

CANADIAN CENTRE OF INTEGRATIVE MEDICINE 12 Main St. North, Markham, Ontario L3P 1X2
905 471-9355 Fax:905 471-4348; 416 480-4069 Sunnybrook Health Sciences Ctr, University of Toronto
“Specializing in EMG-guided Botox and Ultrasound-guided Platelet-Enriched Plasma injections”

Patient name: _____

PLATELET-RICH PLASMA: PRE-TREATMENT INFORMATION

Platelet-rich plasma (PRP) therapy involves the injections of YOUR OWN blood back into your body to promote healing. Venous blood is taken out, spun down in a specialized centrifuge (“Harvest Technologies”). The platelets are concentrated and taken out in the PRP. The platelets contain alpha-granules which house a variety of important proteins needed for healing. These include GROWTH FACTORS (TGF-B, bFGF, PDGFa-b, EGF, VEGF, CTGF) which:

1. stimulates and regulates collagen synthesis (collagen is the building block of your body)
2. promotes growth and differentiation of the cells for your bone (osteoblasts), cartilage (chondrocytes), ligaments and tendons (fibroblasts).
3. stimulates endothelial angiogenesis (new blood vessels)
4. stimulates local stem cells; increases migration of mesenchymal stem cells

The alpha-granules also contains cytokines (which activate the inflammation-repair pathway) and adhesion proteins. Platelets also contain dense granules which contain factors (ADP, calcium, serotonin) that promote platelet aggregation. Platelets must first be activated in order to release their granule contents and begin the cascade of collagen restoration and growth (tissue healing).

Good review papers on this are by D. Crane in Practical Pain Management Jan-Feb 2008, S. Sampson et.al. in Current Reviews in Musculoskeletal Medicine 2008: DOI 10.1007/s12178-008-9032-5 and A. Mishra et.al. in Clin Sports Med 2009; 28:113-25.

There is extensive history in the uses of PRP going back to 1987 for cardiac surgery (Ferrari M, Int J Artif Org 10:47-70). Since then, PRP has also been used by other specialists in ENT-maxillofacial surgery and periodontal dentistry, cosmetics, burn wound healing. In the musculoskeletal area, **PRP has been used over the past 10 years with publications by orthopedic surgeons** including randomized clinical trials. (Tennis elbow: Dr. Allan Mishra, J Sports Med 2006;34:1774-8; Achilles tendon tears: Dr. M. Sanchez Am J Sp Med 2007; 35:245-51; Fracture healing: Dr. J. Koerner, Techniques in Foot & Ankle surgery 2008; 7:72-8; Anterior cruciate (knee) ligament repairs: Dr. A. Ventura, J Orthop Traumatology 2005;6:76-9; Plantar fasciitis: Dr. S. Barrett, Podiatry Today 2004; 17:37-42; Rotator cuff repairs: Dr. S. Gamradt, Techniques in Orthopaedics 2007:22:26-33.). Numerous case reports include the treatment (using prolotherapy technique) for sub-acute low back pain Dr. Crane (article above) and for chronic low back pain Dr. D. Anderson in Pract Pain Manage and Dr. Ko (in press).

The procedure will consist of the following: you will have blood drawn from your vein (typically in the elbow crease area or the wrist/ forearm). For the small kit, 20cc will be withdrawn. For the large kit, 60cc will be needed. (make sure your prepare for this by not skipping your morning meal and drinking plenty of fluids beforehand). It is also advised that you **come in 30 minutes earlier** to have this done.

The blood will then be spun down in the patent-pending Harvest centrifuge. This will take 14 minutes (so bring a good book to read as well). Following this, you will proceed to the injection clinic room

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where the site to be injected will be cleaned with alcohol and chlorhexidine, (In the Ultrasound lab, imaging would also be done to visualize the ligaments/ tendons of the affected peripheral joint which allows the physician to correctly localize the proper area to inject).

Freezing (injection of local anesthetic: buffered preservative-free lidocaine) will then be done to the skin to reduce any discomfort from the PRP needle itself. Following this (and within 30 minutes of the centrifuge finishing), the PRP will be administered to the muscle-ligament-tendon requiring healing. The usual sensation experienced is a “fullness feeling” lasting 10 minutes to ½ an hour. There may also be some local temporary discomfort from the needle.

