



## FEATURES AND BENEFITS OF THE TROPOCELLS® PRP SYSTEM

### Effectiveness

- The Tropocells® system enables high platelet yield
- Rapid and simple preparation process with a single 10-minutes spin time
- Customizable Platelet Concentration for specific clinical applications
- Specially designed accessories for operation room setting.

### Safety and Quality

- Closed, biocompatible and xeno-free system minimizing safety concerns.
- Approved medical device by the European (CE) and USA (FDA) Regulatory Authorities (FDA clearance for orthopedic applications only).
- Manufactured in clean rooms, under EN ISO 13485:2003, ISO 9001:2008 Quality System International Standards.

## UNIQUE BIOLOGICAL PROFILE

The specially-designed Tropocells Separator Gel produces an optimum PRP profile:

- Low granulocytes: PMNs are not considered beneficial in terms of regeneration process and may contribute to a catabolic effect by secreting catabolic mediators, including metalloproteinases [20].
- Virtually eliminating granulocytes from PRP, which are not considered beneficial in terms of regeneration process and may contribute to a catabolic effect by secreting catabolic mediators, including metalloproteinases [20].
- Low RBCs: erythrocytes have been shown to significantly decrease fibroblast proliferation and augment apoptosis in vitro [21].
- High Monocytes: Mononuclear cells present in PRP assist in fighting infection.
- Increasing collagen expression and enhance anabolic effects of PRP [22].
- High Platelet Yield: A proprietary anticoagulant and specialized tube coating help maximize platelet yield so a lower volume of blood is needed.

## ADVANTAGES OF PRP THERAPY IN ORTHOPEDICS & SPORTS MEDICINE

- PRP initiates connective tissue healing, bone and joint surface regeneration and repair, promotes development of new blood vessels and stimulates wound healing.
- PRP provides significant improvement in symptoms
- Minimal safety concerns – PRP is a very safe procedure; it is non-allergenic and without risk of transmissible diseases.
- PRP accelerates healing and may delay or eliminate the need for surgery.
- May be combined with other treatments to stimulate biological healing effects.



## SIDE EFFECTS AND CONTRAINDICATIONS

The autologous nature of PRP eliminates concerns for disease transmission and minimizes chances for possible side effects, which may be in a form of mild bruising, pain, swelling or infection. Standard skin disinfection should be used before PRP injection [23]. Contraindications include pregnancy, breast feeding, autoimmune or blood pathologies and cancer. Furthermore, use of NSAID drugs within 7 days prior to and 5 weeks after TROPOCELLS® PRP should be avoided [23].

### References:

1. Platelet-rich plasma: a review of biology and applications in plastic surgery. Eppley BL et al. *Plast Reconstr Surg.* 2006
2. Platelet Rich Plasma. A New Treatment Tool for the Rheumatologist? De La Mata. *Reumatol Clin.* 2013
3. The effect of thrombin activation of platelet-rich plasma on demineralized bone matrix osteoinductivity. Han B et al. *J Bone Joint Surg Am.* 2009
4. Positive effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial: platelet rich plasma versus corticosteroid injection with a 1-year follow-up. Peerbooms JC et al. *Am J Sports Med.* 2010
5. Platelet-rich plasma versus autologous whole blood for the treatment of chronic lateral elbow epicondylitis: a randomized controlled clinical trial. Thanasis C et al. *Am J Sports Med.* 2011
6. Platelet rich plasma in arthroscopic rotator cuff repair: a prospective RCT study, 2-year follow-up. Randelli P et al. *J Shoulder Elbow Surg.* 2011
7. Platelet-rich plasma vs hyaluronic acid to treat knee degenerative pathology: study design and preliminary results of a randomized controlled trial. Filardo G et al. *BMC Musculoskelet Disord.* 2012
8. Patellar tendon healing with platelet-rich plasma: a prospective randomized controlled trial. De Almeida AM et al. *Am J Sports Med.* 2012
9. Platelet-Rich Plasma Versus Focused Shock Waves in the Treatment of Jumper's Knee in Athletes. Vetrano M et al. *AJSM.* 2013
10. Role of platelet-rich plasma in combination with alloplastic bone substitute in regeneration of osseous defects. Singh I et al. *J Oral Biol Craniofac Res.* 2011
11. Regeneration of human bones in hip osteonecrosis and human cartilage in knee osteoarthritis with autologous adipose-tissue-derived stem cells: a case series. Pak J. *J Med Case Rep.* 2011
12. Application of platelet-rich plasma accelerates the wound healing process in acute and chronic ulcers through rapid migration and upregulation of cyclin A and CDK4 in HaCaT cells. Kim SA et al. *Mol Med Rep.* 2013
13. Efficacy of intradermal radiofrequency combined with autologous platelet-rich plasma in striae distensae: a pilot study. Kim IS et al. *Int J Dermatol.* 2012
14. Platelet-Rich Plasma Induces Increased Expression of G1 Cell Cycle Regulators, Type I Collagen, and Matrix Metalloproteinase-1 in Human Skin Fibroblasts. Cho JW et al. *Int J Mol Med.* 2012
15. Using objective criteria to evaluate cosmetic effects of platelet rich plasma. Amgar G et al. *Prime* 2011
16. Platelet rich plasma (PRP) for facial rejuvenation. Zenker S. *J. Méd. Esth. et Chir. Derm.* 2010
17. A randomized, double-blind, placebo and active-controlled, half-head study to evaluate the effects of platelet rich plasma on alopecia areata. Trink A et al. *BJD* 2013
18. Platelet-Rich Plasma: A Therapy For Hair Growth. Amgar G and Bouhanna P. *Prime* 2013
19. Autologous PRP Injection in Androgenic Alopecia. Amgar G and Bouhanna P. *Prime* 2015
20. Growth Factor and Catabolic Cytokine Concentrations Are Influenced by the Cellular Composition of Platelet-Rich Plasma. Sundman EA et al. *Am J Sports Med.* 2011
21. Red Blood Cells Inhibit Proliferation and Stimulate Apoptosis in Human Lung Fibroblasts In Vitro. Fredriksson K et al. *Scand J Immunol.* 2004
22. Peripheral Blood Mononuclear Cells Enhance the Anabolic Effects of Platelet-Rich Plasma on Anterior Cruciate Ligament Fibroblasts. Yoshida R et al. *J Orthop Res.* 2013
23. ICMS Guidelines, Section VIII Platelet Rich Plasma (PRP). Guidelines, 2011

