
Ministry of Higher
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And Scientific Research
University of Misan
College of Dentisry


# PRP Use in Periodontal Therapy

A Project Submitted to
The College of Dentistry, University of Misan,
Department of Periodontology in Partial Fulfillment
for the Bachelor of Dental Surgery

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# Certification of the Supervisor

I certify that this project entitled " **PRP Use in Periodontal Therapy** " was prepared by the fifth-year students **Idrees Ahmed** and **Hussein Kadhim** under my supervision at the College of Dentistry/University of Misan in partial fulfilment of the graduation requirements for the Bachelor Degree in Dentistry .

**Supervisor's name** **Dr.Hiba Abd-alhussein**

**Date 27/3/2025**

# ACKNOWLEDGMENT

In the Name of Allah, the Most Merciful, the Most Compassionate all praise be to Allah, the Lord of the worlds; and prayers and peace be upon Mohamed His servantand messenger. First and foremost, I must acknowledge my limitless thanks to Allah, the EverMagnificent; the Ever-Thankful, for His help and bless. I owe a deep debt of gratitude to our university for giving us an opportunity to complete this work. My sincere appreciation is to my supervisor Dr.Heba Abdul Hussein Kazem for her thoughtful guidance, suggestion, criticism, invaluable help and advice  planning and conducting this research.

# TABLE OF CONTENTS

# 1. Introduction

The goal of periodontal therapy is to improve periodontal health and thereby satisfy the functional and aesthetic needs of patients.Advances in our understanding of wound healing in the last 3 decades has shifted the goal of periodontal therapy from repair to reconstruction of periodontal tissues, thereby reversing the damage to the periodontium caused by disease process, and reestablishing the periodontal structure. Periodontal regeneration requires the complex interplay of the cells that make up the periodontium, the matrices in which they interact, and their ligands**.**The use of polypeptide growth factors- platelet rich concentrate, a concentrated suspension of the growth factors in the periodontal regeneration has recently attracted the attention of periodontal researchers. Platelet concentrate contains Platelet derived growth factors,Transforming growth factors that are involved in wound Healing that act as promoters of tissue regeneration. They Are responsible for recruiting other cells to the site of Injury, initiating vascular in-growth, and inducing cell Differentiation [1]. Therefore, the term Platelet Rich Plasma is preferred to autologous platelet gel, plasma-rich growth factors (PRGFs) or a mere autologous platelet concentrate [2].The credit of introducing plateletrich plasma into contemporary oral surgery goes to Whitman et al who first advocated its use for oral surgical procedures in 1997 [3].

# 2. Aim of the study

The aim of this review Is to highlight the biological activities of the different Platelet concentrates and possible uses and benefits in the field of periodontics.

# 3. LITERATURE REVIEW

## 1. Platelet Rich Plasma (PRP)

The blood clot is the centre of focus of initiating all soft Tissue healing and bone regeneration. In all natural wounds A blood clot forms and starts the healing process. A natural Blood clot contains [4]

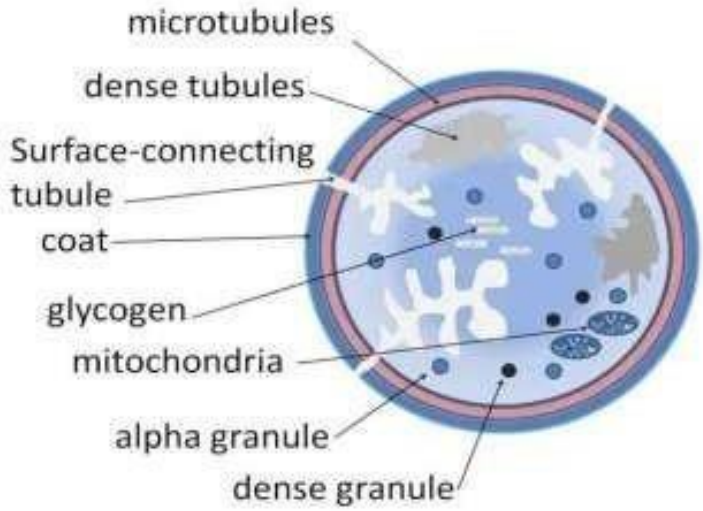
- 94% Red blood cells
- 6% Platelets
- <1% White blood cells along with numerous fibrin Strands. A PRP clot instead contains [4]

- 5% Red blood cells
- 94% Platelets
- 1% White blood cells

### 1.1 Components of Platelet Rich Plasma are:

- Growth Factors
- WBC & phagocytic cells
- Native fibrogen concentration
- Vasoactive and chemotactic agents
- High concentration of platelets

Platelet Rich Plasma is an easily accessible source of growth factors to support bone and soft tissue healing and initiates a more rapid and complete healing process. It has been shown to improve the rate of bone formation and also increase the density of bone formed by 19% to 25% when measure at four months time. Because PRP is an autologous product, it also eliminates concerns about immunogenic reactions and disease transmission between Individual.