EXPECTED BENEFITS:

PRP may relieve symptoms of joint / spinal pain and dysfunction. By stimulating healing, this may lead to longer lasting results. For simple, recent injuries, one injection treatment is only usually required. For more chronic conditions with significant ligament instability or tendon tearing, several injection treatments may be required (spaced 1-3 months apart). The quoted literature success rate is about 80%.

CONSEQUENCES FOR NOT HAVING TREATMENT:

Continuation of your symptoms, pain and loss of function.

ALTERNATIVES TO TREATMENT:

Oral medications (long-term use may lead to side-effects such as weight gain, dry mouth, constipation with amitriptyline; stomach ulcers, kidney, liver, heart problems with anti-inflammatories; drowsiness, unsteadiness with gabapentin; constipation, nausea, possible addiction with opioid drugs etc.)

Physiotherapy including aquatic exercise, osteopathic manipulation.

Chiropractic and massage therapy.

Acupuncture

Psychological counselling and biofeedback to help cope with pain,

SURGERY e.g. arthroscopy

Other types of injections including cortisone (side-effects such as post-injection flare-up, skin discolouration, tissue atrophy; long-term use can result in ↑BP, ↑blood sugar, osteoporosis, hip joint necrosis, ↑infections) and nerve blocks (freezing with and without cortisone);

Viscosupplementation and Botox injections (sometimes these may also be combined with PRP*).

*references: 1) Logan LR Autologous blood injection and BTX for resistant plantar fasciitis accompanied by spasticity. Amer J Phys Med Rehabil 2006; 85:699-703

2) Altman RD, Moskowitz RW et.al. Intra-articular sodium hyaluronate in the treatment of patients with osteoarthritis of the knee: a randomized clinical trial. J Rheumatol 1998; 25: 2203-12

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SIGNIFICANT RISKS WITH PRP TREATMENT:

For any type of needle or injection (including acupuncture):

Allergic reaction to local anesthetic. (it is highly unlikely, that you would have an allergy to your own blood!)

Dizziness, feeling faint

Infection. The quoted risk is 1:50,000 chance (Crane paper). (we use only disposable kits and needles)

Needle break, Nerve injury, Puncture of internal organ (lung, abdomen)

Skin bruising, bleeding, discolouration

Though extremely rare, pain or function may worsen.

(Bovine thrombin has been used to activate platelets for surgical grafting and intra-articular injections; this in the past has been associated with bleeding coagulopathies from antibodies to clotting factors. Since 1997, production has eliminated contamination of factor Va in such thrombin with no further reports of such complications. Note that at this time, we do NOT use Bovine thrombin in our PRP practice)

CONTRAINDICATIONS TO THE USE OF PRP:

Low platelet count (< 105/ uL)

Low hemoglobin (< 10 g/ dL)

Low blood pressure – hemodynamic instability

Dysfunctional platelets and clotting (hemophiliac)

Consistent use of NSAIDs (anti-inflammatory drugs) within 48 hours of PRP procedure

Corticosteroid injection at treatment site within 2 weeks of PRP procedure

Corticosteroid by mouth or i.v. within 2 weeks of PRP.

Concurrent or recent fever or illness. Septicemia (generalized blood infection).

Active history of Psuedomonas, Enterococcus or Klebsiella infections (PRP in one study was shown to potentially stimulate these pathogens).

Cancer – especially hematopoetic or of bone

Rash at injection site.

FOR OPTIMAL RESULTS WITH PRP, PLEASE DO THE FOLLOWING:

1) pre-screening labwork and soft tissue imaging study (ultrasound or MRI)

2) detailed manual therapist (FCAMT physio or chiro) exam to correlate findings and direct exercises

3) functional medicine (naturopath) support to scientifically optimize nutrition for healing.

4) concomitant medications/ interventions for severe neuropathic pain (not treatable by PRP)

5) document that you have tried and failed more conventional OHIP-covered treatments such as cortisone injections, nerve blocks, surgical arthroscopy.

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1a) PRE-INJECTION LABWORK recommended:

Markers of inflammation:

CBC with differential, ESR,

HS-CRP

Quantitative fibrinogens

Uric acid.

(if there are signs of seronegative disease including psoriasis, ulcerative colitis, reiter’s syndrome of family history of ankylosing spondylitis, then HLA-B27 should be done. If there are signs of widespread joint pain and swelling, then ANA, RF, immunoelectrophoresis should be done.)

