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Research Article

Evaluation of Effect of PRF on Rebound of Soft Tissue in Immediate Placement of Implants-A Randomized Control Study

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Abstract

Aims and objectives: To evaluate the effect of Platelet Rich Fibrin (PRF) on rebound of soft tissue in immediate placement of implants and revaluate at 3 months, 6months and 9months. Objectives of the study are to clinically evaluate the thickness of soft tissue, to evaluate the implant mobility and to evaluate peri implant radiolucency.

Methodology: 11 patients from the Department of Periodontics at the Government Dental College and Hospital in Hyderabad participated in the current clinical study in order to receive implants right away. The MYRIAD IMPLANT SYSTEM was the implant system utilised for this study. The application of PRF around the immediate implant led to the division of the subjects into Group I and Group II. The study was conducted for 9 months after receiving approval from the institutional ethical committee. Every patient had their case history filled out in-depth on a unique proforma. Patient was called back three, six, and nine months after the implant was placed for clinical and radiographic evaluation. Later descriptive statistical analysis had been done.

Results: Group I (PRF): The WKS at baseline was 4.03 ± 0.16 and increased to 4.05 ± 0.18 after three months, 4.08 ± 0.13 after six months, and 4.17 ± 0.10 after nine months. The WKS in Group II (without PRF) was 4.02 ± 0.16 at baseline, 4.00 ± 0.11 at three months, 4.07 ± 0.12 at six months, and 4.08 ± 0.10 at nine months. In this study, all 12 implants that were placed right away demonstrated good stability, no implant mobility, and no peri-apical radiolucency during the nine-month postoperative follow-up period.

Conclusion: The width of the keratinized soft tissue increased when compared to the control group. In the group without PRF, the width of keratinized soft tissue did not increase. When compared to Group II, Group I (PRF) showed a statistically significant increase in the width of keratinized soft tissue (without PRF). The study's findings show that Group I (PRF) soft tissue has thicker tissue than Group II, a difference that is statistically significant (without PRF).

Keywords: PRF; Soft Tissue; Placement; Implants

Introduction

The replacement of missing teeth, which are remarkably similar to natural teeth, is the patients' main concern. Due to their enhanced aesthetic appearance, comfort and speech, durability, and self-esteem, dental implants have signalled a significant advancement in the current situation that has provided a strong foundation for tooth replacement.

The implant placement can be classified depending on the time of placement of the implants after extraction as follows

- Immediate placement (immediately after extraction)
- Early placement (6-10 weeks)
- Delayed (6 months)

Since implant dentistry has gained widespread acceptance, placement protocols have developed to allow for a range of implant placement timings, including late (in fully healed sites), delayed, and finally immediate placement after extraction. Actually, the purpose of these procedures was to better satisfy patient expectations [1].

An immediate implant is a fixture that is placed during the same procedure as the tooth it replaces. Schulte., *et al*. first described this method for osseointegrated implants [2].

Immediate implantation has made it possible to achieve more effective results more quickly. By reducing crestal bone loss, the immediate placement of an implant not only delays the collapse of the socket but also improves the aesthetics of the surrounding soft tissue. They can unquestionably be very effective if used right away after the removal of the root stumps. Dental implants' clinical success is dependent on bone cell and implant surface responses that encourage quick osseointegration and long-term stability.

Since patients have high expectations for aesthetics and potential aesthetic complications can be disastrous, implant placement in a post-extraction site in the aesthetic zone is challenging for clinicians.

The timing of implant placement is essential because it affects the results of aesthetic treatment and the likelihood of complications. In comparison to other methods, immediate placement necessitates fewer surgeries, which reduces time and morbidity while also lessening the financial burden on the patient.

The occlusal portion of the implant will typically leave a gap between the bone walls and the fresh alveolus where it is placed. This is referred to as "jumping space." Synthetic bone substitutes, membranes, bone grafting, osteoinductive substances, or a combination of these have all been used to ensure that the entire implant osseointegrates. With immediate implantation, autogenous bone and a variety of xenogenic graft materials have been used, and many of them have produced positive results. But none of them has been demonstrated to be better than the others [3].

