Platelet Rich Plasma
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Peak Veterinary Referral Center is one of only a few practices across the country to offer Platelet Rich Plasma therapy (PRP). Platelet rich plasma has been demonstrated in humans and animals to accelerate the healing of numerous tissues throughout the body including ligament, tendon, and bone and to aid in the management of osteoarthritis. Autogenous PRP is generated from a dog’s own red blood cells and an entire treatment can be performed in about an hour. We will sometimes combine PRP treatments with stem cell treatments for specific medical problems; however, PRP is frequently used on its own. PRP has numerous advantages over stem cell treatments including its being about 1/10 the cost, and the ability to perform immediate treatment without the need for surgery.

What is PRP?
Platelet rich plasma is an autogenous fluid concentrate composed primarily of platelets which is used to accelerate healing of tendon, ligament, bone and other tissues. (PRP is defined as 5.5x10^10 platelets/50ml). Protein Rich Gel is formed by combining PRP with thrombin and calcium chloride to form a semisolid material and has been used extensively in human dentistry.

How does PRP work?
Platelets are among the first cells to migrate to sites of tissue trauma, and in addition to their role in hemostasis, they contain numerous growth factors that stimulate tissue healing. These growth factors include:
platelet-derived growth factor (PDGF)
transforming growth factor-β1 (TGF-β1)
transforming growth factor-β2 (TGF-β2)
vascular endothelial growth factor (VEGF)
basic fibroblastic growth factor (bFGF)
epidermal growth factor (EGF)

Other factors contained in platelets which may affect tissue inflammation and healing include antibacterial and fungicidal proteins, metalloproteases ADP, ATP, calcium ions, histamine, serotonin and dopamine.

Platelet rich plasma and regenerative medicine – What can it do?
Growth factors are critical modulators of tissue healing. The effects of these growth factors have been identified in the healing of tissues throughout the body. PRP has been used extensively in human dentistry, orthopedics and plastic surgery for its ability to enhance healing. Unlike many other treatments, there is extensive evidence in published literature regarding the science and efficacy of PRP treatments (search platelet rich plasma at pubmed - the NIH library website).

Applications of PRP in Tendons and Ligaments
Studies have demonstrated increased tendon callus production and stronger healing when the tendon repair sites were treated with PRP. Growth factors found in PRP increase type I collagen production and tenocyte proliferation. Human clinical studies support the theory that PRP may aid in the treatment of tendonitis. Patients receiving PRP treatment for elbow epicondylar tendonopathy reported a 93% reduction in pain after a single injection. PRP has been used extensively in horses for tendon and ligament injuries. In small animals we are using PRP as an adjunct to surgery in the treatment of diseases such as Achilles tendon ruptures and shoulder injuries as well as collateral ligament ruptures and hyperextension injuries.

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**PRP and osteoarthritis**

The use of growth factors that might aid in the production of hyaline cartilage is very attractive because of the high incidence of osteoarthritis in humans and animals and because of the limited healing ability of articular cartilage. Platelet-derived growth factor increases chondrocyte proliferation proteoglycan synthesis. PRP has been shown to slow the progression of osteoarthritis and PRP injections have been reported to result in decreased pain and improved function in humans with degenerative cartilage disease. A recent unpublished study from the Veterinary School at the University of Missouri has demonstrated decreased lameness scores in dogs with elbow arthritis following PRP injections. We are currently treating cases of arthritis with a series of two intraarticular PRP injections approximately 4 weeks apart.

**PRP and bone**

Protein rich plasma may aid in fracture repair and healing by providing additional growth factors that are critical to bone formation. PRP has been used for bone formation most extensively in human dental and maxillofacial applications. Laboratory studies have demonstrated a significant increase in bone formation attributable to PRP when PRP was combined with other osteoinductive treatments. PRP is being used in delayed and non-union fracture cases in an effort to accelerate healing.

**How is PRP created?**

Platelet rich plasma can be generated at “point-of-care” by centrifugation of autologous blood followed by separation and extraction of the buffy coat. Several systems are available for the creation of PRP but all PRP is not alike. We specifically use the Arthrex system because it results in low amounts of white blood cells in the injection. High levels of white blood cells can increase collagen degradation and decrease matrix production.

For more information about PRP or if you have a case that may benefit from PRP treatments please contact Dr Kurt Schulz.