Figr.1 explaines the structure of platelets (Dr Graham Beards,2023)

## 1.2. Biological rationale for the use of platelet rich plasma

Platelet rich plasma mimics the terminal stage of Coagulation cascade, that is, the formation of fibrin clot. The beneficial effects of PRP are through release of certain Growth factors released through α granule. Platelet Rich Plasma promotes collagen synthesis and angiogenesis Leading to increased early wound strength. These peptides Act both locally and systemically in a self regulatory Feedback system. It is proven that PRP ―jump starts‖ the Regenerative cascade after trauma leading to quality tissue Healing and patient care. The antimicrobial effect is Attributed to high leukocyte concentrate.The concentration Of these factors tapers by 7 days. The rate of healing is Proportional to the number of platelets in the clot within Graft/wound and PRP increases that initial platelet number.

## 1.3. Classification of Platelet Rich Plasma:

They are classified as

1. Pure -Platelet Rich Plasma
2. Leukocyte -Platelet Rich Plasma

## 1. 3.1.Pure Platelet-Rich Plasma (P-PRP) :

Pure Platelet-Rich Plasma (P-PRP) or Leukocyte Poor Platelet-Rich Plasma– products are preparations Without leukocytes and with a low density fibrin network After activation.

- All of the items in this family, by definition, can be utilized as liquid solutions or as activated gel. Thus, it can be injected (in sports Medicine) or applied (much like fibrin glues) to a skin wound or suture while it is gelling.
- There are numerous preparation techniques, but several publications recommend utilizing cell separators (continuous flow plasmapheresis) from haematology laboratories. even if this approach is far too complex to be applied regularly and effortlessly in day-to-day work.
- A widely publicized P-PRP technique is referred to by the trade name PRGF[5] [Plasma Rich in Growth Factors or Preparations Rich inGrowth Factors ] and was Tested in many clinical situations, particularly in sports Medicine.Two major problems with the technique are that it requires approximative pipetting stages during preparation and lacks ergonomics. The research on Since the majority of papers about this technique were written by the corporation that was advertising it, it is still very difficult to evaluate.
- Another technique of P-PRP was widely promoted for Skin ulcers and is known under the commercial name Vivostat PRF (Platelet-Rich Fibrin, Vivostat A/S, Alleroed, Denmark), what can be a source of confusion As this technique is not a PRF following the Terminology, but clearly a P-PRP product.

### 1.3.2. Leukocyte-and Platelet-Rich Plasma (LPRP)

Products are leukocyte-containing preparations that, after activation, have a low-density fibrin network. By definition, all of the products in this family, like the P-PRP, can be utilized as liquid solutions or in the form of activated gel .It can therefore be injected (for example in sports medicine) or placed during gelling on a skin wound or suture (similar to the use of fibrin glues).

- The greatest number of commercial or experimental systems with several interesting outcomes in general surgery (orthopaedic and sports medicine) [6]
- In recent years, a great deal of automated protocols have been established, requiring the use of particular kits that minimize the amount of handling of the blood samples and the highest level of preparation standardization,For Example Harvest Smart-PreP (Harvest Technologies, Plymouth, MA, USA) and Biomet GPS III (Biomet Inc., Warsaw, IN, USA).
- Other kits with more handling also exist, such as Plateltex(Prague,Czech Republic) or Regen PRP (RegenLab, Le Mont-sur-Lausanne, Switzerland)

## 1.4. Growth factors

PRP exerts its beneficial effects via the degranulation of The alpha granules in platelets that contain growth factors Believed to be important in early wound healing When the platelets in PRP are activated by thrombin, They release growth factors and other substances that Serve to accelerate the wound-healing process by increasing cellular proliferation, matrix formation, osteoid Production, connective tissue healing, angiogenesis, and Collagen synthesis.Minutes after the coagulation sequence commences, these growth factors start to actively secrete, And the first hour is when more than 90% of them are secreted .Following this initial outburst, for the final seven days of their life, the platelets produce and secrete more growth factors. Macrophages then arrive due to the vascular

ingrowth stimulated by the platelets and regulate woundhealing by secreting some of the same growth factors plus additional ones. Platelets in the blood clot inside the graft or wound dictate how quickly a wound heals, and PRP increases initial number.[7]

