



Assessment, awareness, and knowledge of different types of PRF among dental students : An online survey

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Abstract: Platelet-rich Fibrin (PRF) has been proven to have a wide range of uses in dentistry like promoting wound healing, regeneration¹ etc. Variation in its preparation has further increased the scope of its uses in dentistry. Different types of PRF with abundant growth factors like platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), fibroblast growth factor (FGF), hepatocyte growth factor (HGF), transforming growth factor (TGF) and epidermal growth factor (EGF) helps in hemostasis^{2,3}. PRF has potential periodontal regeneration in the field of dentistry.

Aim: This survey aimed at assessing the knowledge and awareness of Platelet-rich fibrin among dental students.

Methods and Material: The study was done among dental students. A sample size of 150 participated were selected. Both descriptive (frequency of the responses) and inferential statistics (Chi-square tests) were done and the results were presented in the form of pie diagram.

Statistical analysis used: SPSS, G - Power 3.1.9.2 statistical software.

Results: It was noted that the majority of participants were comprised of females, 97% were aware of the growth factors, 18% were aware of the method of preparation, 45% were awareness of PRF, 35% were aware of speed required for preparation and 8% were aware of the usage of PRF in socket.

Conclusion: From this Survey, we can conclude that dental students were not aware of the usage, method of preparation, types of PRF, speed required and usage in socket preservation. Hence dental curriculum should include knowledge about PRF.

Key-words: Choukroun's PRF, Growth factor release, Platelet concentrates, Platelet-rich fibrin.

Introduction:

Platelet-rich Fibrin (PRF) has been proved to have a wide range of uses in dentistry like promoting wound healing, regeneration¹ etc. Variation in its preparation has further increased the scope of its uses in dentistry. Different types of PRF with abundant growth factors like platelet-derived growth factor (PDGF),

vascular endothelial growth factor (VEGF), fibroblast growth factor (FGF), hepatocyte growth factor (HGF), transforming growth factor (TGF) and epidermal growth factor (EGF) helps in hemostasis^{2,3}. PRF has potential periodontal regeneration in the field of dentistry.

Periodontal regeneration:

The use of PRF along with autogenous bone graft at implant dehiscence site has shown improvement in healing response which has resulted in rapid, clinically relevant bone closure at dental implant dehiscence defect⁴.

Simonpieri et al.⁵ stated that there is a regeneration of gingival tissue and bone volume on the placement of PRF membrane and this concept was named as “natural bone regeneration”

According to Aroca et al.⁶ concluded that there was increase in the width of keratinized gingiva at the test sites when PRF membrane was used compared to the modified coronally advanced flap alone.

Materials and methods:

The study was done in an online setting among the dental students of Rajamahendravaram. Institutional review board approval was obtained for this survey-based analysis. A sample size of 150 participants of the age group 20-50 years, both males and females were selected by a simple random sampling method. To fulfill the inclusion criteria of the survey, the study participants were dental students. Cross-verification with existing studies was the external validity of this study. The set of questionnaires which includes gender and questions on awareness is circulated among the participants through an online link. The results were collected and tabulated. Then the results were exported for statistical analysis to SPSS, G - Power 3.1.9.2 statistical software. Both descriptive (frequency of the responses) and inferential statistics (Chi-square tests) are done and the results were obtained.

Results: A total of 150 respondents took part in this survey-based study. It is observed that more females (74%) participated in the survey than males (26%) as shown in (Fig. 1). When questioned about the awareness of growth factors among the study population; where 97% were aware of growth factors and only 3% were not aware of growth factors. The majority of the participants were aware of the growth factors (Fig. 2). When questioned about method of preparation, 18% of the population opted for Centrifuging (Blue), followed by 79% who opted for rotary (Grey), 3% opted for Freezing(Orange),. The majority of the study population were not aware of its method of preparation. Only 18% of the population were aware that centrifuging was the method of preparation of platelet-rich fibrin (Fig. 3). Pie chart showing the percentage distribution of the awareness of the term PRF among the study population; where 45% were aware of the term and only 55% were not aware of the term. The majority of the participants were not aware of the term PRF (Fig. 4). When questioned about prf can be used for socket preservation, 8% were aware of the usage of PRF can be used for socket preservation and 92% were not aware of it. The majority of the participants were not aware of the usage of PRF in socket preservation.(Fig. 5). The speed required for preparation of PRF among the study population; only 35% were aware of the speed required for preparation and 65% were not aware of the speed required

for preparation (Fig. 6). The awareness on different types of platelet-rich fibrin among the participants in which 10% were aware of i-PRF, 3% were aware of A-PRF, 2% were aware of L-PRF, 5% were aware of T-PRF, 80% were not aware of all the types of PRF, majority of them were not aware of different types of PRF (Fig. 7).

