. The corresponding scores for the control group were  $0.64 \pm 0.07$ ,  $0.44 \pm 0.09$ ,  $0.37 \pm 0.07$ ,  $0.37 \pm 0.09$  and  $0.34 \pm 0.06$

Between study and control group showed statistically significant difference in the plaque score at 3<sup>rd</sup> month ( $0.47 \pm 0.11$  vs  $0.37 \pm 0.07$ ) (p value 0.05) and at 12<sup>th</sup> month ( $0.46 \pm 0.08$  vs  $0.34 \pm 0.06$ ) p value  $\leq 0.002$ .

The intra group using Friedman test showed statistically significant difference in the plaque score from base line ( $0.62 \pm 0.08$ ) to 12 months ( $0.46 \pm 0.08$ ) in study and control group ( $0.64 \pm 0.07$  vs  $0.34 \pm 0.06$ ) with (P value  $\leq .003$ ) and  $\leq 0.001$  respectively.

### **RECESSION DEPTH**

The mean recession depth for the study group were  $3.50\pm 0.71\text{mm}$ ,  $0.30\pm 0.48\text{mm}$ ,  $0.50\pm 0.53\text{mm}$  and  $0.90\pm 0.57\text{mm}$  at baseline, 1month, 3month, 6month and 12 months respectively. The corresponding scores for the control group were  $3.60\pm 0.84\text{mm}$ ,  $0.20\pm 0.42\text{mm}$ ,  $0.40\pm 0.52\text{mm}$ ,  $0.80\pm 0.42\text{mm}$  and  $0.80\pm 0.79\text{mm}$ .

Between study and control group showed statistically no significant difference in the recession depth throughout 12 months of time.

The intra group comparison using Friedman test showed statistically significant difference in the mean recession depth score from baseline ( $3.50\pm 0.71\text{mm}$ ,  $3.60\pm 0.80\text{mm}$ ) to 12 months ( $0.90\pm 0.57\text{mm}$ ,  $0.80\pm 0.79\text{mm}$ ) in both study and control group with P-value of 0.001 and 0.001 respectively.

#### **RECESSION WIDTH:**

The mean recession width for the study group were  $2.92\pm 0.47\text{mm}$ ,  $0.60\pm 0.97\text{mm}$ ,  $1.08\pm 1.14\text{mm}$ ,  $1.67\pm 0.89\text{mm}$  and  $1.69\pm 0.593\text{mm}$  at the base line, 1 month, 3 months, 6 months and 12 months respectively. The corresponding scores for the control group were  $2.93\pm 0.37\text{mm}$ ,  $0.38\pm 0.80\text{mm}$ ,  $0.93\pm 1.23\text{mm}$ ,  $1.92\pm 0.70\text{mm}$  and  $1.23\pm 1.26\text{mm}$

Between study and control group showed no statistically significant difference in the recession width among the recession width from baseline to 12 months.

The intra group comparison using Friedman test showed statistically significant difference in mean recession with from base line ( $2.92\pm 0.47\text{mm}$ ,  $2.93\pm 0.37\text{mm}$ ) to 12 months ( $1.69\pm 0.93\text{mm}$ ,  $1.23\pm 0.37\text{mm}$ ) in both study and control group with p value of 0.001 and 0.001 respectively

#### **WIDTH OF ATTACHED GINGIVA:**

The mean width of attached gingiva for the study group were  $3.13 \pm 0.62$ mm, 0,  $2.80 \pm 0.42$ mm,  $3.50 \pm 0.55$ mm and  $3.56 \pm 0.48$ mm at base line, 1 month, 3 months, 6 months and 12 months respectively. The corresponding scores for the control group were  $3.07 \pm 0.60$ mm, 0,  $3.04 \pm 0.39$ mm,  $3.46 \pm 0.50$ mm, and  $3.77 \pm 0.42$ mm

Between study and control group showed no statistically significant difference in the width of attached gingiva from base line to 12<sup>th</sup> month. The intra group comparison using Friedman test showed statistically significant difference in the increase in mean with of attached gingiva score from base line ( $3.13 \pm 0.62$ mm,  $3.07 \pm 0.60$ mm) p value (0.001) to 12 months ( $3.56 \pm 0.48$ mm,  $3.77 \pm 0.42$ mm) p-value 0.001 in both study and control group respectively.