**The following will be the description of each growth factor And the role they play in repair and reconstruction**

## 1.4.1.Platelet derived growth factor-PDGF AA,AB,BB:

Uses in periodontal reconstruction:

- Mitogenesis increase in the number of healing Cells [8].
- Angiogenesis-generating new capillaries [9] .
- Up regulation of other growth factors and cells in promotion of fibroblastic and osteoblastic functions, promotion if cellular differentiation and acceleration of the effects of growth factors on other cells such as macrophages [9].
- Increase in the rate of proliferation of stem cells [10]

## 1.4.2.Transforming growth factors-TGF-beta:

- mainly affects osteoblasts and stem cell proliferation associated with the process of osteogenesis.It is involved in stimulating fibroblast, osteoprogenitor and endothelial cells, as well as in the production of collagen.

- TGF beta is a multifactorial cytokine that regulate Growth, proliferation, adhesion and apoptosis of Various cell types. In vitro enhances collagen gel Contraction thereby indicates its potential in Induction of fibrosis.

- TGF beta also forms substrates with glycosaminoglycans of different composition and is an important signal in regulation of integrins thus affecting cellular behaviour in adhesion, aggregation and migration.

- TGF beta that was applied in conjunction with implant placement in extraction sockets failed to increase the rate of Osseo integration

- The most important functions of TGF beta 1 and TGF beta 2 seem to be chemotaxis and Mitogenesis of osteoblast precursors and the Ability to stimulate their deposition of collagen Matrix for connective tissue wound healing and Wound formation

## 1.4.3.Insulin Like Growth Factor (IGF):

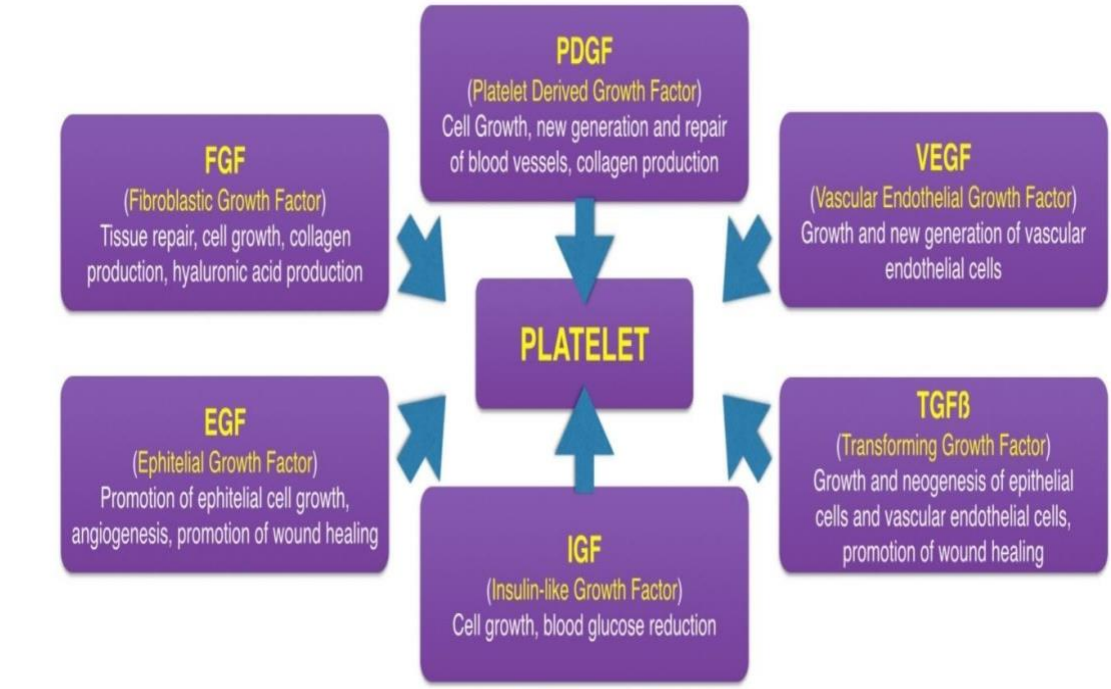
Stimulates the proliferation and differentiation of osteoblasts, as for the processes of periodontal Regeneration IGF-1 turns out to be of greater significance – it stimulates the proliferation of fibroblasts and the synthesis of extracellular proteins. Insulinlike growth factor-1 has a chemotaxis effect On progenitor cells of the periodontal ligament as well.

