

A Questionnaire based Cross-Sectional Survey on PRF

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Abstract

Progress in regenerative endodontic procedures needs approval by clinicians, but there is little or no evidence. This study aimed to examine the awareness, mindset and experience of regenerative endodontics among Indian dental residents. For the survey they used a self-administered questionnaire which consisted of three parts; part A focused on the background and experience of dentists, part B pursued the viewpoint, views and decision of the dentist about the utilize of PRF and Regenerative techniques, Whereas part C contained questions focused on their clinical experience. Findings indicate that maximum respondents knew about PRF during postgraduate training but 90% are willing to attend PRF and REP training. However, few claimed to have used any form of regenerative therapy in their work. Finally, it can be concluded that findings are an indication of optimistic dental residents concerning the use of regenerative endodontic methods; however, further analysis and routine training is needed.

Keywords: PRF, Regenerative Procedures, Dentist, Survey

Introduction

Platelet Rich Fibrin (PRF), a patient blood-derived and autogenous living biomaterial, is rapidly being studied and utilized by clinicians worldwide as an autologous adjunctive biomaterial to facilitate bone and soft tissue healing and regeneration.¹ The gold standard for in vivo tissue repair and regeneration includes the interplay of platelets, scaffold (fibrin matrix), growth factors, leukocytes and stem cells.²

Such main components are both active components of PRF which, when combined and equipped, are implicated in the core processes of tissue healing and regeneration, that act naturally and in synergy to

stimulate, improve, and accelerate tissue healing and to regenerate soft or bone tissue including extracellular matrix synthesis, cell differentiation and proliferation, angiogenesis and chemotaxis.³ In terms of structure, the three-dimensional fibrin membrane is proficient of imitating the extracellular matrix and provides the framework or scaffold for cells to act optimally during healing and regeneration.

Restoration of dentin pulp in endodontics and restorative dentistry is a longer-term goal. There was increasing concern about the application of the tissue engineering theory to endodontics. Theoretical implementation for regenerative and tissue engineering methods to dentistry has an enormous opportunity to address a range of medical needs. Nevertheless, there is a need for implementation of this novel therapy-detailed awareness of PRF and an appropriate capacity to conduct it is of primary importance.

The dental professionals are the next wave who will make up the majority of future researchers whose work associates over the next decade. The aim of this

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study is therefore to consider their views, their degree of understanding and their future recognition of this progress in endodontics. It would also help to determine that further focus has to be paid to PRF curriculum and training programmes. There is little research in the empirical literature that provides details on endodontists' views, values and behaviours concerning the implementation of PRF. It is necessary to consider the reaction of the endodontic society to this modern age of care. The endodontic practitioners would be the foremost professionals to advise as well as educate patients about new treatments regarding the use of REPs. This study aimed to gather endodontist opinions on the employ of PRF and REPs. Different perspectives are required to help establish ethical standards and determine the need for endodontic professionals to accept PRF and REPs.

Materials and Methods

110 copies of the questionnaire on the issues of PRF were distributed among dental professionals throughout the region. The survey consisted of three parts: The first section included questions about respondent profile including a year of study, age and demographics. The second section included 13 questions about information and thoughts on using PRF. The third component covered their participation in clinical experience. The response feedback was measured by the figure of answers as a proportion to all answers to provide an insight into the participants' prevailing views.

Results

110 Copies of the questionnaire circulated and the surveys completed were received, resulting in a cumulative response rate of 100%. The findings of the questionnaires are listed in Table 1.

Profile of Participants:

Most of the participants were in the age group of fewer than 35 years (86%). 62.5% of dental professionals who participated were from Odisha, 18.2% were from West Bengal, the rest of the participants belonged to Bihar, Jharkhand, Chhattisgarh and other areas. The majority (55%) of dental professionals devoted more than 20hrs/week in clinics. Majority of dental professionals who responded to the questionnaire were endodontists(39.1 %) and general practitioners(20.9%). According to the survey, the majority of respondents have practised less than 10yrs(74.3 %), 10-20yrs (21.1%) and more than 20yrs (4.6%).

