

# To Determine Clinical Outcome of Platelet Rich Fibrin in Pulpotomy of Permanent Teeth in Irreversible Pulpitis

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## ABSTRACT

**OBJECTIVE:** To determine the clinical efficacy of platelet-rich fibrin (PRF) in Pulpotomy of permanent teeth in irreversible pulpitis.

**METHODOLOGY:** This observational study was conducted in the Department of Operative Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro / Hyderabad, from January to December 2019, through the non-probability purposive sampling technique. Fifty patients were included of both genders, ranging from 18-50 years. Irreversible pulpitis was diagnosed by lingering pain on hot and cold touch with normal peri-apical status. The written consent was taken from all participants. Each patient was evaluated clinically for the presence of pain, and peri-apical radiographs were taken. A visual analog scale (VAS) measured patients' pain before and after treating pulpitis. After treatment of patients, the efficacy of PRF was evaluated by a pain scale. The results were statistically compiled by SPSS version-21 and applying the "t"-test.

**RESULTS:** The severity of pain was observed as; severe in 18 (36%), moderate in 28 (56%) and mild in 4 (8%) patients before starting the treatment. After 24 hours treating with PRF, 40 (80%) patients became pain-free, 1 (1%) with moderate, while the 9 (18%) patients were observed with mild pain; the results obtained were highly significant with a p-value <0.05.

**CONCLUSION:** PRF is effective for treating irreversible pulpitis occurring in permanent teeth.

**KEYWORDS:** PRF, VAS, Permanent teeth, Pulpotomy, irreversible pulpitis.

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## INTRODUCTION

Pulpitis is pulp inflammation, clinically categorized as reversible and irreversible pulpitis. If the pain lasts for 1 to 2 seconds by touching the cold stimulus, which is reversible and persists for more than 10 seconds is termed irreversible pulpitis. The pain of irreversible pulpitis is very shocking. Tooth decay and its sequelae are the causes of pulpitis and tooth loss worldwide. Likewise, pulpitis is more common in South Asia, including Pakistan<sup>1</sup>. It is a great challenge to maintain the integrity of teeth. The vitality of the dentine-pulp complex is fundamental for the health of a tooth; therefore, priority should be given to preserving vitality through clinical assessment and management strategies.

Root canal treatments were performed in cases of irreversible pulpitis for so long. Its major drawback was the loss of vitality, and the tooth became easily breakable<sup>2</sup> as; the series of studies are recommending that Pulpotomy, which is the removal of coronal pulp and capping of radicular pulp with PRF, which is a straightforward clinical approach to

overcome the irreversible pulpitis in treating the permanent teeth. PRF is separated from the blood sample of the same patient to reduce the chances of material interaction and is called autologous<sup>3</sup>. It is cheaper and easily accessible. The material promotes the healing potential of the remaining radicular pulp in root canals. It contains fibrin and multiple growth factors to encourage the formation of dentine<sup>4</sup>. Therefore the material was used to evaluate its efficacy after Pulpotomy in permanent molars for relieving the pain<sup>5</sup>.

## METHODOLOGY

This observational study was conducted in the Department of Operative Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, from January to December 2019, using a non-probability purposive sampling technique. The sample size consisted of 50 patients, including both genders, and written consent was taken from each patient. The inclusion criteria included; age from 18-50 years, having no history of chronic diseases like DM, TB, CLD and viral illness. While the patients having teeth with necrosed pulp, third molars, and teeth showing periapical radiolucency on radiograph were excluded from the study.

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The participants with normal peri-apical status were included in this study, complaining of irreversible pulpitis. In patients with treatment of pulpitis, before and after 24 hours, the severity of pain was measured by a visual analog scale (VAS). The scale ranges from 0, i.e. no pain and the severity of pain increases as the range of scale increases, i.e. from 1 to 10, so the severity of pain increases accordingly. The periapical radiographs were repeated after six-month intervals and showed no periapical radiolucency; such patients were considered successful with the treatment.

**Laboratory Procedure for Preparation of PRF:** The blood sample was collected by a 10-ml syringe from each patient under all aseptic measures, which was immediately transferred to a 20 ml glass container. It was centrifuged at 3000 RPM for 10 minutes. After centrifugation, the glass tube showed three layers, out of which the superficial layer was plasma, the middle layer showed the fibrin clot, PRF, while the lower layer contained cells. The middle layer of the fibrin clot was separated and placed in the cold container for use, while the superficial and lower cellular layers were discarded.

The results were statistically compiled by SPSS version-21, and the "t"-test was used to compare the effects before and after treating patients.

**RESULTS**

The data results showed the efficacy of PRF among all the 50 patients with pulpitis, including both genders. Table I shows the age-wise distribution of 50 patients, including 33 males (66%) and 17 females (34%); included patient mean age was 33.28±6.5, and the male to female ratio was 1.94: 1. The number of patients with pulpitis was 10(20%) males, and 5(10%) were female with an age range from 18 to 30 years. The age ranges from 31 to 40 years, comprising 16 (32%) males and 10(20%) females. While the ages range from 41 to 50, 7(14%) were male, and 2(4%) were female. Table II shows the pain scale (VAS) description of patients with pre and posts pulpitis treatment. The pain scale (VAS) shows no pain (0), mild pain (1-3), moderate pain (4-6), and severe pain (7-10).