## 1.4.4.Fibroblast Growth Factor- (FGF):

Promotes the growth of fibroblasts, skeletal muscle myoblasts, vascular smooth muscle cells, endothelial cells, and certain types of epithelium Cells. This peptide exists in nine various forms, each identified by a unique gene. The primary forms are[11] :
1.FGF (acidic) –acidic: a FGF
2.FGF (basic) – basic: b FGF
Each of them has different biological effects Effects- Stimulates
angiogenesis, endothelial Proliferation , collagen synthesis, wound Contraction, matrix synthesis & epitheliazation [11]

## 1.4.5.Epithelial Growth Factor- (EGF):

- Released during platelet aggregation, causing cell migration and replication
- Encourage angiogenesis, collagenase activity, and reepithelialization.. [11]




Figr.2 the known types of growth factors released by platelets [61]

## 1.5. Preparation of PRP

PRP preparation begins with drawing the patient's peripheral blood. Peripheral blood is composed of 93% red blood cells,6% platelets, and 1% leukocytes[12] Blood must be drawn carefully since certain steps in the procedure can affect the quality of the PRP that is produced.

For instance, using a small needle to take blood may cause prematur platelet activation[13]. A larger needle (21 gauge or greater) should be used to obtain blood for PRP preparation. Blood should be aspirated slowly because the speed at which it is drawn may also affect the quality of the platelets[14].After blood is drawn from a patient, it undergoes a Centrifugation process to separate the liquid and cellular Components. The goal of this spinning process is to concentrate Platelets and lower the relative volume of erythrocytes[12]. The first spin is performed at approximately 900 g[15]. The purpose of this step is to separate platelets from the red and white blood cells. Next, a second spin may or may not be employed. This second, faster spin is performed at 1500 g and functions to create a buffy coat and further concentrate the platelets into the same layer as the white blood cells[15,16]. The materials utilized to prepare PRP have a influence on the finished result as well. Polypropylene tubes have been shown to be best for

platelet preparation and storage[17]. Tubes made from other materials, including glass and polystyrene, may lead to premature platelet activation or alterations in platelet morphology[18,19]. For these reasons, researchers must note these specifications when describing a PRP protocol, and clinicians should follow these instructions when preparing PRP. The concentration and quality of platelets from a given patient can be affected by a number of patient-specific factors.In comparison to fasting, a high-fat meal has been demonstrated to raise peripheral platelet concentration in healthy Volunteers.[20] Platelet function and concentration are also influenced by circadian rhythms; platelet concentrations rise in the afternoon and platelet decrease in activity from noon to midnight[21] It is important to take into account each of these factors when preparing PRP .

Various methods are now available for Collection of platelets.PRP obtained from gradient density Cell separator by discontinuous cell separation Method[9] The use of platelet concentrates obtained from this method is limited by 1.High levels of cardiovascular stress, they produce In elderlypatients
2.High production costs.
To overcome these difficulties PRP are commercially available and they are

1. Curasan PRP kit
2. PCCS PRP system

## PRP can be prepared by two techniques:

1.General-purpose cell separators
2.Platelet-concentrating cell separator
As the blood is centrifuged it is separated into 3 basic components. From the least dense to the most dense and they are ]9[:

1.Platelet poor plasma
2.Platelet rich plasma called as ―buffy coat‖
3.Dense red blood cells

**Platelet poor plasma:** It is the top level of serum containing autologous fibrinogen. It's poor in platelets, acellular plasma which accounts for about 200ml of volume[9[

**Platelet rich plasma:** It is the second level of serum with a Concentrated number of platelets and white blood cells. It
Contains autologous fibrinogen and accounts for 70ml of Volume [9].

**Red blood cells:** Red coloured fraction of the second level Mainly containing, packed red blood cells and platelets.

Usually the upper 6-7mm are very rich in fresh, young platelets. Below this level the platelet concentration decreased and accounts for 200ml of volume.Clotting factors and fibrinogen are present in both PRP and PPP. The preparation and processing of PRP is quite similar in most of the platelet- concentrating systems although the anticoagulant used and the speed and duration of centrifugation may differ with different systems.