Markers of nutritional status:

25(OH) vitamin D3, serum B12 (low levels associated with neuropathic pain, fibromyalgia)

Serum vitamin C, Serum zinc, ferritin (all are necessary for collagen formation)

(if ferritin is low, then more detailed iron studies (serum iron, TIBC, %saturation) should be carried out; if ferritin is high, then check ESR –acute phase reactant and rule out hemochromatosis – iron overload.)

Serum albumin (particularly in the elderly, poorly nourished; + liver and renal function).

[tests not covered by OHIP]: RBC magnesium, Omega 3 FA profile

Markers of hormonal function (if clinical symptoms and signs suggest such deficiencies):

DHEA-S, serum cortisol (chronic stress leading to adrenal fatigue/ exhaustion)

TSH (thyroid function: esp. if “feeling cold, fatigued”; low body temperature)

Fasting insulin and blood sugar; Hb1AC (check for diabetes)

Sex hormones: estrogens (estrone, estradiol, estriol), progesterone, testosterone (free & total)

[test not covered by OHIP]: IGF-1 (growth hormone)

Optimizing labwork and body biochemistry will help to further ensure a good response to PRP and help the body to “heal itself”. You should discuss this with your family doctor to get the necessary bloodwork done ahead of time.

1b) PRE-INJECTION IMAGING STUDIES should be done:

X-rays, MRIs to look at bone, joint, spine disease (please bring a DVD of this for us to review)

ULTRASOUND (US) to look at soft tissues in detail. It is important to have Musculoskeletal ultrasound done at a Centre that specializes in this (better trained technologists/ radiologists and better US technology will result in more accurate results). We recommend the Canadian Centre for Musculoskeletal Ultrasound (www.ccmsu.com). Hospitals with good MSK US include Sunnybrook and Brampton Memorial.

Your family doctor may refer you ahead to get the MSK US study done. This should include the opposite joint for comparison purposes.

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2) PRE-INJECTION BIOMECHANICAL EXAMINATION BY A SPECIALIZED MANUAL THERAPIST FAMILIAR WITH PRP is recommended. For a list of the best therapists (FCAMT physiotherapists and certain chiropractors, osteopaths) see the website www.DrKoPRP.com. If you are indeed assessed to be a good candidate for PRP, then this therapist will contact Dr. Ko’s office to fast-track you in and help coordinate third-party insurance coverage (if applicable).

3) FOR THOSE WITH SIGNIFICANT ABNORMAL BLOODWORK, a referral to a naturopathic doctor (ND) who specializes in “FUNCTIONAL MEDICINE” is recommended. At the CCIM, the consulting ND is Dr. Leigh Arseneau (on Mondays). He also has his main treatment office in Oshawa. His website is www.FutureofMedicine.com.

Of the chronic pain patients referred to him, Dr. Ko estimates that 8 out of 10 who comply with recommended treatment [optimize their biochemistry (reduce “silent” inflammation and optimize nutrition & hormonal function) and do the necessary manual (FCAMT physio/DC) therapy with supervised exercise] will improve and not require PRP (or other) injections.

4) NEUROPATHIC PAIN patients (skin is very sensitive with burning, numbness, tingling, shocks) will require medications to control this before any injections can be tolerated. In fibromyalgia syndrome (FMS), the neuropathic pain is widespread.

The top 3 neuropathic pain medications (based on the European League Against Rheumatism EULAR guidelines 2007 for FMS treatment) are:

(i) Pregabalin (LYRICA): start with 75 mg at night and then gradually increase to 2-3x/ day dosing. If very drowsy, then use 25 mg in the morning and another optional 25 mg in the afternoon. Common side-effects include drowsiness, dizziness, edema, weight gain. Max. dose is 600 mg/ day.

(ii) Duloxetine (CYMBALTA): this SNRI anti-depressant also helps with FMS pain. Start with 30 mg / day and gradually increase to 60-120 mg/ day. Common side-effects include nausea, headache, dizziness. Watch for drug interactions (excessive serotonin, liver metabolism).

(iii) Tramadol: for intermittent breakthrough pain, use short-acting TRAMACET i q4-6 hours as needed. For continuous pain, use long-acting TRIDURAL beginning with 100mg/ day and titrating up to 200 mg/ day.(max 300mg) Watch for drug interactions with SNRI, TCAs (e.g. amitriptyline) as above. Side-effects as for SNRIs. (structurally, it is very similar to Venlafaxine (Effexor)). Other long-acting tramadol drugs include Zytram-XL and Ralivia.

