

ORIGINAL ARTICLE

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

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ABSTRACT

OBJECTIVE: To determine clinical efficacy of platelet rich fibrin (PRF) in pulpotomy of permanent teeth in irreversible pulpitis.

METHODOLOGY: This observational study was conducted in Department of Operative Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro / Hyderabad from January to December 2019, through non-probability purposive sampling technique. Total 50 patients were included with both genders, age ranges 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 presence of pain and peri-apical radiographs were taken. The pain of patients was measured by Visual analog scale (VAS), before and after treating pulpitis. After treatment of patients, the efficacy of PRF was evaluated by pain scale. The results were statistically compiled by SPSS version-21 and by 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 p-value <0.05. \

CONCLUSION: The use of PRF is effective for treating the irreversible pulpitis occurring in permanent teeth.

KEY WORDS: PRF, VAS, Permanent teeth, Pulpotomy, irreversible pulpitis.

INTRODUCTION

The pulpitis is the inflammation of pulp, which is clinically categorized in the reversible and irreversible pulpitis. If the pain lasts for 1 to 2 seconds by touching the cold stimulus which is reversible and if persists more than 10 seconds is termed as irreversible pulpitis. The pain of irreversible pulpitis is very shocking. Tooth decay and its sequelae are the major causes of pulpitis and tooth loss worldwide. Likewise pulpitis is more common in South Asia including Pakistan¹. It is 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 maintain vitality through clinical assessment and management strategies. As since long the root canal treatments were performed in cases of irreversible pulpitis. Its major drawback was loss of vitality and tooth becomes easily breakable². As the series of studies are recommending that pulpotomy, which is removal of coronal pulp and capping of radicular pulp with PRF, which is an easy clinical approach to overcome the irreversible pulpitis in treating the permanent teeth. PRF is separated from the blood sample of same patient, to reduce the chances of material interaction and is called as autologous³. It is cheaper and easily accessible. The material promotes healing potential of the remaining radicular pulp in root canals. It contains fibrin and multiple growth factors, to promote the formation of dentine⁴. Therefore the material was used to evaluate its efficacy after pulpotomy in permanent molars for relieving the pain⁵.

METHODOLOGY

This observational study was conducted in Department of Operative Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad from January to December 2019, with non-probability purposive sampling technique. The sample size was consisted on 50 patients including both genders, 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 disease. While the patients having teeth with necrosed pulp, third molars, and teeth showing peri-apical radiolucency on radiograph were excluded from study. The participants with normal peri-apical status were included in this study with complain of irreversible pulpitis. In patients with treatment of pulpitis, before and after 24 hours, the severity of pain was measured by visual analog scale (VAS). The scale ranges from 0 that is i.e. no pain and severity of pain increases as the range of scale increases that is i.e. from 1 to 10, so the severity of pain increases accordingly. The peri-apical radiographs were repeated after six months interval and showing no peri-apical radiolucency, such patients were considered as 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 20 ml glass container. It was centrifuged at 3000 RPM for 10 minutes. After centrifugation glass tube showed three layers, out of which the superficial layer was of plasma, middle layer shows the fibrin clot, which is PRF, while the lower layer contains cells. The middle layer of fibrin clot was separated and placed in cold container for use, while the superficial and lower cellular layers were discarded.

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

RESULTS

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

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

The number of above all patients, pre and post pulpitis treatment were compared with each other by applying “*t*”- test statistically, which shows the 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
Total	33 (66%)	17 (34%)	100

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%
Total	50	100%	50	100%
p Value	0.005			

DISCUSSION

Tooth decay of permanent teeth is a very common disease affecting all populations of the world. Especially during early or six to seven years age, all 1st molars are erupted, which are more affected, resulting in pulpitis⁶. Pulp exposure may cause acute painful condition. The disease is also frequent in our population and almost affecting all age groups⁷. To relieve the pain, it is the first priority of clinicians, that to do the root canal treatment as prior option. During root canal the pulp tissue is completely removed and tooth vitality is compromised. As it is cost-effective and time-consuming with more chances of treatment failure⁸, so the tooth becomes liable to break. Therefore, the pulpotomy is getting popularity as this treatment maintains the vitality of pulp. PRF material is easily available which can easily be derived from blood sample of patients. But there is a matter of patient anxiety in blood sampling. As PRF has many growth factors, it has the ability to maintain the vitality of pulp in root canals after pulpotomy by formation of calcification bridge⁹.

The material selection was due to its autologous nature, and efficacy of material was evaluated in fifty patients, which showed high success rate¹⁰. The male to female ratio was 1.94: 1, which shows that increased frequency of male population suffers pain of pulpitis as compared to female patients. This is in accordance with other studies, showing male to female ratio of 1.36: 1¹¹. Maximum number of cases was observed in 4th decade of life i.e. 31-40 years age, with least number of cases in 3rd and 5th decade of life respectively. That shows more frequency of irreversible pulpitis in 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 the patients with great age range from 18-79 years¹². The maintenance of tooth vitality preserves the sensory function of the pulp, which is important for the defense of the tooth, due to its vast innervation of nerve fibers, which give an indication or warning when it is under attack from noxious stimuli¹³.

In this study it was 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 2 weeks 94% patients were pain free, which is in accordance with other studies, that report 94.4% success rate¹⁴.

Vital pulp also plays an important role in induction, formation of tertiary/reparative dentin to the external stimuli¹⁵. Dental radiographs such as bitewing and long cone paralleling technique peri-apical radiographs were used as additional tool to detect any visible periapical pathology before treatment¹⁶. And such teeth were excluded. After six months of treatment radiographs were also taken to find any visible defect¹⁷. In 47 patients (94%), radiographs showed no any peri-apical pathology. Whereas abnormality was visible in 3 patients (6%)¹⁸. This studies shows that use of PRF as pulp capping material relieves the pain of pulpitis with high success rate. The studies are also supporting the use of PRF in the treatment of irreversible pulpitis in permanent as well as in deciduous teeth or milk teeth¹⁹. As per our knowledge previously there was 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 to treat irreversible pulpitis in permanent teeth.

Ethical permission: Liaquat University of Medical & Health Sciences Jamshoro ERC letter No. LUMHS/REC/-701, dated 17-8-2018.

Conflict of Interest: There is no conflict of interest

Funding: Funding was not requested/self-funded

AUTHOR CONTRIBUTIONS

Sahito AH: Conception, design, collection and data collection

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

Jokhio AL: Drafting of manuscript, data analysis & interpretation

Tagar MR: Data analysis & interpretation

Ahmed M: Critical revision of manuscript, data analysis

Kalwar MR: Statistical & data analysis

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