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Opinion

PRF: An Indispensible Adjunct in Implantology

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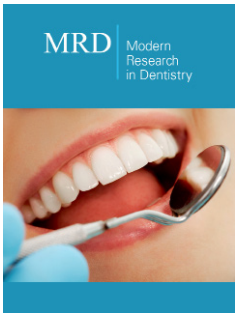

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Opinion

PRF or Platelet Rich Fibrin is an autologous meshwork of polymerised fibrinogen molecules which contains additional blood components entrapped during the process of deriving this mineral from the ore of whole blood. Blood has traditionally been known as "Elixir of life" as it supplies tissues with auto regulated elements of generation, survival and destruction of cellular and sub cellular forms. Researchers have worked for decades to strike a balance in derivation of concentrates from blood which can be applied in various aspects of regeneration of tissues including qualitative enhancement of wound healing. The first breakthrough was in 1950's when Kingsley [1] first used the term PRP (Platelet rich plasma). Many researchers contributed to evolution of blood concentrates extraction techniques until Marx revolutionized the blood concentrates arena with his research work [2]. This sizzled a new craze across the medical fraternity and led to widespread usage of this modality. There were mixed results and then Marx et al established the norms and standards of preparation with minimum threshold of platelet count for tipping the balance in one's favour. Not much time had passed and Choukroun et al superceeded Marx et al with making of PRF (Platelet Rich Fibrin) which was a 100 percent autologous product [3]. It required a tabletop centrifuge which had to be spun at particular rpm (rounds per minute) for a particular time (Table 1). Although the angulation of glass/silica coated tubes containing blood kept in the housing of centrifuge was specific to the unit invented for the purpose. This was followed by development of variations of this technique based on change in rpm and duration of centrifugation.

Table 1

Type of Blood Concentrate	RPM of Centrifuge	Duration of Spin	Phlebotomy Tube	Product Characteristics
Platelet Rich Fibrin (PRF)	3000	10	Glass/silica coated	A yellowish gel like clot as middle layer between top layer of acellular serum and bottom layer of RBC's
Autologous Fibrin Glue (AFG) [4]	2400-2700	2	Glass/silica coated	Superficial layer of pale yellow AFG which can be drawn with needle over syringe and bottom layer of RBC's
Injectable Platelet Rich Fibrin (i-PRF) [5]	3300	2	Glass/silica coated	Reddish plasma top layer which can be drawn with needle over syringe and bottom layer of RBC
Concentrated Growth Factor (CGF) [6]	Acceleration 2700 2400 2700 3000 Deaccelera-tion	30sec 2min 4min 4min 3min 36sec	Glass/silica coated	Four layers: 1. Top layer: serum 2. Interim layer: fibrin buffy coat 3. Liquid phase: growth factors 4. Lower phase: RBC
Titanium Prepared PRF(T-PRF) [7]	2800	12min	Grade 4 Titanium tubes	Same as PRF but on scanning Electronmicroscopy, fluorescence microscopy and histomorpho-metric analysis T-PRF had: Highly organised fibrin network with continuous integrity, Fibrin net-work covered larger are

Tremendous amount of research work has gone into exploration of benefits of PRF and its variants and their application in the speciality of Implantology. PRF has found and established its role as more than an adjunct in many a procedure. It has been used to fill in the extraction sockets [4]. The advantages were lesser pain and faster and better regeneration of bone. It has been used successfully as a sole biomaterial for crestal sinus lift with great success. This negated the need for a bone graft. It is also used along with alloplastic and allogenic bone in sinus lifts where greater volumes are needed [5]. PRF is shredded into tiny bits and mixed with graft particles to fill in the sinus cavity. Sustained release of growth factors helps in accelerated maturation of the graft and keeps inflammation in check. AFG and PRF membrane have been used alone and in combination for repair of sinus perforation and many authors have reported successful results [10]. PRF membranes can be used alone or in conjunction with collagen membrane in guided bone regeneration. The AFG can be used to enhance the handling characteristics of bone graft material [6]. Heap of graft material is poured with AFG and allowed to polymerise for 5-10 minutes. PRF membranes with or without heat treatment can be used to cover the raw defects arising from harvesting full thickness connective tissue grafts from palate [7]. This promotes early epithelisation and reduces postoperative pain. The big question is "Why has PRF attracted so much of an interest in various aspects of tissue regeneration?" The answer lies in its extremely low risk benefit ratio. Use of PRF has multiple advantages with very few limitations. Preparation of PRF is a simple procedure which requires the use of a tabletop centrifuge. It is 100 percent autologous product with no chance of rejection or infection from a patient's body. Rather, it has been proven to possess antibacterial properties, which might bring down the chances of infection. It causes sustained release of growth factors entrapped within the fibrin clot as it undergoes gradual lysis [8,9]. This accelerates both soft and hard tissue regeneration and simultaneously keeps inflammatory mediators under check. It stimulates osteoblastic activity both in terms of proliferation and differentiation. PRF in membrane form has the potential to repel epithelial cells from the defect and promotes surface epithelisation making it an ideal aid for guided bone regeneration. It is biodegradable and the period may range from anywhere between 7-14 days. Heat treatment may increase the longevity for up to 28 days [10,11]. A biomaterial with all these advantages comes at a close to nil cost. The only requirement is a onetime investment into a centrifuge and every case requiring a phlebotomy set and vaccutainers. PRF definitely deserves the research attention and application craze it has attracted and has become an Indispensible tool in the armamentarium of an Implantologist.

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