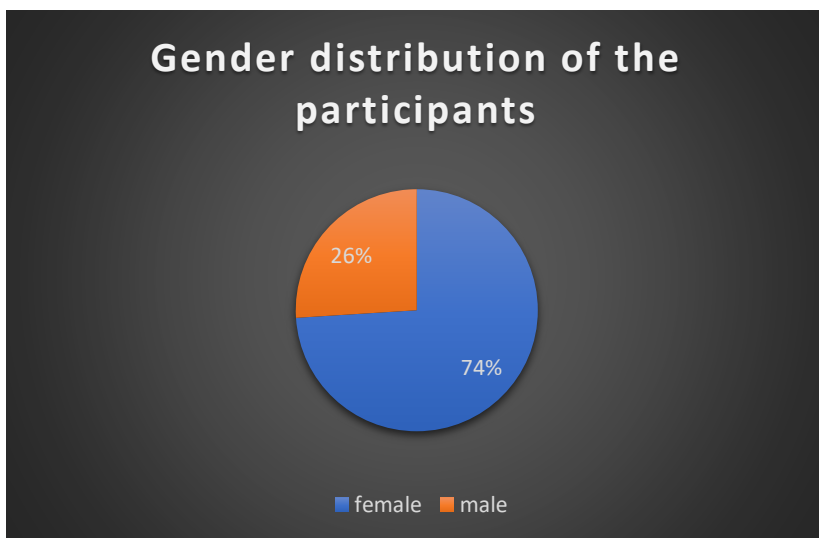


Fig. 1. Pie chart showing the percentage gender distribution of the study population; where 74% were females (blue) and only 26% were males (orange) in the study.

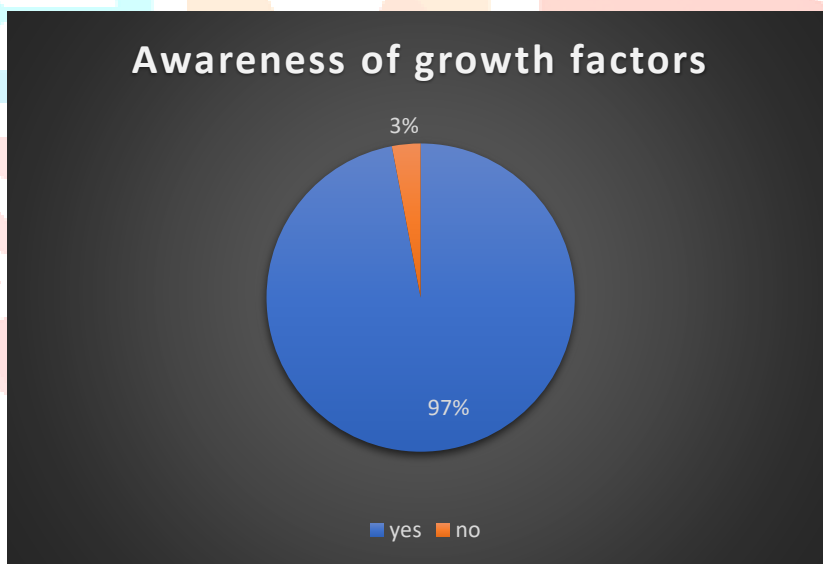


Fig. 2. Pie chart showing the percentage distribution of the awareness of growth factors among the study population; where 97% were aware of growth factors (Blue) and only 3% were not aware of growth factors (Red). The majority of the participants were aware of the growth factors.