Dental implants have been found to be affected by a number of factors, both positively and negatively. While some factors affect long-term survival, others affect osseointegration. One of the elements affecting the stability of marginal bone levels is the function of the peri-implant mucosa [4].

According to the 2017 Workshop, periodontal biotypes have recently been renamed as gingival phenotypes. They are an important factor in treatment planning for dental implants, especially in locations where immediate post-extraction implant placement is intended.

Seibert and Lindhe introduced the term "periodontal biotype" to classify gingiva as "thick-flat" or "thin-scalloped." Thin gingival biotypes are more prone to gingival or periodontal diseases. Thick-flat tissue biotype was also important for aesthetic implant restorations. In immediate single-tooth-implant restorations, patients with "thin-scalloped" mucosa had more tissue recession than those with "thick-flat" mucosa. These observations suggested tissue biotype may affect esthetic-treatment outcomes [5].

Softtissue thickness was measured many ways. Direct measurements, probe transparency, ultrasonic devices. Directly measuring soft tissue thickness with a periodontal probe. Soft tissue > 1.5 mm thick was a thick biotype. Soft tissue biotype 1.5 was thin. This method of measurement has several limitations, including the probe's 0.5 mm precision, its angulation during trans-gingival probing, and tissue distortion during probing. In TRAN, the gingival biotype was thin when the periodontal probe outline showed through the soft tissue margin from inside the sulcus. If the probe didn't penetrate the soft tissue margin, the biotype was thick. Muller., *et al.* used a non-invasive ultrasonic device to measure soft tissue thickness, but it was difficult to determine the correct position and get reproducible results [6].

Height and width of buccal plate, tissue manipulation, surgical procedure, implant microstructure and macrostructure, angulation, diameter, type, shape, implant position, and PRF placement can affect soft tissue thickness. Postoperative soft tissue thickness depends on regenerative materials and growth factors. PRF is frequently used for bone regeneration, which can affect soft tissue thickness. Many studies link PRF to implant success and soft tissue thickness.

Joseph Choukroun discovered the importance of PRF in tissue regeneration. PRF is a second-generation platelet concentrate obtained by centrifuging blood that accelerates soft and hard tissue healing [7].

In 2001, Dohan., *et al*. defined it as activating the vascular system and angiogenesis and releasing growth factors involved in soft and hard tissue healing. Activated platelets release growth factors (Bone morphogenetic proteins, Platelet-derived growth factor [PDGF], Insulin like growth factor, Vascular endothelial growth factor, Transforming growth factor-1 [TGF-1], and Transforming growth factor (TGF-2)) that attract undifferentiated mesenchymal cells to the injured site [8].

PRF is centrifuged once without anticoagulant. PRF gradually released autologous growth factors, resulting in a stronger and more durable effect on rat osteoblast proliferation and differentiation than PRP *in vitro* [9].

This study aims to determine the effect of PRF on soft tissue rebound following immediate implant placement and to reevaluate at 3, 6, and 9 months. The study's objectives are as follows

- To clinically assess the thickness of soft tissue.
- To evaluate the mobility of the implant
- To evaluate the peri implant radiolucency.

Methodology

Eleven patients undergoing immediate implant placement at the Department of Periodontics, Government Dental College and Hospital, Hyderabad, participated in the present clinical study. The following are the inclusion and exclusion criteria for the included subjects

Inclusion criteria are as follows

- Age 18 to 50 yrs
- Good systemic and periodontal health
- Single rooted maxillary teeth

Exclusion criteria are as follows

- All medical conditions that adversely affect implant surgery
- Implant site with acute infections (abscess, periodontitis)
- Poor oral hygiene
- Patients with poor compliance
- Close proximity to anatomical structures

Armamentarium used for implant placement

- Front surface mouth mirror
- Periodontal probe UNC- 15
- Explorer
- Cotton pliers
- Disposable 2 cc syringes
- Local anesthetic solution
- Topical anesthetic spray
- Sterile cotton
- Normal saline
- BP handle
- No. 15 surgical blade
- Periosteal elevator
- Periotome
- Extraction forceps
- Myriad implant kit
- Physiodispenser
- Myriad implant
- Needle holder
- Scissors
- Ethicon suture material

Armanentarium for PRF preparation

- 5ml syringe
- Sterile cotton with spirit
- Tourniquet
- PRF collection tube
- Centrifuge
- Dapen dish
- Tweezer

Study design

Myriad implant system was the implant system utilised in this study. Eleven patients, both male and female, meeting the aforementioned criteria were selected for the study. The subjects were divided into two groups based on the application of PRF around the immediate implant: Group I and Group II.