#### **PROBING DEPTH:**

The mean probing depth for the study group were  $1.60 \pm 0.52$ mm, 0,  $1.10 \pm 0.32$ mm, 1mm and 1mm at the preoperative, 1 month, 3 months, 6 months and 12 months respectively. The corresponding scores for the control group were  $1.70 \pm 0.48$ mm, 0,  $0.50 \pm 0.53$ mm,  $1.10 \pm 0.32$ mm and  $1.10 \pm 0.32$ mm

Between the study and control group comparison of probing depth at 3 months is statistically significant p-value (0.01) and not significant at 1, 6 and 12 months.

The intra group comparison of probing depth using Friedman test showed statistically significant difference in from base line ( $1.60 \pm 0.52$ mm,  $1.70 \pm 0.48$ mm) p-value  $\leq 0.001$  to 12 months (1mm,  $1.10 \pm 0.32$ mm) in both study control group with P-value 0.001 and 0.01

#### **PERCENTAGE OF ROOT COVERAGE:**

The mean percentage of root coverage for the study group were  $93.00 \pm 11.35$ ,  $87.17 \pm 13.90$ ,  $74.33 \pm 14.21$  and  $75.16 \pm 18.12$  at the baseline, 1 month, 3 months, 6 months and 12 months respectively. The corresponding scores for the control group were  $94.67 \pm 11.68$ ,  $90.17 \pm 13.21$ ,  $76.83 \pm 13.39$  and  $79.50 \pm 18.12$ .

Between the study and control group comparison of percentage of root coverage is statistically not significant from baseline to 12 months.

The intra group comparison of percentage of root coverage using Friedman test at 1 vs 3 months, 3 vs 6 months, 6 vs 12, months showed no statistical difference.

The intra group comparison of percentage of root coverage between 1 and months showed statistically significant difference in study group (p value- 0.02) and control group (p value- 0.04)

The intra group comparison of percentage of root coverage between 1 vs 6 months showed statistically significant result (p value- 0.02) in study group only and in significant difference in control group. The intra group comparison of percentage of root coverage between 1 vs 12 months showed statistically significant result (p value- 0.02) in study group and control group

Table1: **Plaque index**

s.no	plaque index (test)					plaque index (control)				
	preop	1 mon	3mon	6 mon	12 mon	preop	1 mon	3 mon	6 mon	12mon
1	0.69	0.47	0.58	0.48	0.35	0.55	0.48	0.33	0.43	0.34
2	0.74	0.55	0.57	0.41	0.39	0.59	0.47	0.36	0.44	0.44
3	0.57	0.57	0.35	0.52	0.47	0.63	0.35	0.35	0.42	0.33
4	0.61	0.48	0.39	0.46	0.37	0.64	0.39	0.36	0.48	0.25
5	0.68	0.35	0.57	0.28	0.48	0.71	0.44	0.43	0.46	0.28
6	0.51	0.3	0.29	0.43	0.59	0.66	0.33	0.34	0.33	0.42
7	0.53	0.48	0.51	0.44	0.55	0.69	0.48	0.24	0.34	0.33
8	0.52	0.35	0.38	0.51	0.47	0.72	0.55	0.51	0.28	0.28
9	0.64	0.57	0.42	0.39	0.51	0.68	0.56	0.32	0.22	0.33
10	0.68	0.53	0.59	0.42	0.39	0.53	0.33	0.43	0.27	0.35

**Table 2: Inter and intra group comparison of plaque levels at different time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
Pre-op	10	.62	.08	.64	.07	.47
1 month	10	.47	.10	.44	.09	.40
3 month	10	.47	.11	.37	.07	<b>.05</b>
6 month	10	.43	.07	.37	.09	.13
12 month	10	.46	.08	.34	.06	<b>.002</b>
p value**		<b>.003</b>		<b>.001</b>		

