

Platelet-Rich Plasma (PRP) Treatment

Regenerative Injection Therapy



A new treatment for pain is becoming popular among orthopedic and pain specialists: the injection of platelet rich plasma or PRP. Blood platelets are involved in clotting but they are also responsible for bringing white blood cells to the injured area to clean up the remains of dead and injured cells. Most importantly, blood platelets release growth factors that are directly responsible for tissue regeneration.

PRP has been used for years in surgical centers around the US and abroad to improve the success of bone grafting (especially in dental surgery) and also by cosmetic surgeons for speeding healing time and decreasing the risk of infection after surgery.

What can PRP treat?

More recently, doctors and surgeons have been injecting PRP for the treatment of chronic pain. PRP can treat all chronic and acute joint, ligament and tendon injuries including:

- Tennis elbow
- Plantar fasciitis
- Achilles tendonitis
- Rotator cuff tears
- Shoulder dislocations
- Meniscal tears
- Osteoarthritis
- Chronic low back
- Neck pain
- and many more...

The goal is to promote the regeneration of degenerated and/or torn or strained connective tissue, ligaments, tendons and joints. Using PRP, there are reports of success at a magnitude greater than regular dextrose prolotherapy, and of benefit where prolotherapy effects have plateaued or been insufficient.

What is Platelet-Rich-Plasma (PRP)?

Platelet Rich Plasma or PRP is blood plasma with concentrated platelets. The concentrated platelets found in PRP include growth factors and a huge reservoir of bioactive proteins that are vital to initiate and accelerate tissue repair and regeneration. These bioactive proteins increase stem cell production to initiate connective tissue healing, bone regeneration and repair, promote development of new blood vessels and stimulate the wound healing process.

While a normal concentration of platelets circulating in your blood is 200,000 per micro litre, the platelet count in Platelet Rich Plasma can exceed 2 million platelets per micro litre. To be considered PRP the platelet count must be 4x or greater above baseline.

How is Platelet-Rich-Plasma (PRP) made?

The process of creating Platelet-Rich-Plasma begins by drawing 20 - 60 cc (mL) of blood (significantly less than the 500 cc that is regularly taken in blood bank donations).

The blood is then put into the Harvest SmartPREP®2 Platelet Concentrate System and spun down separating the red blood cells, plasma and concentrating the platelets.

How does it work?

All injuries result in tissue damage. The body's natural response to injury is an organized process of regeneration and remodelling of damaged cells that ideally returns the injured tissues to its normal state. Collectively, this process is known as the healing cascade.

This healing cascade is primarily controlled by bioactive tissue growth factors found in platelets. With PRP prolotherapy, these growth factors are concentrated and injected directly into the site of injury.

Growth Factor Biology

The response of living tissue to injury forms the foundation of all surgical practices:

- All surgery results in tissue and cellular damage
- The body's natural response to this injury is a series of regeneration and remodelling steps collectively referred to as the "Healing Cascade"
- The steps are initiated and controlled by bioactive proteins found in platelets, plasma, and white blood cells
- Cellular regeneration, remodelling, and proliferation required a combination of:
 - Scaffold (structure or matrix)
 - Undifferentiated Cells (Mesenchymal stem cells)
 - Signal Proteins (platelets, plasma and white blood cells)
- Increasing the concentration of the bioactive proteins acts as a catalyst for accelerating the wound healing process and forms the foundation of tissue engineering

Bioactive proteins replace, repair, and regenerate tissue. These proteins are natural components found in the body and are considered by many to be a "new frontier" of clinical treatment. By increasing the bioactivity at the wound site medicine takes a step closer to the ultimate goal of naturally accelerating the body's normal healing process.

The bioactive proteins carried by platelets are already being used successfully for hemostasis, wound sealing, and wound healing in surgical disciplines such as: oral and maxillofacial, orthopaedic, neurology, otolaryngology, cardiovascular, vascular, general, plastic and reconstructive, non-healing wounds, and paediatrics.

Why use your own plateletes?

Platelets are tiny cells that are critical to healing. They are the body's primary source of bioactive tissue growth factors, including CTGF (Connective Tissue Growth Factor) PGDF (Platelet Derived Growth Factor), TGF- β (Transforming Growth Factor-beta), EGF (Epidermal Growth Factor), IGF (Insulin Growth Factor), bFGF (basic Fibroblast Growth Factor), and VEGF (Vascular Endothelial Growth Factor).

By concentrating these growth factors and injecting them at the site of injury, the body's own stem cells are drawn to the injured area and differentiate to form new healthy and robust regeneration of damaged ligaments and tendons.

PRP provides a fibrin matrix graft

Fibrin matrix provides the scaffolding for new collagen to form along damaged ligaments and tendons. With a fibrin matrix graft, even severely damaged tissues can re-organize and heal.

PRP concentrates Mesenchymal stem cells (MSCs)

MSCs are multi-potent stem cells that can differentiate into a variety of cell types during tissue repair processes. Cell types that MSCs have been shown to differentiate into include collagen secreting cells, bone forming osteoblasts and cartilage forming chondrocytes. Together these cells have the potential of rejuvenating tissues damaged by injury, degenerative changes, and osteoarthritis.

What does it do?

The PRP process concentrates fibrin, mesenchymal stem cells, and platelets so that each cubic millimeter of solution contains 1.5 to 2 million platelets, resulting in up to a five-fold increase in platelets and bioactive growth factors. Because it is so concentrated, PRP acts as a potent tissue growth stimulant, amplifying the natural process of tissue repair and healing.

Studies show that PRP induces the production of new collagen by the fibroblasts, bone and cartilage cells at the site of the injection; thus rebuilding the joint cartilage and strengthening injured ligaments and tendons. This new collagen is naturally incorporated directly into your existing cartilage and ligaments, making them thicker, stronger and more elastic.

How does PRP Regenerative Injection Therapy compare with Cortisone shots?

Studies have shown that cortisone injections may actually weaken tissue. Cortisone shots may provide temporary relief and stop inflammation, but may not provide long term healing. PRP therapy is healing and strengthens these tendons and ligament. In some cases the tendon and ligament tissue has been thickened up to 40%.