- Group I- Immediate implant placement with PRF
- Group II- Immediate implant placement without PRF.

All patients were given a thorough explanation of the procedure in their native language before obtaining their written consent. The study was approved by the institution's ethics committee and conducted over a nine-month period. Every patient's case history was recorded on a specially designed proforma.

Preoperative procedure

A detailed medical and personal history, Clinical photographs and Peri-apical radiographs were taken. Later, upper and lower alginate impressions were managed to obtain, and study models

were fabricated.

Measurement of Soft Tissue Thickness – Following the administration of local anaesthesia at the implant site, the tissue thickness was measured with a measuring gauge. The tissue thickness was measured at the midpoint of the buccal surface.

At baseline, periodontal assessment was performed using various parameters, including modified Plaque Index, modified Bleeding Index, Width of Keratinized Soft tissue, and Thickness of Soft tissue.

Width of Keratinized Soft Tissue (WKS): The University of North Carolina Probe (UNC-15) was utilised to measure the width of keratinized mucosa as the distance from the gingival margin to the mucogingival junction, inclusive of both marginal and attached gingiva. The thickness of soft tissue (TS) was measured using a measuring gauge marked in millimetres. The biotype of > 2mm was classified as thick, while the biotype of 2mm was classified as thin. Mobility of the implant was measured using the Dichotomas Index. Intraoral peri apical radiographs were taken to rule out the presence of any peri apical pathology (abscess, cyst).

Preparing platelet-rich fibrin (PRF)

Under aseptic conditions, approximately 5 ml of the patients' whole venous blood was collected in a sterile vacutainer tube with a 6-ml capacity and no anticoagulant. The vacutainer tube was then centrifuged for 10 minutes at 3000 revolutions per minute (rpm) in a centrifugal machine. The fibrin clot-containing middle fraction was collected 2 mm below the lower dividing line to obtain the PRF.

Surgical procedure

Under local anaesthesia consisting of 2 percent lignocaine with adrenaline, the extraction was performed without causing any trauma. The socket was then thoroughly irrigated with Povidine-Iodine and degranulated with curettes. With a UNC- 15 probe, the length and width of the extracted roots were measured.

The osteotomy site was drilled using the socket walls as guides, beginning with a two-millimeter pilot drill. Drilling was performed sequentially with bit sizes of 2.2, 2.8, 3.2, 3.65, 4.3, and 5 mm at speeds ranging from 500 to 1200 rpm. The drill was then extended 3 to 4 millimetres past the socket's apex to ensure primary stability, taking into account anatomical boundaries. Implants were placed in the osteotomy site and primary stability was ensured prior to the placement of PRF in the jumping space in six patients.

The second surgical procedure was performed three months after the initial operation. All radiographic and clinical parameters were recorded. After making a crestal incision and exposing the implant, the cover screw was removed and a healing cap was placed for one week. A metal-ceramic crown was fabricated and cemented with GIC cement one week after the placement of the abutment and impressions. At six and nine months after implant placement, all patients were recalled and clinical measurements were recorded.

After implant placement, the patient was evaluated clinically and radiographically at 3 months, 6 months, and 9 months.

Listed below are the clinical parameters

- mPI was obtained from the implant's mesial, distal, buccal, and lingual-palatal surfaces.
- WKG was measured as the distance between the gingival margin and the mucogingival junction, which included both marginal and attached gingiva at mid buccal aspects.
- TS was measured using a measuring instrument.
- Implant mobility evaluation

In the present study, descriptive statistical analysis was employed.

Results

In the present study, immediate implant placement was done in a total of 11 patients, who had attended Government dental college and hospital to undergo surgical extraction of teeth, immediate placement of implants was done to replace the extracted teeth, in accordance with the protocol of the study, the offending tooth was extracted atraumatically and meticulously. The site of extraction was immediately treated by inserting a newly designed macro implant along with the Platelet rich fibrin (PRF) obtained from the same patient. Out of the 12 implants, all were successful hence overall success rate of implants in this study was 100%, with good stability and osseointegration.