Mann Whitney U test, Friedman test

**Table 3: Inter and intra group comparison of recession depth levels at different**



**time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
Pre-op	10	3.50	.71	3.60	.84	.86
1 month	10	.30	.48	.20	.42	.61
3 month	10	.50	.53	.40	.52	.66
6 month	10	.90	.57	.80	.42	.69
12 month	10	.90	.57	.80	.79	.67
p value**		<b>.001</b>		<b>.001</b>		

Mann Whitney U test, Friedman test

**Table 4: Inter and intra group comparison of recession width levels at different time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
Pre-op	10	2.92	.47	2.93	.37	.79
1 month	10	.60	.97	.38	.80	.52
3 month	10	1.08	1.14	.93	1.23	.77
6 month	10	1.67	.89	1.92	.70	.36
12 month	10	1.69	.93	1.23	1.06	.55
p value**		<b>.001</b>		<b>.001</b>		

Mann Whitney U test, Friedman test

**Table 5: Inter and intra group comparison of width of keratinized gingiva at different time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
Pre-op	10	3.13	.62	3.07	.60	.72
1 month	10	.00	.00	.00	.00	1.00
3 month	10	2.80	.42	3.04	.39	.28
6 month	10	3.50	.55	3.46	.50	.74
12 month	10	3.56	.48	3.77	.42	.37
p value**		<b>.001</b>		<b>.001</b>		

Mann Whitney U test, Friedman test

**Table 6: Inter and intra group comparison of mean probing depth at different time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
Pre-op	10	1.60	.52	1.70	.48	.648
1 month	10	.00	.00	.00	.00	1.00
3 month	10	1.10	.32	.50	.53	<b>.01</b>
6 month	10	1.00	.00	1.10	.32	.317
12 month	10	1.00	.00	1.10	.32	.317
p value**		<b>.001</b>		<b>.001</b>		

Mann Whitney U test, Friedman test

**Table 7: Inter and intra group comparison of mean % of root coverage at different time points**

Time	n	Study group		Controls		p value*
		Mean	Std. Deviation	Mean	Std. Deviation	
1 month	10	93.00	11.35	94.67	11.68	.72
3 month	10	87.17	13.90	90.17	13.21	1.00
6 month	10	74.33	14.21	76.83	13.39	.28
12 month	10	75.16	18.27	79.50	18.12	.74
p value**		<b>.02</b>		<b>.03</b>		

Mann Whitney U test, Friedman test

**Table 8: Intra group comparison of mean % of root coverage at different time intervals.**

Time	study	control
	p value*	p value*
1 vs 3 month	.18	.18
3 vs 6 month	.06	.11
6 vs 12 month	.75	.47
1 vs 6 month	<b>.02</b>	.06
1 vs 12 month	<b>.02</b>	<b>.04</b>

Wilcoxon signed rank test

**DISCUSSION:** Gingival recession is one of the most common esthetic and functional concerns associated with periodontal tissues. Mucogingival therapy are aimed to regenerate and restore form, function and esthetics. Local anatomical factors like interdental bone level, thickness and width of attached gingiva, aberrant frenal attachment determines the outcome of root coverage.<sup>5</sup>

PRF is a platelet concentrate releasing various growth factors critical for wound healing process. In addition, they have shown superior esthetic outcomes when compared with SCTG in the case of Miller's class I and class II recession.<sup>6</sup> In the present study, total of twenty patients with Miller's class I and class II gingival recession in the age group of 20 to 40 years were selected in both the genders. Among these subjects, 10 subjects for PRF with CAF and ten subjects for CTG with CAF were randomly selected. The test groups were treated with PRF with CAF and the control groups were treated with CTG with CAF.

On evaluation of clinical parameters, mean recession depth showed similar clinical values in both control ( $3.60 \pm 0.84\text{mm}$ ) and test ( $3.50 \pm 0.71\text{mm}$ ) group at base line and at 12 months ( $0.80 \pm 0.79\text{mm}$  in control and  $0.90 \pm 0.57\text{mm}$  in test suggesting both the procedures are proving similar clinical outcomes for root coverage.