Knowledge, attitude and opinion towards regenerative endodontics and PRF :

Around 88% of participants were aware of the potential application of PRF. Most of them knew about its centrifugation protocol, different forms and properties. From Figure 1, it can be seen 49% of participants noted that the biggest obstacle accepting PRF as regenerative dental treatment was a need for specialized equipment and 26.9% noted about their lack of experience. 40% of participants had ethical concerns regarding the use of PRF. Around 70 of participants agreed that PRF as a regenerative therapy will be a superior management alternative than implant procedures and 28 of them were not sure of it. A majority of participants (90%) agreed that dental professional association would encourage PRF for their benefit in regenerative dentistry(Figure 2) and 60% advocated the introduction of PRF as regenerative therapy into the undergraduate course of dentistry. More than half of the participants (58.9 per cent) completed the Continuing Dental Education Program (CDE) on regenerative endodontics and PRF, and 90 per cent of the participants are interested to engage in further instruction and/or continuing education on the use and use of PRF to enhance their understanding of it.

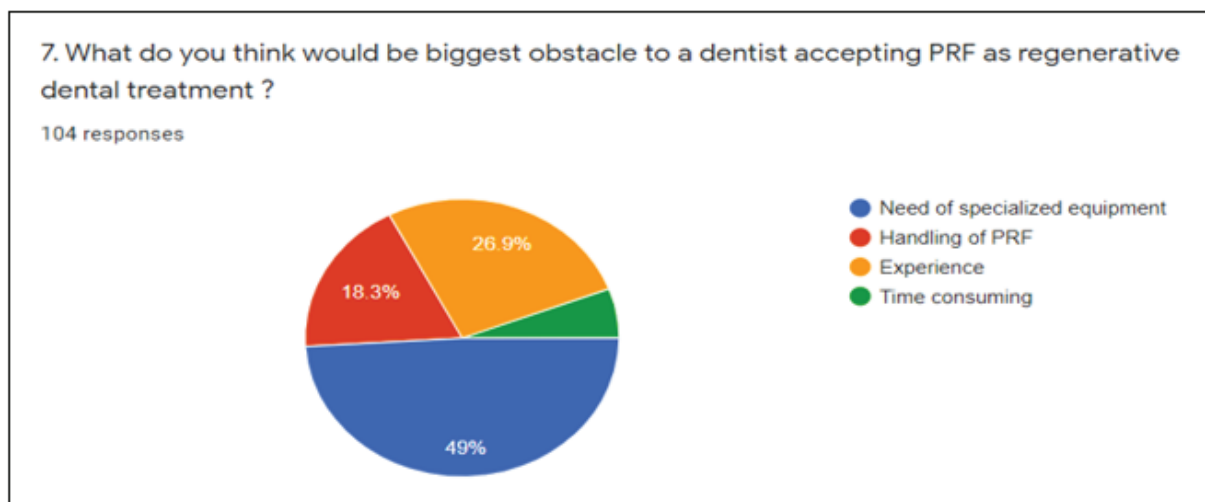


Figure 1. Responses for the biggest obstacle to a dentist for accepting PRF as regenerative treatment.