11 patients between the ages of 18 and 50 comprised the total sample size of the study. As shown in table 1, patients were distributed with a ten-year age interval and it depicts 5 patients (41.7%) belong to 21-30 years age, 4 patients (33.3%) belong to 31-40 years age group and 3 patients (25%) fall in 41-50 years age group.

In the present study, among 11 patients, 4 males and 7 females were included as shown in table 1. All cases were evaluated for the following clinical and radiographic parameters at baseline, 3 months, 6 months, and 9 months.

Category		No. of patients	%
Age (years)	18-30	5	41.7
	31-40	4	33.3
	41-50	3	25.0
	Total	12	100.0
Gender	Male	5	41.7
	Female	7	58.3
	Total	12	100.0

Table 1: Age and gender distribution of the study design.

Width of keratinized soft tissue

- Group I (PRF): The WKS at baseline was 4.03 ± 0.16 and at 3 months raised to 4.05 ± 0.18, at 6 months raised to 4.08 ± 0.13 and at 9 months raised to 4.17 ± 0.10 as shown in table 2
- Group II (without PRF): The WKS at baseline was 4.02 ± 0.16, at 3 months decreased to 4.00 ± 0.11, at 6 months increased 4.07 ± 0.12, at 9 months raised to 4.08 ± 0.10 as shown in table 2.

Group I (PRF)				Group II (without PRF)		
FOLLOWUP	MEAN	SD	P VALUE	MEAN	SD	P VALUE
BASELINE	4.03	0.16	0.421	4.02	0.16	0.617
3 MONTHS	4.05	0.18	NS	4.00	0.11	NS
6 MONTHS	4.08	0.13		4.07	0.12	
9 MONTHS	4.17	0.10		4.08	0.10	

Table 2: Mean comparison among in Width of Keratinized Soft tissue and gingival in (mm) in Group I (PRF) and Group II in BASELINE, 3 months, 6 months and 9 months follow-ups.

Statistical analysis: ANOVA one way test. Statistically significant if P < 0.05.

- Group I (PRF): The mean difference of the WKS at baseline and that of 3 months was obtained as 0.02 ± 0.02 whereas with that of 6 months and 9 months was 0.05 ± 0.03 and 0.14 ± 0.06. The mean differences of WKS at 3months and that of 6months and 9 months was obtained as 0.03 ± 0.05, 0.12 ± 0.08 which was statistically significant. The mean difference of WKS at 6months and 9 months was obtained as 0.09 ± 0.03 which was statistically significant, as shown in table 3.
- Group II (without PRF): The mean differences of the WKS at baseline and that of 3 months was obtained as 0.02 ± 0.05 which was not statistically significant, whereas with that of 6 months and 9 months was 0.05 ± 0.04 and 0.06 ± 0.06 respectively, which did not show statistically significant difference. The mean differences of WKS at 3months and that of 6months and 9 months was obtained as 0.07 ± 0.01 and 0.08 ± 0.01 respectively, which was statistically insignificant. The mean difference of WKS at 6months and 9 months was obtained as 0.01 ± 0.02 which did not show statistically significant difference, as shown in table 3.

The mean comparison of WKG in Group I (PRF) and Group II (without PRF) at baseline 0.01 ± 0.00, 3 months is 0.05 ± 0.07, at 6 months is 0.01 ± 0.01 and at 9 months is 0.09 ± 0.00 as shown in table 4.

Thickness of soft tissue

- **Group I (PRF):** The TS at baseline was 1.92 ± 0.41 which at 3 months decreased to 1.78 ± 0.44 and increased to 2.02 ± 0.38 and 2.28+ ± 0.38 at 6 months and 9 months respectively as shown in table 5.
- **Group I (PRF):** The mean differences of the TS at baseline and that of 3 months was obtained as 0.14 ± 0.03 whereas with that of 6 months and 9 months was 0.10 ± 0.03 and 0.36 ± 0.05 respectively which is statistically significant. The mean differences of TS at 3months and that of 6months and 9 months was obtained as 0.24 ± 0.06 and and 0.50 ± 0.08 respectively which is statistically significant. The mean difference of TS at 6months and 9 months was obtained as 0.26 ± 0.02 which is statistically significant as shown in table 6.
- **Group II (without PRF):** The TS at baseline was 1.75 ± 0.36 which at 3 months decreased to 1.63 ± 0.35 and increased to 1.68 ± 0.34 and 1.78 ± 0.34 at 6 months and 9 months respec-