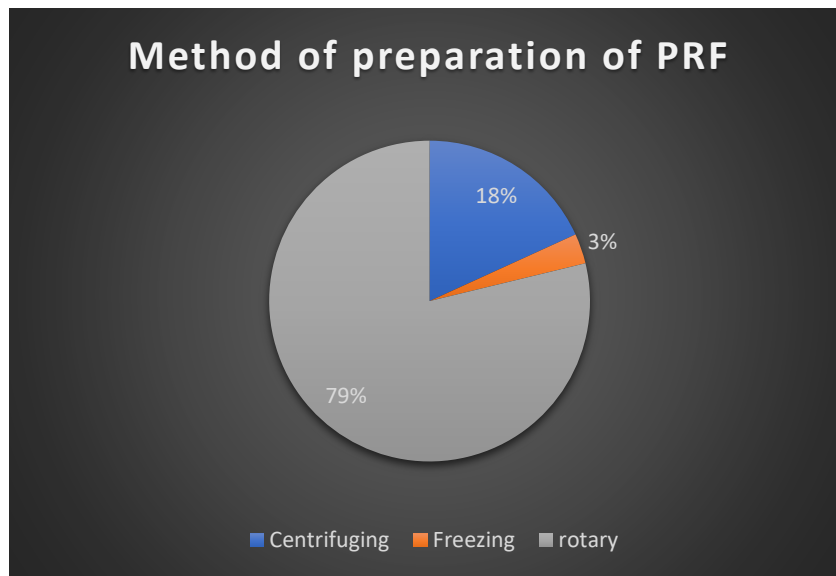


Fig. 3. Pie chart showing the percentage distribution of awareness of the preparation of Platelet-rich fibrin. When questioned about method of preparation, 18% of the population opted for Centrifuging (Blue), followed by 3% opted for Freezing (Orange), 78% who opted for rotary (Grey). The majority of the study population were not aware of its method of preparation.

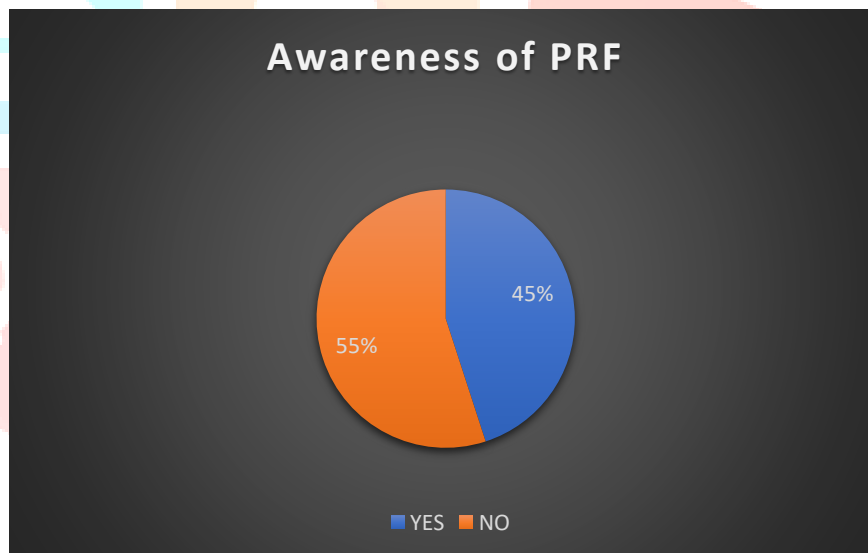


Fig. 4. Pie chart showing the percentage distribution of the awareness of the term PRF among the study population; where 45% were aware of the term (Blue) and only 55% were not aware of the term (Orange). The majority of the participants were not aware of the term PRF.

