STANFORD
SCHOOL OF MEDICINE
Stanford University Medical Center
Department of Radiology

Platelet Rich Plasma (PRP) Injection – Information and Instructions for Patients

Dear Patient,

You are receiving this letter because your physician has prescribed an injection of platelet rich plasma, or PRP for your musculoskeletal problem. Moreover, your condition has been identified as one that should benefit from *Image Guidance*, to improve the accuracy of the injection, thus specialists in the Department of Radiology using Ultrasound (US) will do the procedure. Here we provide some basic information and instructions regarding this procedure.

Background on PRP

PRP is derived from your own blood by taking a sample of venous blood, placing it in a special tube, and spinning the blood in a centrifuge for about 15 min. This separates whole blood into its components including red blood cells, platelets, and plasma (the non-cellular fluid in blood). The middle layer constitutes PRP, which contains highly concentrated platelets, the cells that normally promote blood clotting. These cells also contain a number of specialized chemicals called growth factors. These include platelet derived growth factor, transforming growth factor beta, and vascular endothelial growth factor. These factors interact with the local cells and send signals that initiate a variety of events such as cell division and migration. The basic idea behind PRP injection is to deliver high concentrations of growth factors to an area of injury, with the hope of stimulating a healing response and reducing inflammation in the tissue. To some extent, injection of whole blood will stimulate the same response, but to a lesser degree.

PRP has been used since about 1987 to help promote healing in dental, orthopedic, and plastic surgery procedures. Over about the past 5 years, PRP has been recognized for its potential in treating both chronic and acute musculoskeletal injuries involving tendons, ligaments, and muscles. This procedure is gaining wide media attention as it has been used in professional athletes in attempts to return them to competition as soon as possible.

Potential Benefits and Risks

While PRP has been injected for many musculoskeletal disorders (see Further Reading below), carefully controlled studies are not available for the majority of musculoskeletal injuries. Injection of PRP into degenerated or partially torn tendons in tennis elbow has been shown to be effective in the majority of patients, however these results may not translate directly to other tendons or conditions. **As such, how effective PRP will be in treating your particular condition is not known**. Most PRP injections are being done in areas of tendon degeneration or tendinopathy which are causing pain for the patient. Examples include the

Achilles tendon, elbow tendons, rotator cuff, and hamstring tendons. PRP may also be beneficial in treatment of muscle strain injuries, but again, there is very little controlled data to support this as yet. **Overall, your physician and radiology consultant feel that PRP is a reasonable alternative for you when compared with the options – cortisone injection, surgery, or no treatment except oral medications and physical therapy; the potential benefits appear to outweigh the risks.**

Because PRP is derived from your own blood ("autologous" transplantation), there is NO chance of having an allergy or immune reaction. Indeed in the literature, side effects or complications of PRP injection are extremely rare. The main risks include **local infection** (< 1% chance) and **pain** at the site of injection. Injection of non-buffered PRP (which is acidic) tends to be very painful, thus we add a small amount of sodium bicarbonate to the solution to neutralize the pH, which seems to alleviate much of the pain associated with injection. In addition, we will anesthetize the area before PRP injection with long-acting local anesthetic. Your referring physician may give you a prescription for pain medication to be taken if you are in significant pain afterwards.

Pre-procedure Planning, and What to Expect During the Procedure

You should **stop taking any non-steroidal anti-inflammatory medications** 7 days before the procedure, and should not take these medications again for 7 days after the procedure. Common examples of these medications include ibuprofen, naproxyn, and indomethacin or as well as aspirin. Non-steroidal medications work by blocking the action of some of the growth factors present in PRP, thus may render the injection ineffective. You may use acetaminophen (Tylenol) before or after the procedure. For lower extremity injections, **we strongly recommend** having someone else with you to drive you home. In some cases, your referring physician may want you to be on **crutches** for 1-2 days after the injection and this should be arranged ahead of time. Crutches are mainly useful if pain is severe in when standing or walking after lower extremity injections. **If you had an MRI scan performed outside of Stanford, it is critical that you bring these images to the procedure either on disk or on film**, so the scan can be reviewed for an appropriate target ahead of the injection. Stanford studies are available on our electronic image storage system.

The following steps will occur when you arrive in radiology imaging center:

- Check-in at the imaging center front desk, B15 at Stanford North Campus.
- Consultation with radiologist regarding the procedure and providing informed consent to proceed with the procedure.
- Nursing staff will draw approximately 50 cc of blood from an arm vein and place it in the centrifuge to concentrate the PRP.
- Ultrasound of the affected area will be done to help localize areas of injury, and to determine if the procedure can be safely performed.
- Under sterile technique, local anesthetic will be used to numb the skin and the area of injection, followed by PRP injection. This may include needling of the adjacent bony attachment of a tendon, which can contribute to procedural and post-procedural pain.
- Following needle removal, you will rest for 15 minutes in the exam room
- Discharge home, the entire procedure typically taking about 1 hour.

What to Do and What NOT to Do after the Procedure
You may ice the area for 20 minutes every 2-3 hours for the first 24-48 hours after the procedure. About 1 in 10 patients experience a "flare" reaction beginning the day after the procedure, manifested by intense pain. If this occurs, begin taking the prescribed pain medication and notify the radiologist who performed the procedure. During the day, the number is **650-721-7370**, and after hours, call **650-723-6661** and ask for the radiologist on call. While some redness and swelling are common after the procedure, if any progressive swelling, redness, drainage or fever occurs, notify the performing radiologist and/or the referring physician to be assessed for possible infection (again, an extremely rare complication but which may warrant antibiotic treatment). If symptoms are severe, you may be directed to the Emergency Room at Stanford Hospital for evaluation.

Activity Level and Followup
For the day of the procedure and the day after, limit the activity related to the injection site to activities of daily living. Depending on the injection site and your referring physician, you may be on crutches for 1-2 days until pain is not increased with weight bearing. Return to higher level activities such as running, cycling, golf, weight training, etc, will be directed by your referring physician and physical therapist, if one is involved. **It is expected that it will take up to 6-8 weeks to adequately assess your response to the therapy.** Please make an appointment with your referring physician at that time point to assess your progress and help us collect systematic data that will be useful for research and will benefit future patients.

Will My Insurance Pay for PRP?
Currently, PRP is not approved by the FDA for many of the musculoskeletal injuries being referred. While we hope that some insurance carriers will cover the entirety of the procedure, it is likely that your carrier will deny part or all of the reimbursement related to the procedure. In particular, the companies that make the special centrifuge tubes to prepare PRP charge around **$800** for this piece of equipment. Thus if you carrier doesn't reimburse for this, you will be responsible for payment of this cost, as well as any other components denied by your insurance. In some cases, there will be pre-approval for components of the procedure (the US itself and the fee for guiding the injection). Since much of the billing is not under our direct control, our hope is to give you information so your expectations are realistic.

Further Reading
There is considerable PRP information available on the Web, and even a Wikipedia page (http://en.wikipedia.org/wiki/Platelet-rich_plasma). Results of preliminary scientific studies and review articles are also available, listed here.

Mishra A, Pavelko T "Treatment of chronic elbow tendinosis with buffered platelet-rich plasma". *The American Journal of Sports Medicine* **34** (11): 1774–8, 2006.

Sampson S, Gerhardt M, Mandelbaum, B "Platelet rich plasma injection grafts for musculoskeletal injuries: a review" Curr Rev Musculoskelet Med **1**:165–174, 2008.

Mishra A, Woodall J, Vieira A "Treatment of tendon and muscle using platelet-rich plasma". *Clinics in Sports Medicine* **28** (1): 113–25, 2009.