Group I (PRF)						Group II (without PRF)				
Follow up	Mean	SD	Difference MEAN ± SD	% of change	P value	Mean	SD	Difference Mean ± SD	% of change	P value
Baseline	4.03	0.16	0.02 ± 0.02	0.50	0.363 NS 4.00	4.02	0.16	0.02 ± 0.05	-0.50	0.611 NS
3 Months	4.05	0.18				0.11				
Baseline	4.03	0.16	0.05 ± 0.03	1.24	0.076 NS 4.07	4.02	0.16	0.05 ± 0.04	1.24	0.076 NS
6 Months	4.08	0.13				0.12				
Baseline	4.03	0.16	0.14 ± 0.06	3.47	0.010 S 4.08	4.02	0.16	0.06 ± 0.06	1.49	0.175 NS
9 Months	4.17	0.10				0.10				
3 Months	4.05	0.18	0.03 ± 0.05	0.74	0.175 NS 4.07	4.00	0.11	0.07 ± 0.01	1.75	0.025 S
6 Months	4.08	0.13				0.12				
3 Months	4.05	0.18	0.12 ± 0.08	2.96	0.034 S 4.08	4.00	0.11	0.08 ± 0.01	2.00	0.042 S
9 Months	4.17	0.10				0.10				
6 Months	4.08	0.13	0.09 ± 0.03	2.21	0.042 S 4.08	4.07	0.12	0.01 ± 0.02	0.25	0.611NS
9 Months	4.17	0.10				0.10				

Table 3: Mean comparison in Width of Keratinized Gingiva in (mm) in Group I (PRF) and Group II between follow-ups.

Statistical analysis: Paired t test. Statistically significant if P < 0.05.

Follow up	PRF Status	Mean	SD	Difference Mean ± SD	P value
Baseline	With PRF	4.03	0.16	0.01 ± 0.00	0.862
	Without PRF	4.02	0.16		NS
3 Months	With PRF	4.05	0.18	0.05 ± 0.07	0.568
	Without PRF	4.00	0.11		NS
6 Months	With PRF	4.08	0.13	0.01 ± 0.01	0.825
	Without PRF	4.07	0.12		NS
9 Months	With PRF	4.17	0.10	0.09 ± 0.00	0.183
	Without PRF	4.08	0.10		NS

Table 4: Mean comparison in Width of Keratinized Soft tissue in (mm) Group I (PRF) and Group II (without PRF) between follow-ups

Statistical analysis: Independent sample t test. Statistically significant if P < 0.05.

Group I (PRF)			Group ii (without PRF)			
Follow up	Mean	Sd	P value	Mean	Sd	P value
Baseline	1.92	0.41	0.205	1.75	0.36	0.617
3 Months	1.78	0.44	Ns	1.63	0.35	Ns
6 Months	2.02	0.38		1.68	0.34	
9 Months	2.28	0.36		1.78	0.34	

Table 5: Mean comparison in Thickness of Soft tissue in Group I (PRF) baseline,3 months, 6 months and 9 months follow-ups.

Statistical analysis: ANOVA one way test. Statistically significant if P < 0.05.

tively as shown in table 5.

- **Group II (without PRF):** The mean difference of TS at baseline and that of 3 months was obtained as 0.12 ± 0.01 which was not statistically significant, whereas with that of 6 months and 9 months was 0.07 ± 0.02 and 0.03 ± 0.02 respectively, which did not show statistically significant difference. The mean difference of TS at 3months and that of 6months and 9 months was obtained as 0.05 ± 0.01 and 0.15 ± 0.01 respectively. The mean difference of TS at 6months and 9 months was obtained as 0.10 ± 0.00 which is statistically significant, as shown in table 6.