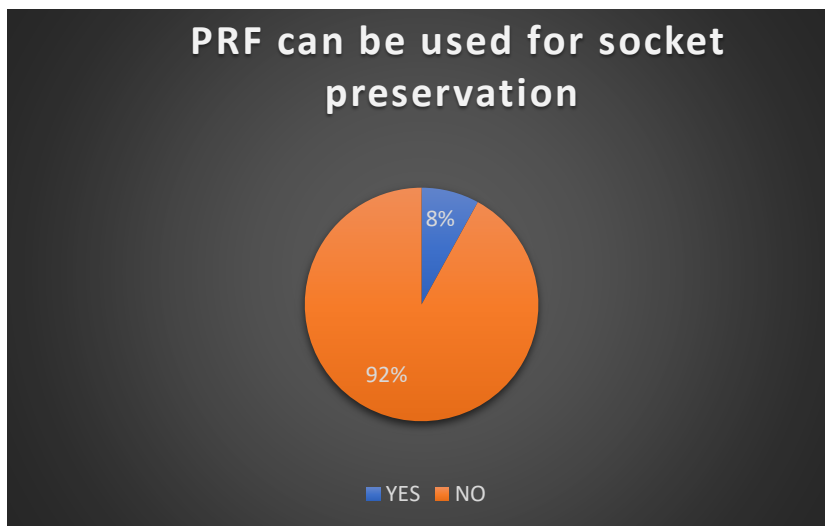


Fig. 5. Pie chart showing the percentage distribution of PRF can be used for socket preservation among the study population; where 8% were aware of the usage of PRF can be used for socket preservation (Blue) and only 92% were not aware of its usage in socket (Orange). The majority of the participants were not aware of the usage of PRF in socket preservation.

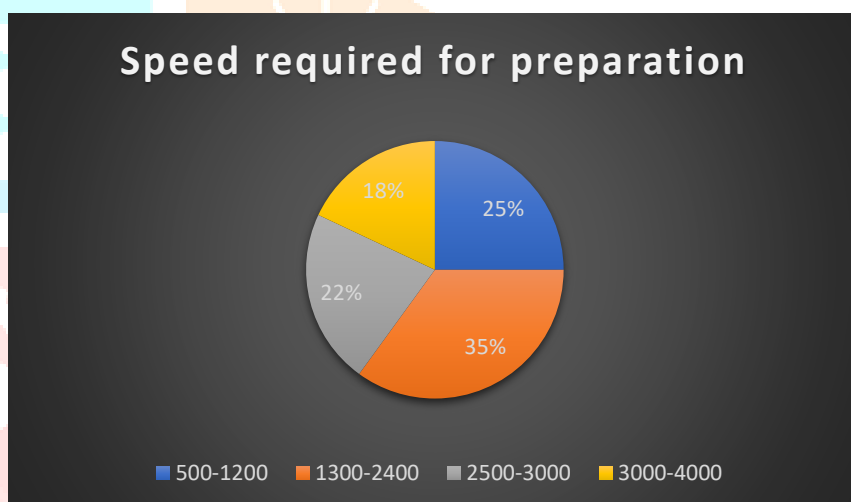


Fig. 6. Pie chart showing the speed required for preparation of PRF among the study population; where 35% were aware of the speed required for preparation (orange) and 65% were not aware of the speed required for preparation (Blue),(yellow),(Grey)

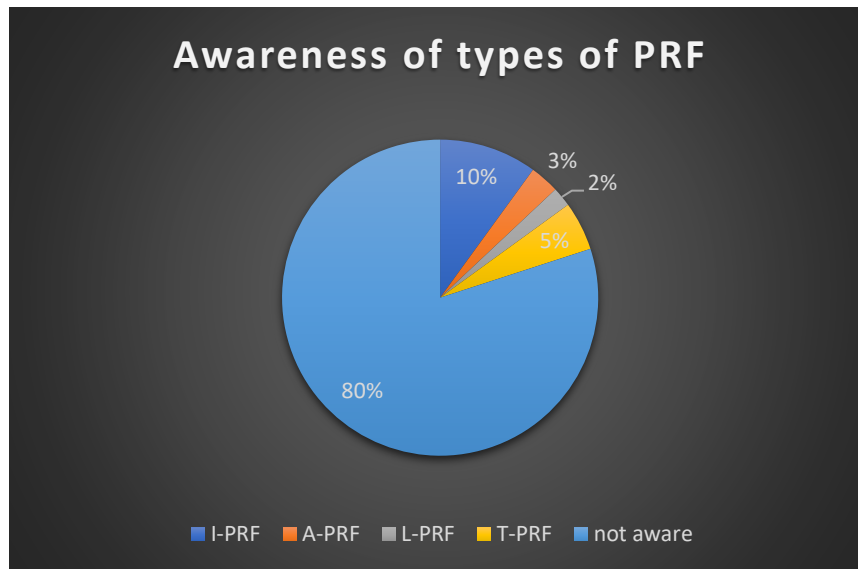


Fig. 7. Pie diagram showing the awareness of types of PRF only 10% were aware of I-PRF(Dark blue),3% were aware of A-PRF(Orange),2% were aware of L-PRF(Grey),5% were aware of T-PRF(Yellow),80% were not aware of all the types of PRF(light blue)