It has been stated that an increase in the width of attached tissue is a desired effect in decreasing the possibility of recurrence of gingival recession.<sup>7</sup> In the present study both the groups showed statistically significant difference in the increase in mean width of attached gingival score from base line ( $3.13 \pm 0.62\text{mm}$ ,  $3.07 \pm 0.60\text{mm}$ ) (p value 0.001) to 12 months ( $3.56 \pm 0.48\text{mm}$ ,  $3.77 \pm 0.42\text{mm}$ ) (p-value 0.001) in both study and control group respectively.

The results from the present study prove that CAF+ PRF and CAF+CTG can be successfully used in the treatment of Miller's Class I & II recession. Though percentage of root coverage attained in control group is higher, it is statistically not significant when compared with PRF group.

The placement of PRF over the root surface provides a scaffold for cell migration, proliferation and regulation of collagen synthesis in the extracellular matrix. The platelet clot releases various growth factors which aids in regeneration, angiogenesis and finally enhances in wound healing.<sup>8</sup> The PRF also shows good esthetic results in root coverage by increasing tissue thickness when used along with root coverage procedure. These properties of PRF could have played a significant role in contributing to achieve results comparable to CTG.<sup>9</sup>

Thus, concluding PRF under pedicle (CAF) graft could be used as an alternative to CTG and other autogenous grafts for the treatment of Millers class I & II gingival recession.

## **SUMMARY AND CONCLUSION**

The aim of the study is to compare and evaluate the clinical efficacy of coronally advanced flap with platelet rich fibrin and coronally advanced flap with connective tissue graft in the treatment of Miller's class I and class II gingival recession defects.

In the present study, a total of 20 subjects within the age group of 20 and 40 years with Miller's class I and class II recession defects were randomly selected from the outpatient Department of Periodontics, Tamil Nadu Government Dental College & Hospital, Chennai.

Informed consent was obtained from the patients, and they were randomly assigned into test (PRF) and control (CTG) group. Test group received coronally advanced flap with PRF as graft and the control group received coronally advanced flap with subepithelial connective tissue graft (SCTG).<sup>10</sup> The percentage of root coverage, recession depth, recession width, thickness of keratinized gingiva, and Plaque index were assessed in all the subjects at base line, 1 month, 3 months, 6 month and 12 months post operatively.

Both the groups showed an improvement in all the clinical parameters as discussed in the results. A statistically significant improvement in recession depth, recession width, width of keratinized gingiva, percentage of root coverage, and plaque index were observed in both the groups when compared between the base line and 12 months postoperatively.

Though the control group (CTG) showed greater improvement than that of test group (PRF), there was no statistically significant difference among both the groups.

The reason for superior result among the test and control group could be due to dual blood supply in the recipient bed from the periosteum underneath and the over lying flap. In addition, PRF ability to release growth factors, hemostasis, angiogenesis, chemotaxis, act as a collagen scaffold which aids to augment tissue thickness.<sup>11</sup> The release of growth factors by PRF enhances wound healing and regeneration when used with root coverage procedures. The post operative discomfort is very less for the reason, it requires only a prick of a needle to procure the graft whereas, the CTG group requires a second surgical site to harvest the graft tissue.<sup>12</sup>

The following conclusions were drawn within the limitations of this study:

1. Platelet rich fibrin group showed significant improvement in recession depth, recession width, probing depth, width of keratinized gingiva and root coverage in Miller's Class I & class II gingival recession defects post operatively.
2. Greater root coverage was attained with CTG than PRF but this difference is statistically insignificant.
3. The PRF group showed comparable clinical outcomes with connective tissue graft in the treatment of Miller's class I & II recession defects.

Thus, this study demonstrates that platelet rich fibrin can be effectively used as an alternative for connective tissue graft, thereby avoiding a second surgical site and post operative pain.

Although the use of platelet rich fibrin may be an effective and less invasive modality for the treatment of Miller's class I & II gingival recession defects, long term clinical and histological studies have to be performed to validate the effectiveness of this technique.