The findings of our study showed that 40 patients (80%) with post pulpitis treatment had a 0 scale, and no patient with pre-pulpitis treatment with having 0 scale was found. The number of patients with pre-pulpitis treatment was 04 (8%), and the number of patients with post pulpitis treatment was 9(18%) patients with a 1 - 3 pain scale. The number of patients with pre-pulpitis treatment was 28 (56%), and the number of patients with post pulpitis treatment was 01 patients (02%), having a 4-6 pain scale. The number of patients with pre-pulpitis treatment was 18 (36%) with a 7-10 pain scale, and no patient post pulpitis treatment was observed.

The number of above all patients, pre and post pulpitis

treatment were compared with each other by applying the "t"- test statistically, which shows a highly significant p-value (< 0.05).

**TABLE I: AGE-WISE DISTRIBUTION OF PULPITIS PATIENTS**

Age in Years	Male (n=33)	Female (n=17)	Percentage (%)
18 – 30	10 (20%)	05 (10%)	30
31 - 40	16 (32%)	10 (20%)	52
41 – 50	07 (14%)	2 (4%)	18
<b>Total</b>	<b>33 (66%)</b>	<b>17 (34%)</b>	<b>100</b>

**TABLE II: PAIN SCALE OF PATIENTS WITH PRE AND POST PULPITIS TREATMENT**

Pain Scale (VAS)	PULPITIS			
	PRE		POST	
	No. of Patients	%	No. of Patients	%
No Pain=0	0	0%	40	80%
Mild Pain =1-3	4	8%	9	18%
Moderate Pain= 4-6	28	56%	1	2%
Severe Pain = 7-10	18	36%	0	0%
<b>Total</b>	<b>50</b>	<b>100%</b>	<b>50</b>	<b>100%</b>
<b>p-Value</b>	<b>0.005</b>			

**DISCUSSION**

Tooth decay of permanent teeth is a prevalent disease affecting all world populations. Especially during early or six to seven years of age, all 1<sup>st</sup> molars are erupted, which are more affected, resulting in pulpitis<sup>6</sup>. Pulp exposure may cause an acutely painful condition. The disease is also frequent in our population and almost affects all age groups<sup>7</sup>. To relieve the pain, it is the first priority of clinicians to do the root canal treatment as a prior option. The pulp tissue is completely removed during the root canal, and tooth vitality is compromised as it is cost-effective and time-consuming with more chances of treatment failure<sup>8</sup>. Hence, the tooth becomes liable to break. Therefore, Pulpotomy is gaining popularity as this treatment maintains the vitality of pulp. PRF material is readily available and can easily be derived from patients' blood samples. But there is a matter of patient anxiety in blood sampling. As PRF has many growth factors, it can maintain the vitality of pulp in root canals after Pulpotomy by forming a calcification bridge<sup>9</sup>.

The material selection was due to its autologous nature, and the material's efficacy was evaluated in fifty patients, which showed a high success rate<sup>10</sup>. The male to female ratio was 1.94: 1, which shows the

increased frequency of the male population suffering pulpitis pain compared to female patients. This is in accordance with other studies, showing a male to female ratio of 1.36: 1<sup>11</sup>. A maximum number of cases was observed in the 4th decade of life, i.e. 31-40 years of age, with the least number of cases in the 3rd and 5th decade of life. That shows more frequent irreversible pulpitis in the fourth decade of life in patients attending LUMHS hospital. This result is different from the other studies conducted among other populations because they have included patients aged 18-79 years<sup>12</sup>.

The maintenance of tooth vitality preserves the sensory function of the pulp, which is essential for the defense of the tooth due to its extensive innervation of nerve fibers, which give an indication or warning when it is under attack from noxious stimuli<sup>13</sup>.

This study observed that 40 patients (80%) were pain-free within 24 hours. The use of PRF relieved the pain of 44 patients (88%) after a week, and after two weeks, 94% of patients were pain-free, following other studies that report a 94.4% success rate<sup>14</sup>.

Vital pulp also plays an essential role in the induction and the formation of tertiary/reparative dentin to external stimuli<sup>15</sup>. Dental radiographs such as the bitewing and long cone paralleling technique were used as an additional tool to detect any visible periapical pathology before treatment<sup>16</sup>. And such teeth were excluded. After six months of treatment, radiographs were taken to find any visible defect<sup>17</sup>. In 47 patients (94%), radiographs showed no periapical pathology. At the same time, an abnormality was visible in 3 patients (6%)<sup>18</sup>. This study indicates that PRF as pulp capping material relieves the pain of the pulpitis with a high success rate. The studies also support the use of PRF in treating irreversible pulpitis in permanent and deciduous teeth or milk teeth<sup>19</sup>. As per our knowledge, no such study had been conducted, so this research was carried out, and the results were significant.

## CONCLUSION

It has been concluded that PRF is an effective material for treating irreversible pulpitis in permanent teeth.

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## AUTHOR CONTRIBUTIONS

Sahito AH: Conception, design, collection and data collection

Kuhuawar SR: Critical revision of the article for important intellectual content, final approval of the manuscript

Jokhio AL: Drafting of manuscript, data analysis & interpretation

Tagar MR: Data analysis & interpretation

Ahmed M: Critical revision of the manuscript, data analysis

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