**Steps:**

1. Venous blood is drawn into a tube containing an anticoagulant to avoid platelet activation and degranulation.
2. The first centrifugation is called "soft spin"
3. Separation into three layers, namely bottom-most RBC layer (55% of total volume), topmost acellular plasma layer called PPP (40% of total volume), and an intermediate PRP layer (5% of total volume) called the "buffy coat".
4. Using a sterile syringe, the operator transfers PPP, PRP And some RBCs into another tube without an Anticoagulant.
5. This tube will now undergo a second centrifugation, which is longer and faster than the first, called "hard spin". This allowsthe platelets (PRP) to settle at the bottom of the tube with a very few RBCs, which explains the red tinge of the final PRP preparation. The acellular plasma, PPP (80% of the volume), is found at the top.
6. Most of the PPP is removed with a syringe and Discarded, and the remaining PRP is shaken well.
7. This PRP is then mixed with bovine thrombin and calcium chloride at the time of application. This results in gelling of the platelet concentrate. Calcium chloride nullifies the effect of the citrate anticoagulant used, and thrombin helps in activating the fibrinogen, which is converted to fibrin and cross-linked[3].

Figure 3 Photograph showing (A) After first spin platelet poor plasma (PPP),platelet-rich plasma (PRP) and RBC base, (B) PPP and PRP were separated from RBC base and transferred into another empty vacutainer tube, (C) After second spin, PRP settled at the bottom [60].

The PCCS method Is Better and not only on the basis of results but also because Of the ease of handling clinically and the advantages Includes:

- Higher platelet counts in the final products are thought to be a sign of higherquality PRP.
- With a higher platelet collection efficiency, the surgeon can employ a greater quantity of the drawn thrombocytes.
- For the majority of dento-alveolar procedures, the amounts of PRP generated by the PCCS technique are enough.
- Compared to the Curasan technique, utilizing PCCS requires less preparation time .
- Because PCCS PRP preparation is more standardized and requires less training, staff mistakes are less likely. [22, 23].

## Methods for Activating PRP:

1. Calcium chloride activation:One of the most widely used techniques is the activation of calcium chloride. The agent causes platelets to degranulate and release their growth factors by triggering a fast coagulation response in PRP.Calcium chloride activation is simple, cost-effective, and widely accessible. It is particularly suitable for clinical applications requiring quick and uncomplicated activation[33].

2. Thrombin activation: Another popular PRP activator is thrombin. The clotting cascade is started by thrombin, which causes platelets to degranulate and release growth factors.This is an efficient technique that has been applied to a number of medical procedures. Nonetheless, there are worries over the possibility of thrombin-induced coagulation disorders, particularly in individuals who have clotting problems[34].

# 1.6.Mechanism of action of Platelet Rich Plasma:

PRP works via the degranulation of the α granules in platelets, which contain the synthesized and pre-packed growth factors. The active secretion of these growth factors is initiated by the clotting process of blood and begins within 10 minutes after clotting. More than 95% of the presynthesized growth factors are secreted within 1 hour. Therefore, PRP must be developed in an anticoagulated state and should be used on the graft, flap, or wound, within 10 minutes of clot initiation [24].

1. Through transmembrane receptors, the released growth factors attach themselves immediately to the outside of the cell membranes of the graft, flap, or wound.

2. In turn, these transmembrane receptors cause an endogenous internal signal protein to become activated. Which causes the expression of a normal gene sequence of the cell such as cellular proliferation, matrix formation, osteoid production, collagen synthesis etc. PRP growth factors therefore function by stimulating normal healing, but much more quickly[25]. The importance of this knowledge is that the PRP growth factors never enter the cell or its nucleus, they are not mutagenic. Consequently, PRP cannot and has never been able to cause the creation of tumors.

## 1.7.Advantages of Platelet Rich Plasma:

1. Because PRP enhances osteoprogenitor cells in the host bone and in bone grafts [24,25] it has found clinical applications in fully autogenous bone grafts and composites of autogenous bone grafts with a variety of bone substitutes with as little as 20% autogenous bone.
2. Consequently, PRP has demonstrated better outcomes in continuity defects [24,25] . sinus lift augmentation grafting [26,27] horizontal and vertical ridge augmentations, ridge preservation grafting [28] and periodontal/peri- implant defects [29].
3. When PRP is used in impaired bone, such as osteoporotic bone and bone after radiation therapy, it has been shown to enable early implant loading and enhanced osseointegration .
4. Because PRP also enhances soft tissue mucosal and skin healing, it is used in connective tissue grafts, palatal grafts, gingival grafts, mucosal flaps together with Alloderm (BioHorizons, Birmingham, AL) for root coverage, skin graft donor and recipient sites, dermal fat grafts, face lifts, blepharoplasty, and laser resurfacing surgery.
5. Nontoxic to tissues.
6. Easily and readily available
7. Accelerates endothelial, epithelial and epidermal regeneration
8. Stimulates angiogenesis and enhance collagen synthesis
9. Promotes enhanced soft and hard tissue wound healing

## 1.8.Disadvantages of PRP:

1. The first disadvantage of PRP is the variable preparation quality of the technique-sensitive preparation method.
2. The time-consuming nature of the PRP preparation method, which usually requires at least 30 min.
3. The third disadvantage is the continued use of bovine thrombin for clotting the liquid preparation of PRP [30–31].Concerns have been expressed in this regard regarding the potential for animalderived biologicals, like bovine thrombin, to transmit unidentified infections to PRP recipients[32].