#### **LIST OF ABBREVIATIONS**

CAF	Coronally advanced flap
CAL	Clinical attachment level
CEJ	Cemento-enamel junction
CTG	Connective tissue graft
CTR	Complete root coverage
HCl	Hydrochloride
IGF	Insulin-like growth factors
mm	Millimeter
MGJ	Mucogingival index
MTR	Marginal tissue recession.
PDGF	Platelet-derived growth factor

PPP	Platelet poor plasma
PI	Plaque Index
PPD	Probing pocket depth
PRF	Platelet rich fibrin
RBC	Red blood corpuscles
rpm	Revolutions per minute
SCTG	Subepithelial connective graft
SD	Standard deviation
TGF- $\alpha$	Transforming growth factors- $\alpha$



Figure 1: Armamentarium

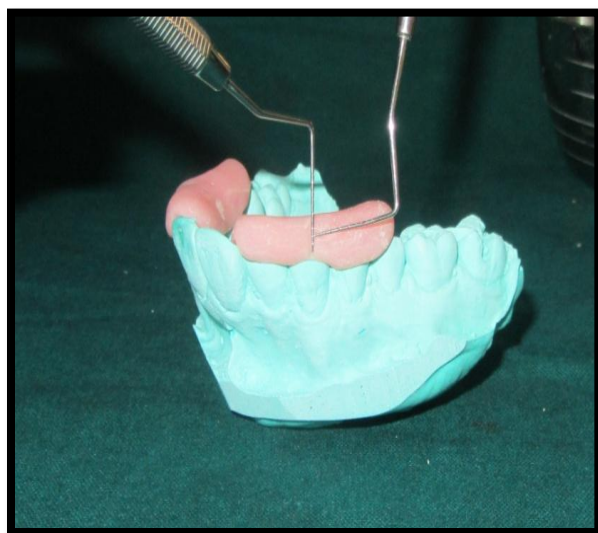


Figure 2: Stent fabrication



Figure 3: Centrifuge

**TEST GROUP(CAF+PRF)**



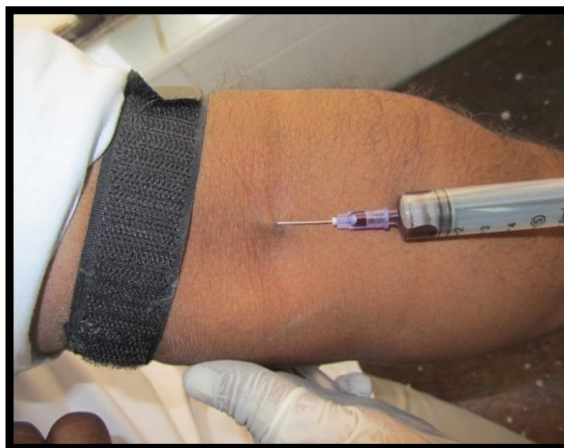
**Figure 4. Measurement of recession depth**



