Scientific Background for Equine Therapy

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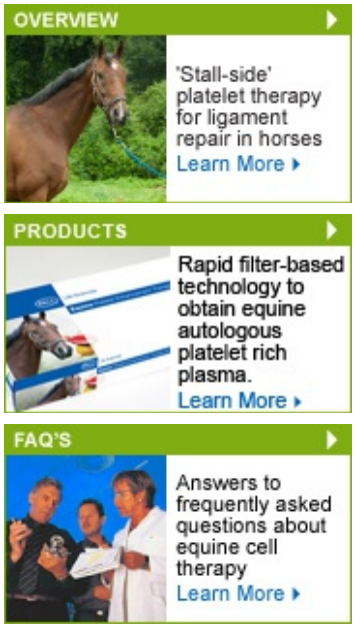


Platelet Therapy for Tendinosis in Humans

Support for the use of **autologous platelet** therapy in the treatment of tendinosis in humans is rapidly emerging.[1,2,3,4] Details of the mechanism of action of therapy for muscle, tendon and ligament damage using autologous platelets is unknown but thought to result from the elaboration of growth factors from the alpha granules of platelets (including IGF-1, PDAF, VEGF, TGF-beta, bFGF, IGF-1, and PF4[†,5]) released at the site of application that can promote healing directly.

Some of these factors may serve to recruit stem cells from within the affected tissue or other tissue to facilitate repair.[6,7] The active component of the various preparations used is the platelets. Confusion in the literature exists over whether the product contains, in addition to platelets, white blood cells or fibrin or both ; but common to all preparations are the platelets.

Early human clinical trials were designed to establish safety, and collect pilot data to estimate sample sizes for prospective randomized trials. They showed improvement in functional indices using both objective and correlated visual analog score (VAS) measurements.[9,10]

The first attempt at a clinical trial of 20 patients with chronic tennis elbow, refractory to standard therapy, resulted in 3 of 5 patients in the control group, receiving bupivacaine, dropping out at 2 months with only a 16% improvement as measured using a VAS for pain. Significantly greater ($p<0.05$) improvement of 60% for the platelet-treated group (n=15) was reported at 2 months post-treatment; and, that group remained enrolled to show continued improvement at 6 and 26 months of 81% and 93%, respectively.

In a study of Achilles tendon complete tears requiring surgery, the presence and absence of platelet therapy applied on the surgical site before wound closure was studied in groups of 6 patients each.[11] Surgery with platelet therapy resulted in a statistically significant decrease in the latency to improved range of motion, functional recovery and resumption to normal training. As is true for any area of clinical medical research, not all studies reveal clinical benefit. A recent study of platelet therapy for Achilles tendon failed to show clinical benefit.[12] However, it is too early to make final judgment given the variety of applications of platelet therapy – among the variables under study are the indications for use, dose required, purity of the preparation and the manner in which the product is made.

A third trial focused upon impingement of the rotator cuff tendon requiring surgical intervention with and without PC added at the surgical site prior to wound closure.[13] In this prospective randomized control trial of 20 patients per group, platelet therapy resulted in a statistically significant improvement using a VAS for pain and a self-evaluation instability score as determined by 2-way analysis of variance. Interestingly, long-term effects appear to persist following a single injection of PC.[14]

Although platelet therapy has gained notoriety for its potential to heal sports injuries, veterinary patient's owners are likely to have read of reports of use in high profile athletes. The lay press reported multi-million dollar annual contract athletes including Pittsburgh Steelers' Hines Ward and Troy Polamalu,[15] along with New York Mets star athletes, Jose Reyes and Carlos Beltran,[16] have been treated with platelet therapy attesting to its perception of safety.

Equine Platelet Therapy for Desmitis

A case report of platelet therapy for suspensory ligament repair using a point-of-care, filter-based, platelet harvest system showed the treatment to be safe,

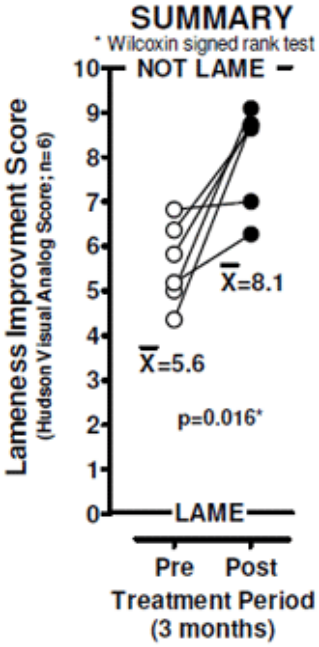
and apparently efficacious in effecting improvement at 8 weeks post-treatment.[17] Improvement in this animal, who failed to respond to standard therapy, was judged by comparing the size of the hypoechoic region measured with ultrasound before and after platelet therapy. The same filter-based system was reported upon by Roger Smith, DVM of the Royal College of Veterinary Medicine, at the Dec 6, 2008 American Association of Equine Practitioners annual meeting in San Diego, CA. Dr. Smith conveyed the results of a trial of 14 cases of suspensory ligament desmitis with lesions affecting an average 28% of their total cross-sectional areas as determined by ultrasonography. The average time for lameness score to reduce to 0/5 (not lame) was 5 weeks. Ultrasonographic mean score on presentation was 2.9 (range 2.5 -3) and the average score at the three month evaluation was 1.25 concluding this easy-to-use, point-of-care treatment took 15 minutes to prepare, required no instrumentation, and conferred clinical benefit.

Platelet Therapy Promotes Stem Cell Recruitment – Potential Value in Osteoarthritis

Platelet therapy has been used for years in orthopedic bone repair.[18] Recent data show factors derived from platelets can recruit stem cells to undergo angiogenesis, chondrogenic differentiation[19,20] and facilitates bone repair[21,22,23] and therefore may, in principle, have value in the treatment of osteoarthritis.

Initial Experience of Platelet Therapy Use in Dogs

(unpublished)



Veterinarians in reasonably close proximity to Pall Corporation (Port Washington, NY) were provided with the information detailed here and they elected to attempt treatment in canines who failed to respond to conventional therapies for either tendinopathies with or without previous surgical interventions and/or osteoarthritis.

Six dogs were treated with the filter-based platelet therapy and none reported any adverse clinical sequelae. The longest follow-up at the time of this writing was 3 months. All animals had their pre-treatment injury assessed by a VAS for lameness[24] slightly modified for convenient use by the treating veterinarian.

Results show a statistically significant improvement in outcome as shown in the figure on left.

† ABBREVIATIONS USED: IGF-1=insulin-like growth factor-1; PDAF=platelet-derived angiogenesis factor (PDGF)- AA, -BB, -AB; PDEGF=platelet-derived epidermal growth factor; VEGF=vascular endothelial growth factor; TGF-b = transforming growth factor beta-1 and -2; bFGF=basic fibroblast growth factor; IGF-1= insulin growth factor-1; PF4=platelet factor 4.

References