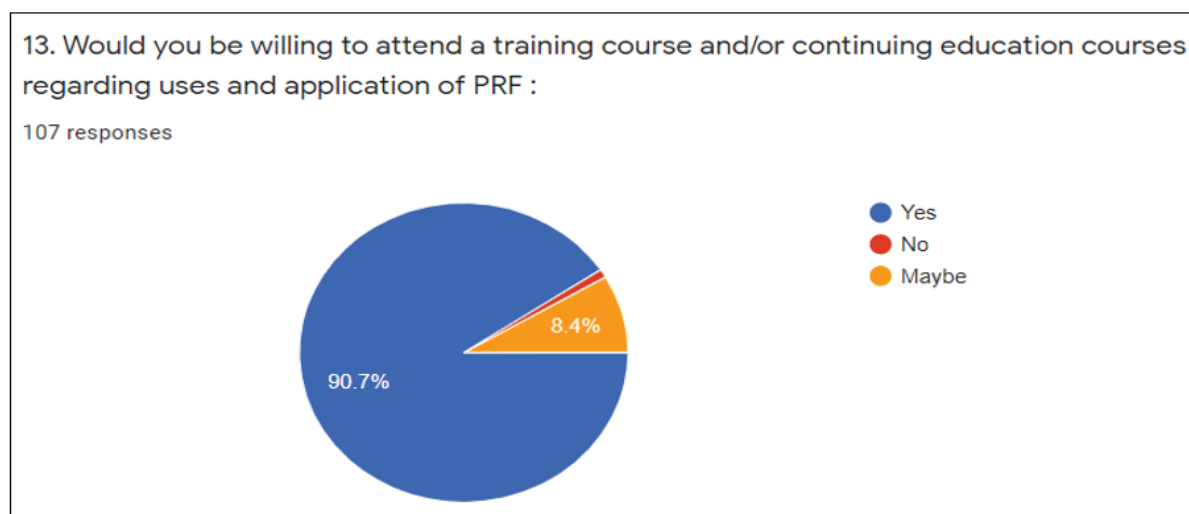


Figure 2. Responses for participants willing to attend training courses regarding the use and application of PRF

Clinical Practice:

85.5% of participants considered that PRF can be applied to continued root formation, healing of periradicular bone and revitalization of pulp tissue within the root canal. 78 dentists agreed on the periapical tissues healing be can be improved by PRF as a tissue engineering process following non-surgical endodontic treatment and 27 of them are unsure regarding it.

Some participants indicated that necrotic premature teeth in their work accounted for 10-25 per cent (57 per cent) of cases. Periradicular lesions were stated to account for the majority of patients (45.7 per cent)

between 26% - 50% of all cases observed. The majority of participants (36.8 per cent) found the application of calcium hydroxide accompanied by a mineral trioxide aggregate apical plug and obturation content backfilling to be the best treatment for premature necrotic teeth. About a quarter of participants (27.4 per cent) found tribiotic paste application and pulpal regeneration to be the best therapy for immature necrotic teeth.

71% of practitioners would like to recommend a patient to store dental stem cells and explain its prospects and 22.4% are not sure about it. 50% of respondents agree that it is the most successful treatment choice

and will suggest PRF and regenerative dental therapies to their patients, while 31.8% think it is the safest and most efficient treatment process. 55.7% of dentists considered the greatest limitation for use of PRF are increased risk of transmitting infectious agents, can't be used as allogenic material and faster resorption rate. Finally, 63.2% of participants regard successful for PRF as treatment outcome and 36.8% are not sure about it.

Discussion

The biologically based procedures designed to repair damaged components, including dentine and root components and pulp-dentine cells, are demarcated in the regenerative endodontic processes.⁴ The harmonized biological spurs and mechanical regulators encouraging cellular development have greatly expanded the recognition of regenerative therapy for dental tissues. PRF technology aims to extract from a patient's blood sample the essential elements that could be used to enhance healing and promote tissue regeneration, and to prepare it in a clinically functional form such as membrane (A-PRF, L-PRF, or GCF) or injectable liquid (i-PRF).⁵ Improved understanding of the growth, biological and physiological properties and characteristics of PRF in tissue healing and regeneration over the past two decades has resulted in more effective therapeutic applications, especially in the areas of periodontology, implantology and oral surgery.

PRF gives off a variety of growth factors. Between them, platelet-derived growth factor, the transforming growth factor-beta, matrix glycoproteins and vascular endothelial growth factor which are slowly released for at least 1 week.⁶ The enhanced accumulation of such growth factors indicates an improvement in the healing of soft and hard tissues.⁷ Moreover, several studies have indicated that PRF can promote regeneration of the osseous and soft tissue while reducing inflammation, pain and adverse effects.⁸ Due to these physiological properties, the use of platelet concentrates has become increasingly popular over the last 15 years to improve wound healing and advance the clinical benefits of bone replacement grafts.^{6,8}

Adequate research interest and expertise among service providers are paramount to achieve clinical relevance to human beings. This research was undertaken to collect data from the dentists in our country about the

level of understanding, expertise and clinical status of PRF and other REPs. Throughout this survey, residents reacted quite strongly, where nine of 10 felt that PRF should be used in dentistry. In the survey conducted by *Epelman et al. 2009* concluded that "due to the increased interests and activities that are ongoing in this field, dental practitioners' opinion towards REPs reported that almost 89% of practitioners are willing to save teeth and dental tissues for stem cell banking".⁹