**Figure 5. Measurement of recession width**

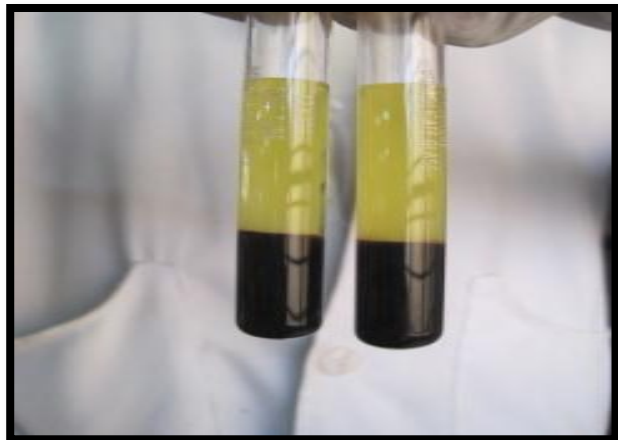


**Figure 6. Incision made at recipient site**



**Figure 7. blood withdrawn from cubital vein**





**Figure 8. PRF clot after centrifuging**



**Figure 9. PRF clot**



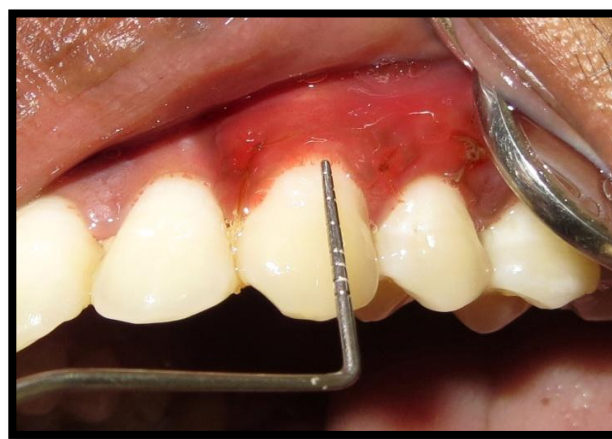
**Figure 10. Placement of PRF clot in the recipient bed**



**Figure 11. Placement of suspensory sutures**



**Figure 12. Periodontal dressing given**



**Figure 13. 15 Days post-operative view**



Figure 14. 1 month post - operative view



Figure 15. 3 months post-operative view



Figure 16. 6 months post- operative view



Figure 17. 12 months post-operative view

**CONTROL GROUP**



Figure 18. Measurement of recession depth site.



Figure 19. Incision placed in recipient site.



Figure 20. Removal of CTG from donor site by trap door technique

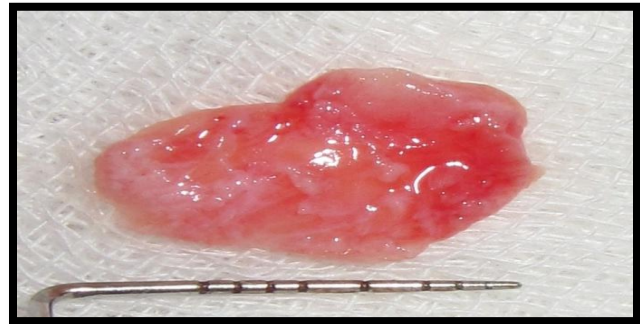


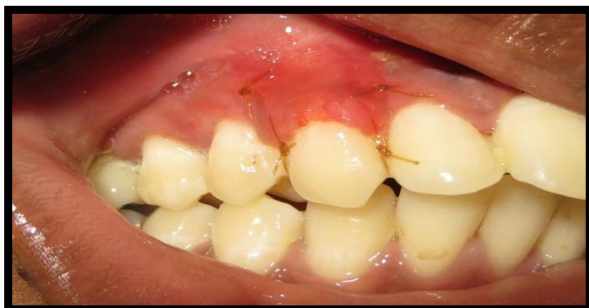
Figure 21: SCTG graft



Figure 22 : Graft sutured in recipient bed



Figure 23 : Suspensory sutures placed



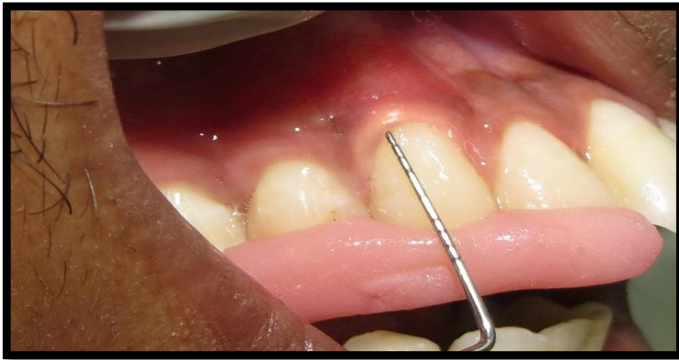
**Figure 24: 15 days post operative view**

**Figure 25:1 month post-operative view**



**Figure 26:3 months post-operative view**

**Figure 27: 6 months post-operative view**



**Figure 28:12 months post-operative view**

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