The mean comparison of TS in Group I (with PRF) and Group II (without PRF) at baseline 0.017 ± 0.05, 3 months is 0.15 ± 0.09, at 6 months is 0.34 ± 0.04 and at 9 months is 0.50 ± 0.02 as shown in table 7.

Implant mobility

In this study, all 12 immediately placed implants, have shown good stability and without any implant mobility in post operative

Group I (PRF)						Group II (without PRF)				
Follow up	**Mean**	**SD**	**Difference Mean ± SD**	**% of change**	**P value**	**Mean**	**SD**	**Difference Mean ± SD**	**% of change**	**P value**
Baseline	1.92	0.41	0.14 ± 0.03	-7.29	0.010 S	1.75	0.36	0.12 ± 0.01	-6.86	0.013 S
3 Months	1.78	0.44				1.63	0.35			
Baseline	1.92	0.41	0.10 ± 0.03	5.21	0.041 S	1.75	0.36	0.07 ± 0.02	-4.00	0.235 NS
6 Months	2.02	0.38				1.68	0.34			
Baseline	1.92	0.41	0.36 ± 0.05	18.75	0.001 S	1.75	0.36	0.03 ± 0.02	1.71	0.363 NS
9 Months	2.28	0.36				1.78	0.34			
3 Months	1.78	0.44	0.24 ± 0.06	13.48	0.003 S	1.63	0.35	0.05 ± 0.01	3.07	0.076 NS
6 Months	2.02	0.38				1.68	0.34			
3 Months	1.78	0.44	0.50 ± 0.08	28.09	0.001 S	1.63	0.35	0.15 ± 0.01	9.20	0.001 S
9 Months	2.28	0.36				1.78	0.34			
6 Months	2.02	0.38	0.26 ± 0.02	12.87	0.000 S	1.68	0.34	0.10 ± 0.00	5.95	0.012 S
9 Months	2.28	0.36				1.78	0.34			

Table 6: Mean comparison in Thickness of Soft tissue in Group I (PRF) between follow-ups.

Statistical Analysis: Paired t test. Statistically significant if P < 0.05.

Follow-up	PRF status	Mean	Sd	Difference mean ± SD	P value
Baseline	With PRF	1.92	0.41	0.17 ± 0.05	0.474 Ns
	Without PRF	1.75	0.36		
3 months	With PRF	1.78	0.44	0.15 ± 0.09	0.531 Ns
	Without PRF	1.63	0.35		
6 months	With PRF	2.02	0.38	0.34 ± 0.04	0.143 Ns
	Without PRF	1.68	0.34		
9 months	With PRF	2.28	0.36	0.50 ± 0.02	0.034 S
	Without PRF	1.78	0.34		

Table 7: Mean comparison in Thickness of Soft tissue in Group I (PRF) and Group II (without PRF) follow-ups.

Statistical Analysis: Independent sample t test. Statistically significant if P < 0.05.

follow up of 9 months as shown in table 8.

Peri-apical radiolucency

Out of 12 immediately placed implants, none of them had shown any Peri-apical radiolucency in 9 months follow up as shown in table 8.

	Implant mobility		Periapical radiolucency	
	n	%	n	%
Present	0	0	0	0
Absent	12	12	12	12
Total	12	12	12	12

Table 8: Number of subjects with and without implant mobility and periapical radiolucency.

Discussion

In the current study, implants were placed immediately in a total of 11 patients (6 patients in Group I (PRF) and 5 patients in Group II (without PRF). Patients were recalled 3 months, 6 months, and 9 months after the first surgical procedure. Immediate implantation of implants with PRF enhanced the thickness of soft tissue without implant mobility or peri apical radiolucency. These outcomes were comparable to those of earlier short-term trials conducted by Anand., *et al.* [10] and Kenawy., *et al.* Viswambaran., *et al.* [11].

Funato., *et al.* 40 further on the significance of the period between extraction and implant insertion. The interval between tooth extraction and implant insertion was categorised as follows [10].

- **Class I:** Immediate -Extraction, implant implantation immediately flapless or with a flap, and osseous augmentation with guided bone regeneration (GBR).
- **Class II:** Early implant implantation (6-8 weeks) - guided bone regeneration (GBR) may be conducted at the time of extraction or implant placement.
- **Class III:** Lagging Implant implantation - four to six months following extraction, with preservation of the alveolar ridge and guided bone regeneration (GBR) in addition to soft tissue augmentation.