From the present survey-based study it was observed that there was no awareness of platelet-rich fibrin , method of preparation, types of PRF, speed required for its preparation, and its usage in socket preservation.

Discussion:

In the last few years, there has been increased interest in the term PRF. Platelet-rich fibrin has various applications in dentistry. PRF was first used in 2001 by Choukroun et al. specifically in oral and maxillofacial surgery ⁷ and is currently considered a new generation of platelet concentrate. Most of the responders were not aware of PRF(55%) and only (45%) were aware of the PRF. One of the main benefits of PRF is the fibrin network which promotes not only blood clot formation but also tissue repair mechanisms. The main components of platelet-rich fibrin include Growth factors, which are stored within platelet α granules, like platelet-derived growth factor (PDGF), insulin-like growth factor (IGF), vascular endothelial growth factor (VEGF), platelet-derived angiogenic factor (PDAF), and transforming growth factor-beta (TGF- β), platelets, leukocytes as well as an autologous fibrin matrix. However, the majority of the populations 97% were aware of growth factors.

Miron et al.⁸ observed that by further reducing the centrifugal force (g force) and the time duration of spin, a liquid PRF can be prepared. This was termed as Injectable-PRF or I-PRF. The centrifugal speed was kept at 60 g for 3 min. This small centrifugation time allows separation to occur before the clot has had time to form and preparation remains liquid. The volume of I-PRF produced in a 10 mL tube is usually 1-1.5 mL only. It has been found to have a higher concentration of platelets and WBC than L-PRF and A-PRF. Most of the respondents were not aware of its method of preparation (82%) only few (18%) were aware of its preparation by using centrifuge. Saluja et al. ⁹ stated that the PRF preparation protocol is very simple and armamentarium required is same as that of PRP. Around 5 ml of whole venous blood is collected in each of

the two sterile vacutainer tubes of 6 ml capacity without anticoagulant. The vacutainer tubes are then placed in a centrifugal machine at 3000 revolutions per minute (rpm) for 10 minutes, after which it settles into the following layers: red lower fraction containing red blood cells, upper straw-coloured cellular plasma and the middle fraction containing the fibrin clot. Most of the responders were not aware (65%) of the speed required for the preparation of PRF only 35% were aware of its speed. It can be further noted that the preparation of PRF is easier compared to other platelet concentrates as it does not require the use of an anticoagulant. Compared to PRP, the kinetics of growth factor release appear to be slower, thus affecting regeneration over a longer period of time. More and more studies are drawing attention to the beneficial effects of leukocytes on healing.

Girish kumar et al ¹⁰ conducted a study that found regeneration through PRF in both the bone volume and gingival tissue. They reported satisfactory clinical results related to reshaping the alveolar bone and in socket preservation. Awareness of the various types of PRF which include the injectable type of platelet-rich fibrin (I-PRF), leukocyte type of platelet-rich fibrin (L-PRF), and advanced platelet-rich fibrin (A-PRF), Titanium type of platelet-rich fibrin (T-PRF)¹¹. Most of the responders were not aware of all the types of PRF(80%). A significant association was found between gender and the awareness of types of PRF with female respondents(74%) having more awareness than male respondents(26%). Due to its effective hard and soft tissue regeneration properties, platelet-rich fibrin is being utilized not only in dentistry but also in various fields¹². Hence detailed research on PRF should be done.

Conclusion:

From this Survey, we can conclude that dental students are aware of growth factors but they were not aware of the term ,usage ,its method of preparation and speed required for the preparation of PRF and they do not have extensive knowledge of its usage in various techniques. Hence dental curriculum should include the knowledge about PRF.

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