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# ADVANCE REPAIR RESTORE

YOUR BODY'S ABILITY  
IN A NATURAL WAY  
Platelet-Rich Plasma (PRP) Therapy





### What is Platelet-Rich Plasma?

Platelet-Rich Plasma (PRP) is an innovative and promising approach in tissue regeneration. PRP is defined as an autologous concentrated preparation of platelets in a small volume of plasma [1]. PRP owes its therapeutic interest to the crucial instrumental role of growth factors released by platelets granules which possess multiple regenerative properties. The autologous nature of Tropocells® PRP guarantees its excellent safety profile [2].

### Therapeutic Effect of PRP

PRP is thought to promote physiological healing and rapid soft and hard tissue regeneration by delivering high concentrations of growth factors essential for connective tissue healing; regenerating and repairing bone, tendon, cartilage and ligament; promoting development of new blood vessels and stimulating wound healing.

### PRP Growth Factors

Upon activation, platelets release growth factors, cytokines and other bioactive proteins, which are part of the natural healing process. These growth factors are regeneration-associated signaling molecules, such as Platelet-Derived Growth Factor (PDGF), Transforming Growth Factor group (TGF), Epidermal Growth Factor (EGF), Vascular Endothelial Growth Factor (VEGF), Fibroblast Growth Factor (FGF) and others. These growth factors control and regulate the healing cascade, by exerting their effects on inflammatory process, cell proliferation, reepithelialization, angiogenesis, wound healing, collagen production and other tissue remodeling processes [1-2].

### Platelet Activation

Platelets may be activated via addition of activating substances, such as thrombin and calcium chloride. However, It has been postulated that in situ activation of platelets (caused by injection; upon contact with connective tissue and exposure to in situ coagulation factors, such as collagen), the cell membrane of the platelet is "activated" to release these alpha granules, resulting in a slow release pattern of growth factors secretion, which is beneficial for stimulating a continuous healing response [3].

### PRP Applications

PRP's safety and effectiveness have been established for accelerating soft and hard tissue healing in treatment of tendinopathies [4-6], osteoarthritis [7] and various joint and muscle pathologies in Orthopaedics and Sports Medicine [8, 9\*]. PRP may be used as a standalone treatment or as a biological adjunct to other biomaterials, such as bone substitutes [10], hyaluronic acid, collagen and stem cells [11]. Moreover, PRP has been used extensively for treating chronic wounds [12\*, 13\*, 14\*], in Plastic [1, 13\*], Oral and Maxillofacial surgery [10], Skin Rejuvenation [15\*,16\*] and Hair Restoration [17, 18\*, 19\*]

\* Publications with Estar Medical's device for PRP preparation.