Nevertheless, in an effort to overcome the first two disadvantages (i.e., technique- sensitive quality and time labor-intensive PRP preparations), automated preparation systems have been newly developed. Furthermore, some of the automated systems are capable of generating autologous thrombin for clotting PR preparations,which addresses the third concern of animal-derived biologicals.

# 2. Applications of PRP in Periodontal Therapy

Periodontal health implies the absence of inflammation associated with gingivitis, periodontitis, and mucogingival deformities, such as gingival recessions, considering individual anatomical, and morphological variability [35]. Periodontitis is an inflammatory disease of a multifactorial nature that affects the supporting tissues of the teeth. Here, the interaction between factors such as the immune response, lifestyle, habits, parafunctions, anatomical conditions, and occlusal trauma [36, 37] associated with dysbiotic plaque biofilms leads to the progressive destruction of tooth support tissues, generating residual soft, bone, and intraosseous tissue defects of varying degrees, up to the consequent dental loss [37, 38]. Periodontitis is a prevalent disease that affects more than 40% of individuals in the United States. The severe form of the disease has a global frequency of 11% [36].

## A. Treatment of Gingival Recession

Gingival recession is defined as the apical displacement of the gingival margin with respect to the cementoamelic junction associated with the loss of attachment and exposure of the root surface [38]. There is still insufficient scientific evidence for the associated etiological factors, which are mainly based on clinical observations and include a thin periodontal biotype, absence of attached or attached gingiva, reduction in the thickness of the alveolar bone due to the inadequate position of the tooth within the alveolar process, orthodontic movements, and non optimal restorative procedures and oral hygiene [38, 39]. This mucogingival condition causes deterioration of the exposed root surfaces, development of carious and

non-carious cervical lesions, dentinal hypersensitivity, loss of dental attachment, predisposition to localized inflammatory processes, and deterioration in dentogingival esthetics [39]. Treatment is indicated when it is difficult to control biofilm formation and when restorative or orthodontic treatment is required depending on the direction and size of the movements [40]. It is important to note that gingival recessions and a lack of keratinized tissue are highly prevalent in the adult population [38]. The clinical manifestations of gingival recessions and the residual bone defects, sequelae of periodontitis, are as variable and diverse as the patients treated. Therefore, the therapeutic approaches must be individualized and include surgical therapies with a regenerative approach to reduce morbidity and improve results in terms of insertion level gains, thereby increasing the probability of dental survival; this currently represents a surgical challenge due to the innovations in the techniques and biomaterials used [41, 42]. Platelet derivatives are autologous biomaterials that have been introduced in recent years as a scaffold to allow better healing and in regenerative treatments of periodontal diseases and mucogingival deformities [43]. They are associated with the presence of growth factors such as transforming β1, platelet-derived growth factor (PDGF), vascular endothelial growth factor, glycoproteins such as thrombospondin-1, and cytokines such as interleukins (IL)-1β, IL-4, and IL-6 [44, 45], in addition to fibrin, fibronectin, and vitronectin, which act as connective tissue matrix and adhesion molecules for more efficient cell migration [46–47]. In dental procedures, this protocol was adopted in 2001, and in 2009, Dohan Ehrenfest et al. [48] established a classification for the different platelet concentrates. Thus, according to their leucocyte and fibrin content, platelet-rich products are currently classified as follows: (1) PRP: (a) pure platelet-rich plasma (P-PRP) and (b) leukocyte- and platelet-rich plasma

(L-PRP); (2) platelet-rich fibrin (PRF): (a) pure platelet-rich fibrin (PPRF), (b) L-PRF, and (c) injectable platelet-rich fibrin (I-PRF).

