Official Title: PRP vs PRP Plus IGF for Patellar Tendinosis

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TITLE: A comparison of two different platelet-rich plasma injections for patellar tendinosis: a randomized, double blinded comparative trial.

I. Objective:

The purpose of this study is to compare two different platelet-rich plasma (PRP) injections for patellar tendinosis.

Introduction/Background:

Patellar tendinosis is a frustrating ailment commonly encountered in sports medicine. Treating this condition continues to be a significant challenge for sports medicine physicians.[3, 11, 13] The tendinosis lesion is characterized by collagen disorganization and increased ground substance. One method of treating this problem is using platelet rich plasma (PRP), which is a concentration of platelets from the patient's own blood that provides a high dose of growth factors aimed at stimulating tendon healing. These injections have been used extensively to treat many tendon disorders including patellar tendinosis. Several studies have demonstrated the safety and efficacy of using PRP to treat patellar tendinosis.[1, 2, 4-6, 12, 14]

One growth factor that is known to be helpful in tendon healing is insulin-like growth factor (IGF).[7, 9] However, IGF is not found in PRP but rather in the free plasma that is spun off during the PRP processing.[8] This free plasma or platelet poor plasma (PPP) is typically discarded but it is a known source of IGF. We have shown that concentrating PPP in the FDA cleared Plasmax device yields an increased concentration of IGF.[10] Local IGF injections into the patellar tendon have demonstrated improved tendon healing, but the effect on clinical outcomes has never been studied in a controlled fashion.[7]

Aim: To perform a randomized, double blinded study comparing the clinical effect of PRP versus PRP + concentrated IGF in patients with patellar tendinosis.

III. Procedures:

A. Research Design: Double blinded randomized comparative trial.

B. Patients:

Sample: 38 total volunteers (19 per treatment arm, accounting for 15% dropout with goal of 16 per group). This is sufficient to detect a change of 13 points (the minimal clinically important difference).

Inclusion:

>6 weeks of symptomatic patellar tendinosis
unilateral or bilateral
14 yrs of age or older
active in sport and exercise at least 3x / week
able to take time away from sport (for healing and rehabilitation phase after procedure)
failed at least 6 weeks of guided rehabilitation (under the supervision of either a certified athletic trainer or physical therapist)
Minimum Tegner activity level of 4

Exclusion: Prior injection therapy:

Steroid injection in target knee in the last 3 months
PRP in the target knee in the last 6 months

No other cellular treatments in index knee (bone marrow, amniotic suspensions) last 1 year
Participation in any experimental device or drug study within 1 year before screening visit
Oral or IM steroids for last 3 months
Dry needling of patellar tendon in last 6 months

Medical condition that may impact outcomes of procedure including
anemia
thrombocytopenia
bleeding disorders
inflammatory disorders like rheumatoid arthritis, lupus
diabetes
any history of cancer (other than non-melanoma skin malignancies)
taking anticoagulants (aspirin, Plavix, eliquis, Xarelto, warfarin, lovenox)

Taking immunosuppressants
Previous cartilage repair procedure on the injured cartilage surface (ie, OATS, ACI, MFX)
Previous surgery at the target knee within the past 1 year
Any degree of cognitive impairment.
Symptomatic OA of either knee
Underlying medical conditions that could interfere with evaluation of the outcome
Positive pregnancy test, or lactating, or intent to become pregnant during treatment period
Gout
History of infection or current infection at the affected joint
Smoking

C. Measurements

Demographics:
Age
Sex
Race
Body mass index
MRI of affected knee (if one exists in past year; none will be order as part of study)

Outcome measures (all assessed at baseline, 1,3 and 6 months).
1) Victorian Institute of Sport Assessment-patellar tendon (VISA-P)
2) Visual analog scale-Pain with ADL and Sport (VAS-P ADL and VAS-P Sport)
3) Tegner activity scale
4) Marx scale
5) Blazina

Ultrasound measurements (performed at clinic visit at no additional cost) at baseline and 6 months

1) Tendon thickness
2) Modified Ohberg scale

Primary outcome: VISA-P at 6 months.

In the case of competitive athletics, we will monitor time to return to sport. We will also monitor continuously for adverse events.

Schedule of Outcome Measures

	Baseline	1 mo	3 mo	6mo
VISA-P				
VAS-P ADL				
VAS-P Sport				
Tegner				
Marx				
Blazina				
Tendon Thickness		x	x	
Modified Ohberg		x	x	

Outcomes will be completed by research assistant (Ms. Jia) who will be blinded to the treatment allocation.

D. Detailed Study Procedures: 38 patients will be randomly assigned using a computer randomization scheme (from RedCap) to a treatment arm, with 19 patients for each treatment arm. Patient will be blinded to their treatment, but treatment team will not. PRP will be prepared according to standard sterile procedures out of view of the patient to ensure patients are adequately blinded. The injecting physician (Baria) will not be blinded to randomization scheme.

PRP:
Procedure will be carried out with excellent sterile technique. 54ml of whole blood will be drawn. 54ml will be processed by centrifugation using the GPS III system (Zimmer Biomet, Warsaw, IN) and 1 ml will undergo a complete blood count (for a baseline comparison to determine the fold increase in platelets). The resultant PRP (5ml) will be injected (after 5ml 1% lidocaine has been injected into the skin for comfort) into the patellar tendon using ultrasound guidance to accurately direct the injection to the site of the tendon abnormality. The patient will rest after the injection for 15 minutes and then be dismissed.

PRP + concentrated IGF

The PRP preparation and blood draw will be identical to the above. 55ml of whole blood will be drawn (1ml will undergo a CBC and the remaining 54ml will be used to make PRP). In addition to preparing the PRP, the resultant PPP (instead of discarding it) will be placed into the Plasmax device (Zimmer Biomet, Warsaw, IN) and concentrated via a second centrifugation cycle. The plasmax concentrate (concentrated IGF) will be added to the PRP (3ml of PRP + 2ml of plasmax concentrate for a total of 5ml) and then will be injected (after 5ml 1% lidocaine has been injected into the skin for comfort) under ultrasound guidance followed by the same rest period.

The injection volume for each group will be identical (5ml total).

For each patient, 1ml of whole blood of 1ml of PRP will be tested for a total cell count

After Care

Patients will avoid NSAIDs for the remainder of the trial. They may ice and use Tylenol.

For the 1st month, patients will be given a home rehabilitation plan consisting of range of motion and gentle strengthening.

In month 2, they will be allowed to return to sport as tolerated.

F. Data Analysis: Continuous variables will be checked for normality and subsequently compared using either unpaired t-tests (for normally distributed data) or Mann-Whitney U test (for non-normally distributed data.

Patient incentive:

10 dollar Amazon gift card at each of the 4 appointments (injection and 3 follow-up visits).

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