Other older medications that can help in neuropathic pain- FMS include amitriptyline, nortriptyline, trazodone, gabapentin, muscle relaxants: cyclobenzaprine, tizanidine. Nabilone (CESAMET) and the Sativex spray may help in FMS. Articles on these drugs are available on www.NeuropathicPain.ca.

The above medications may be prescribed by your family doctor. Physicians specialized in Pain Medicine who can help include Dr. David Saul (restricted to FMS patients only), Dr. Steve Blitzer, Dr. Lisa Goldstein, Dr. Kevin Rod’s Toronto Poly clinic, Dr. Howard Jacob’s Pain clinic, Rothbart Pain clinic, Greenspoon Pain clinic and physicians at the CPM clinics (across the GTA).

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5) It should be noted that PRP injections are still considered experimental. More research will need to be done and published before it becomes more mainstream (and eventually accepted into the OHIP type system). The costs are not covered by OHIP and involve the specialized disposable injection kit, patent-pending centrifuge (Harvest technologies), time required for 2 nurses to draw blood and prepare the PRP, the MD injection procedure and pre-post injection manual therapy (PT or DC). In some patients, ultrasound guidance will also be needed. **NOTE THAT WITH APPROPRIATE DOCUMENTATION, SOME EXTENDED HEALTH INSURANCE COMPANIES HAVE COVERED THE COSTS OF PRP TREATMENT** (including motor vehicle accident claims). When communicating to your insurance adjuster, you should get confirmation of coverage first in writing before proceeding with PRP (as you will be responsible for paying upfront at the CCIM).

You should be aware that more conventional treatments are available that are covered by OHIP (and should have been tried by yourself). This includes cortisone injections (which can help in treating an acute inflamed painful condition), nerve blocks (including xray guided injections to the spine), surgeries (such as radiofrequency denervation treatment of neck/ back pain and joint arthroscopies and replacements). Your family doctor can refer you out to other specialists (as listed earlier under paragraph 4) for such interventions as Dr. Ko’s clinic is primarily focused on PRP and Botox.

POST-PRP INJECTION MANAGEMENT.

After the injection, it is important to:

- 1) Keep the area clean. Rest and use common sense (don’t do heavy lifting, dancing right after).
- 2) Avoid anti-inflammatory drugs and cortisone that would interfere with collagen synthesis and ligament regeneration. Keep taking the recommended nutraceuticals and eat and sleep well.
- 3) For post-injection soreness, use ice intermittently (5-10minutes at a time) and use pain-killers that won’t interfere with healing. This includes extra-strength Tylenol. Stronger drugs include Tylenol with codeine, Tramadol (as described above), opioids (morphine type drugs).
- 4) Avoid aggressive exercise and manipulation of the affected joint. It is wise to see an experienced manual therapist **BEFORE** and 1-2 weeks **AFTER** your PRP treatment. For a list of therapists who are familiar with PRP/ Botox, see the “links” section of the website www.DrKoPRP.com.
- 5) For 3+ unstable sacroiliac (SI) joints (no end feel), it is recommended to wear the Serola or Diane Lee Sacroiliac belt when upright, active for 2 months. As the SI joint tightens and heals up, it may “lock” up resulting in pain recurrence. This can be treated with a gentle vertical “gapping” manipulation to restore proper alignment (again done with an experience therapist as listed above).
- 6) Be patient and give it time to heal. Remember that ligament regeneration and remodeling can occur over the ensuing 6-9 months after injection treatment. When phenol and/or sodium morrhuate (cod liver oil extract) was used for prolotherapy previously, injections were done on a monthly basis (often up to 4 -6 sessions) and often with significant post-injection soreness and inflammation. With PRP, we have found less post-injection pain and better healing rates with fewer injections required.
- 7) For chronic pain...recovery will also require retraining and strengthening of deconditioned muscles. It is important to work closely with your specialized FCAMT physiotherapist or DC. The goal with PRP is to heal the chronically injured ligament or tendon in order to facilitate your successful long-term rehabilitation back to work/ sport/ quality of life. Exercise your body, mind and spirit for greater health and happiness!