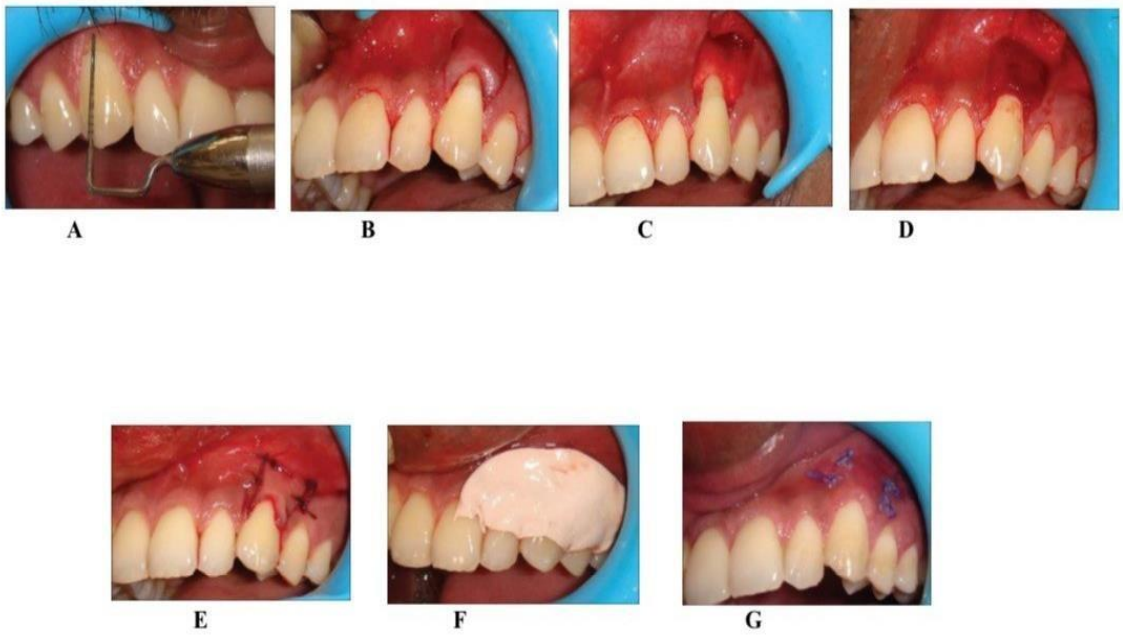



Figure 4: A: Pre-operative view of recession, B: Vertical and sulcular incisions, C: Full and partial thickness flap reflected, D: Platelet rich plasma with collagen sponge placed over the defect, E: Flap coronally advanced and sutured, F: Periodontal pack in place, G: 1 week post- operative view. [59]

B. Use of platelet derivatives for the management of intrabony defects [49–50] and mucogingival deformities [48], most of them present results only on PRF [49, 51]. Furthermore, all these reviews present only encouraging results in terms of healing and postoperative morbidity, except for reviews by Miron et al. [51] and Najeeb et al. [52] that present clinical results comparable with those of open flap debridement plus bone graft. On the other hand, Tavelli et al. [53] found that the type of bone graft material and biological agent used had a substantial impact on the clinical and radiographic results of intrabony defect treatment. These reviews also indicate a lack of evidence and the lack of a convincing role for the use of PRF in the management of intrabony defects and gingival recessions.

Therefore, the objective of this umbrella review was to consolidate the best available evidence considering the clinical efficacy of platelet derivatives in the treatment of periodontal defects associated with periodontitis and in the management of mucogingival deformities.[47]

C. .Therapies combined with platelet derivatives (PRP, PRF, or LPRF) produce superior regenerative results in intrabony defects in terms of improvement of CAL, PD, and bone filling, compared to monotherapies and surgical periodontal therapeutic procedures alone.
D. The use of PRP in surgical therapies of intraosseous defects provides more benefits in terms of radiographic bone filling and clinical attachment gain when combined with bone substitutes, being the most recommended xenograft in intraosseous defects. [49]

E. PRF and L-PRF can be used alone in surgical therapies of intrabony defects with improved results in terms of improvement of CAL, PD, and bone filling, compared to the use of PRP without bone substitute or only surgical therapy. [54]

F. In GRT therapies, the type of defect and the surgical technique to be used should be diagnosed appropriately if the defect is not contained. If extensive regeneration of a defect wall is required, it is recommended to use a barrier membrane and bone substitute, which, in turn, can be combined with PRP. However, it is not Recommended to use PRF and L-PRF and other biologics because they do not confer an additional benefit to that already provided by the barrier membrane. [56]

G. In periodontal plastic surgery where the main objective is to achieve not only root coverage but also an increase in the band of keratinized gingiva, it is not recommended to replace the autologous CTG or xenograft with PRF or L-PRF, since they do not provide significant advantages regarding clinical results (PD, CAL, and root coverage). Their use is only recommended to improve early healing processes, especially in the donor bed, where they show good results.[55]