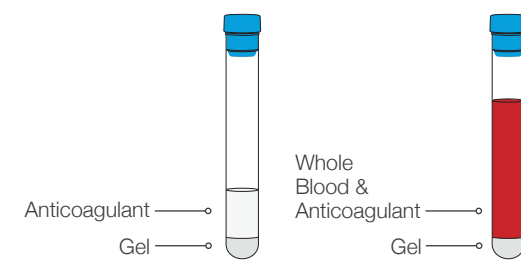


## PRP PREPARATION USING TROPOCELLS® PRP

PRP is prepared by taking a small sample of the patient's own blood, then separating platelets from Platelet-Poor Plasma (PPP), Red Blood Cells (RBC) and leukocytes via centrifugation. PRP is then collected and can be injected back into the treated site to promote healing response. The whole preparation process is simple and takes up to 15 minutes.

1

Collect blood directly into Tropocells® PRP vacuum tube containing separation gel and anticoagulant



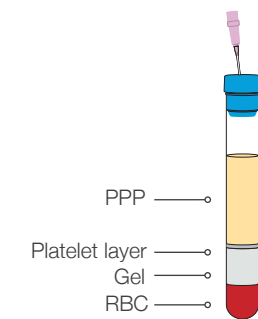
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Centrifuge for 10 min at 1500 g.



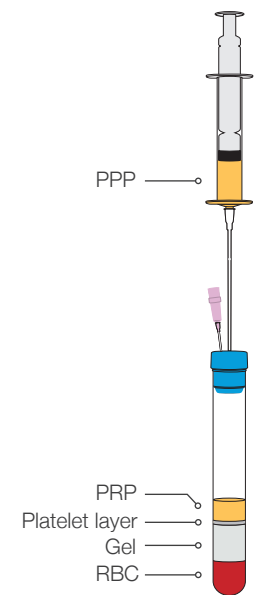
3

Gel separates platelets from PPP, RBC and granulocytes. Platelets reside on top of the gel. Insert the vented needle into the tube



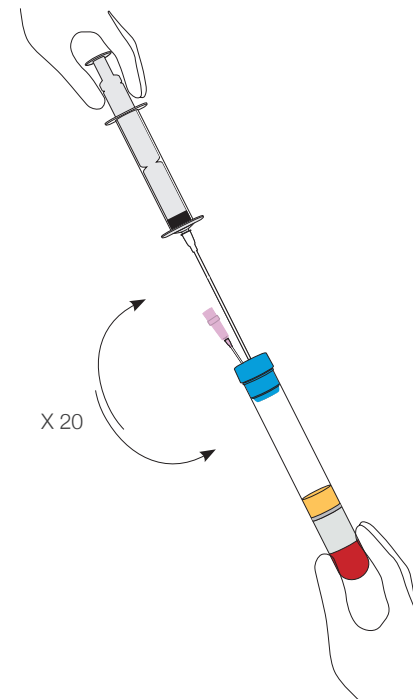
4

Remove a portion of PPP to achieve higher platelet concentration (optional)



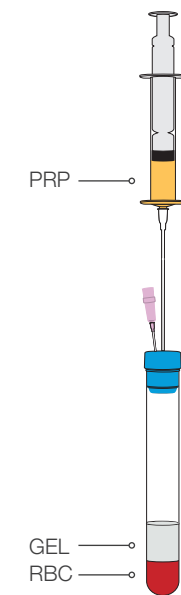
5

Resuspend platelets in the remaining plasma to generate PRP by inverting the liquid a few times against the tube wall



6

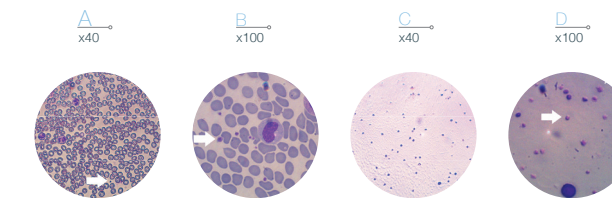
Draw PRP for use



## Tropocells® PRP – 2ml

Platelets concentration fold	X 4 - 5
RBC (10 <sup>6</sup> /ul)	0.0
WBC (10 <sup>3</sup> /ul)	0.2
Granulocytes %	8.5
Mononuclear cells %	86.2
PDGF (pg/ml)	2048
VEGF (pg/ml)	220
EGF (pg/ml)	269

The performance tests were carried out according to the U.S. FDA requirements for Platelets Rich Plasma medical devices.



Hematological analyses of PRP vs. whole blood. (A-B) Stained whole blood smears containing numerous erythrocytes and leukocytes. Conversely, PRP smears (C, D) contain primarily platelets (arrow), while the erythrocytes and granulocytes are eliminated.



Tropocells® PRP preparation

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