In the past, dental implants were inserted in extraction sites after a two-stage surgical operation and a load-free interval of three to six months [12]. Diverse implant placement techniques have been studied in the modern period in order to provide simpler and speedier surgical treatment strategies [13]. In current implantology, the load-free time has been shortened by quick restoration implants placed in extraction sockets [12].

According to Covani., *et al.* [14] and Schropp., *et al*. [3], placement of an implant into a fresh alveolus results in a "jumping space" between the occlusal part of the implant and the bone walls, and immediate placement of an implant cannot prevent dimensional changes of the alveolar ridge after tooth extraction. According to Tomasi., *et al*. these dimensional alterations may be expected based on the size and shape of the defect arising from tooth extraction [15]. In guided tissue regeneration (GTR), resorbable or non-resorbable membranes with or without bone grafting have been utilised for many years to cure periodontal abnormalities and restore peri-implant deficiencies in guided bone regeneration (GBR) [16]. A product derived from the patient's own blood has gained a great deal of favour as an adjunct to tissue regeneration treatments as a result of the membrane's high cost and disease transmission risk [16].

Gomez-Roman., *et al.* [17] demonstrated a success rate of 99 percent for immediate post-extraction implant insertion after one year of observation and 97 percent after five and a half years of monitoring. Thus, instantaneous implant insertion in terms of osseointegration and biological acceptability may be accepted without doubt.

In agreement with the findings of Gomez-Roman., *et al*. and Viswambaran., *et al.* the results of the current study showed a substantial decrease in the modified plaque index at the follow-up visits, indicating improved oral hygiene status [11]. Possible explanations include reinforcement of good dental hygiene and periodic oral prophylaxis, which led to a better treatment result.

Elimination of post-extraction healing period, preservation of alveolar height and width, reduction of surgical sessions, lower risk of dehiscences or fenestrations around dental implant, improved surgical orientation in relation to pertinent anatomical structures, better angulation leading to improved aesthetics and axial occlusal loading are the benefits of immediate implant placement after tooth extraction [16,18]. Greater primary implant stability is frequently the intended outcome of rapid implant placement, which suggests that there is less micromotion between the implant and bone, resulting in improved osseointegration [15].

The study's findings are consistent with the hypotheses of Albrektsson and Adell [19]. fulfilled the successful implant criterion, as there was no incidence of implant movement, no radiographic indications of peri-implant radiolucency, no persistent discomfort

or infection, and marginal bone loss was less than 1.5mm at the 9-month follow-up.

Platelet-rich fibrin (PRF) was produced by Choukron., *et al.* in 2001. It is a second-generation platelet concentrate whose growth factors promote good healing [9,20,21]. Dentistry has created a novel idea involving the enhancement of the human body's restorative process by employing the patient's own blood [22].

Platelet rich fibrin (PRF) also eliminates the need for membranes and barriers, hence lowering the danger of exposure to the oral cavity and the regeneration process' susceptibility to bacterial contamination [16].

Platelets are reservoirs of growth factors and cytokines, which are the fundamental elements for regeneration of the bone and maturation of the soft tissue, and so play a significant role in periodontal regeneration. Platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) are patient-derived platelet concentrates [23]. Dohan Ehrenfest., *et al*. [24] provided the first taxonomy of platelets, which is now widely recognised. The categorization is straightforward and is determined by the presence or absence of leukocytes and the fibrin architectural density in platelet concentrates. Based on the differences in these properties, it may be subdivided into four distinct types: pure platelet-rich plasma, pure platelet-rich fibrin (PRF), leukocyte and platelet-rich plasma, and leukocyte and PRF.

The PRF clot generates a dense fibrin matrix that concentrates nearly all of the blood's platelets and growth factors [25,26] and demonstrates a complex design as a healing matrix with exceptional mechanical capabilities that distinguish it from other platelet concentrates. PRF promotes wound healing and regeneration, and a number of studies demonstrate that the usage of PRF accelerates wound healing [27,28]. PRF is better to other platelet concentrates, such as PRP, since its production is simple, affordable, and does not require the addition of exogenous substances such as bovine thrombin and calcium chloride. Moreover, an autograft necessitates a second surgical site and technique, which makes it superior to autogenous grafts. Thus, PRF has emerged as one of the most promising regenerating materials in periodontology [23].