H. The ultimate goal of periodontal therapy in the case of infrabony defects is regeneration. Regeneration means “reproduction or reconstitution of a lost or injured part. It considers all the procedures attempting to regenerate lost periodontal structures through differential tissue responses and by different biomaterials such as grafts, membranes or Biomodulators as Enamel Matrix Proteins” [56].The adjunctive use of PRP in the regenerative treatment of infrabony defects can be considered as an affordable technique to get a better CAL gain and PPD reduction in the surgical treatment of periodontal infrabony defects. The regeneration/repair of infrabony defects would favor the use of adding PRP to a simple surgical repositioned flap technique, like in the open flap debridement (OFD), with the use of bone grafts (xenografts, HA, or TCP). No better results would be achievable using combinations with biomodulators (Emdogain) or membranes, the PRP just would act as a biomodulator itself.In a biological sense, this observation would state for the biomolecular signaling action between PRP and the surrounding cellular environment that any membrane could interrupt or modify. The use of bone grafts would state as a blood clot stabilizer enhancing the osteoinductive properties of the PRP itself [57].

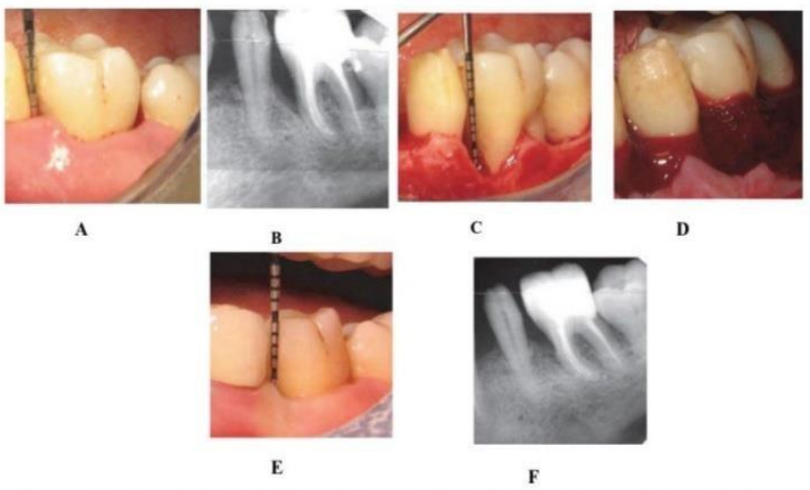



Figure 5 A: Initial clinical view of the intrabony defect and probing depth, B: Initial radiographic view of the intrabony defect, C: Intrasurgical measurement of the intrabony defect, D: Application of PRP alone, E: 12- months clinical view of the intrabony defect and probing depth, F: 12-months radiographic view of the intrabony defect. (58).

# Conclusion

PRP is a promising biologic treatment with a wide range of Applications.·Platelet concentrate contains Platelet derived growth factors,Transforming growth factors that are involved in wound Healing that act as promoters of tissue Regeneration.They Are responsible for recruiting other cells to the site of Injury, initiating vascular in-growth, and inducing cell Differentiation Platelet Rich Plasma is an easily accessible source of growth factors to support bone and soft tissue healing and initiates a more rapid and complete healing process. PRP exerts its beneficial effects via the degranulation of The alpha granules in platelets that contain growth factors Believed to be important in early wound healing When the platelets in PRP are activated by thrombin, They release growth factors and other substances that Serve to accelerate the woundhealing process Applications of Platelet-Rich Plasma (PRP) in Periodontal Therapy involve treating periodontitis, gingival recession, and mucogingival deformities. Periodontitis is an Inflammatory disease that affects the supporting tissues of the teeth and can lead to tooth loss. It is a prevalent disease affecting over 40% of individuals in the United States.

Gingival recession refers to the displacement of the gingival margin and Exposure of the root surface, leading to various dental issues. The etiological factors include thin periodontal biotype, lack of attached gingiva, inadequate tooth position, orthodontic movements, and restorative procedures. Gingival recession can cause deterioration of the root surfaces, hypersensitivity, loss of dental attachment, and Esthetic problems. Treatment is required when biofilm control is difficult or when restorative or orthodontic treatment is necessary. Platelet derivatives, such as platelet- rich plasma and platelet-rich fibrin, have been introduced as biomaterials to aid in Healing and regenerative procedures for periodontal diseases and mucogingival deformities. These derivatives contain growth factors and cytokines that promote tissue regeneration. The use of platelet derivatives in dental procedures has been Established since 2001, and different classifications have been established based on their cellular and fibrin content.

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