The benefits of "PRF as a scaffold is that it has an architectural flexible trimolecular or equilateral fibrin intersection that facilitates cytokine interaction and cell migration".¹ Many of the participants suggested that regenerative procedures should be integrated into dentistry and were prepared for saving teeth and dental tissues with the application of PRF and not favouring implants over as a treatment choice. Half of the participants used regenerative methods, like bones, membranes, or bioactive materials, in their research already, signifying that numerous regenerative techniques are already in use. Yet only one-fourth respondents discovered useful regenerative techniques in the treatment of necrotic immature teeth in 20% of their patients. More than half of the participants also find the best management for necrotic immature teeth to be the application of Ca(OH)₂, followed by MTA apical plugs and backfilling with the sealing content. This offers an overview of the idea that people are not being trained about advanced regenerative endodontic approaches. Continuing education and training services are required about all procedures involving dentin-pulp regeneration from the easiest type of blood clot revascularization (BCR) to more complex technique, including the development of tissue-engineered pulpal structures in the laboratory and their implantation in clean along with shaped root canals.

A large number of participants thought that PRF can be used in different applications such as continued root regeneration of developing teeth, periradicular bone recovery and pulp tissue revitalization inside a root canal. The positive outcome of the regenerative procedures can be assessed as the capability to achieve periapical lesion recovery response, apical tooth root closure, root lengthening and dentinal wall response.^{10,11,12} According to *Pinto et al. 2017*, "The periapical reaction to lesion healing was 88.9 per cent for BCR and 100 per

cent for both PRP and PRF. To dentists, these results are positive news. It indicates that REPs are very effective in disinfecting periapical bacteria, which helps treat isolated lesions and avoids the need for complex apical surgery".¹³

Clinicians may have an aversion to PRF as they need venous blood drawn from the patient's arm at the time of treatment, more time and effort in the procedures required to administer the dental therapy and more cost for the PRF kits.¹⁴ Some of the respondents knew about other REP procedures but were unsure about the outcomes. A survey found that 55% per cent of dentists were unsure as to whether REPs should work.¹⁵ The inability to use REPs to treat immature traumatized due to less experience or trust in the result, might lead millions of children with lost natural teeth that can be rescued. To modify professional attitudes and achieve greater approval of RETs for use in helping to preserve traumatized teeth for children, it was important to decide whether the PRF techniques could make regenerative methods more effective or not.

It was estimated that in the United States 2 million dental implants are inserted per year.¹⁶ Implant placement may surpass a few endodontic therapies and also REPs.¹⁶ Around 50% of respondents felt regenerative procedures will be a preferable management choice than tooth implant procedure. Epidemiological research showed 97% of 1,4 million endodontically treated tooth remained functional following 8 years¹⁷, with efficacy or survival levels achieved by more than 90% of endodontic procedures and implants. ^{18,19} The high level of performance poses a threat for researchers and practitioners of tissue engineering. Most attendees would consider REPs only if they were the most successful care choice. For researchers developing REPs, the message from this analysis is that they would need to build a base of proof to convince patients and endodontic practitioners that latest regenerative-endodontic therapies are successful and also as safe as the existing endodontic therapies that these seek to substitute.

Endodontist curriculum, instruction, and ongoing education have evolved to persist with the availability of newer treatments.²⁰ Dentists who participate in regenerative therapy have a social and ethical imperative to be active and qualified, but there are few training

programmes in REPs. In addition to existing curriculum standards, additional educational or qualification systems will be needed, and these concerns may impose a greater academic strain on clinicians. This seems that the participants expect new training activities to take place, as almost all were able to undergo training courses in REP.

Conclusion

The participants in the study were overwhelmingly positive about the implementation and effectiveness of PRF and regenerative treatments. The groundbreaking character of this sample avoided differentiation with endodontists and other health care practitioners' views, values and attitudes. It is not clear if the same passion intended for stem cell adoption and regenerative therapy occurs among doctors, dentist, and other health care professionals. Further study work by health professionals is required for evaluating ethical recommendations along with examining the possible acceptability and drawbacks of providing patients with stem cell and regenerative therapies.

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