In the dentistry sector, platelet-rich fibrin (PRF) is emerging as a biological revolution. PRF is a method for accelerating and enhancing the body's natural wound-healing processes. Platelets are engaged in wound healing largely through clot formation and the release of growth factors that begin and promote wound healing [29]. During 7 days, PRF contains leukocytes, cytokines, structural glycoproteins, and growth factors including transforming growth factor 1, platelet-derived growth factor, vascular endothelial growth factor, and glycoproteins including thrombospondin-1 [30]. During wound healing, leukocytes concentrating in PRF scaffolds play a crucial role in growth factor release, immunological control, anti-infectious actions, and matrix remodelling [31]. The delayed polymerization mechanism of platelet-rich fibrin (PRF) and cicatricle capacity produce a favourable physiologic architecture for wound healing [32].

Other advantages include improved wound healing, bone development and maturation, and hemostasis. Platelet-rich fibrin's (PRF) ability to provide concentrated growth factors at the surgical site, which have a strong stimulating influence on the healing of soft and osseous tissues, is one of its most attractive characteristics. It speeds wound closure and mucosal healing due to the release of growth factors and fibrin bandage. PRF is a potent healing biomaterial with inherent regenerative capacity that can be utilised in a variety of procedures, including the treatment of periodontal intrabony defects [30,31] the treatment of furcation [33] sinus lift procedures [34], and as a scaffold for human periosteal cells *in vitro*, which has applications in the field of tissue engineering [35].

It has been claimed that different tissue biotypes affect the efficacy of restorative therapy. Consequently, the thickness of soft tissue appears to play a crucial role. It has been reported that the so-called "thick-flat" soft tissue biotype is a prognostic factor for aesthetically successful implant outcomes, predictable results after recession coverage, and regain of soft tissue after respective osseous surgery. In contrast, individuals with "thin-scalloped" soft tissue were more likely to develop periodontal recessions following insertion of immediate implants. Typically, the thickness of soft tissue is an important determinant of implant health.

When leukocyte-platelet rich fibrin was employed for immediate post-extractive implantation, soft tissue continued to grow and the soft tissue collar had an enhanced shape and thicker biotype, according to Marco Del Carso., *et al*. In a research by Tatullo., *et al.* similar soft tissue maintenance, a decrease in healing time, and optimum bone regeneration were reported [18].

Similar to the case study performed by Singh., *et al*. [20], the quick insertion of implants in the present investigation resulted in aesthetically attractive soft tissue. Similar to the work by Tatullo., *et al*. [18], which assessed the possible use of platelet-rich fibrin as a grafting medium in pre-implantology sinus grafting of severely atrophied maxillary bones, peri-implant tissue preservation was

likewise obtained.

This method, however, carries little hazards and has few flaws. Micromovement of the implant during the healing phase may impede its integration, and a lack of sufficient bone apical to the socket may undermine primary stability. When an implant is put in a new extraction socket, a space might develop between the implant surface and the bony socket walls. Indeed, the existence or size of the space is controlled not only by the shape of the alveolus but also by the implant's design and breadth [16].

The present clinical investigation presented a novel route of rapid implant insertion using platelet-rich fibrin (PRF), which exhibited several benefits, including superior hard and soft tissue maintenance and increased survival. However, it has several disadvantages, such as a lower sample size and a comparatively shorter observation duration. Clearly, further research with bigger sample sizes and better radiography tools are required to monitor the long-term changes in hard and soft tissue.

Conclusion

The Width of Keratinized Soft tissue was increased in group with PRF. The Width of Keratinized Soft tissue was not increased in group without PRF. The increase in Width of Keratinized Soft tissue was statistically significant in Group I (PRF) than compared to Group II (without PRF).

From the study, it can be concluded that there is increase in thickness of soft tissue Group I (PRF) which is statistically significant than in Group II (without PRF).

Even though the study shows positive results, longitudinal multicentric randomized controlled studies have to be done so that the results can be generalized.

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