

## Platelet-Rich Plasma in 2019

There are now several studies documenting positive results utilizing Platelet-Rich Plasma (PRP) for the treatment of hip and knee disorders. Several studies have shown a benefit in the treatment of knee osteoarthritis, hip osteoarthritis, and tendonitis of the hip and knee (see below).

At this point in time very few insurance companies pay for PRP injections or stem cell injections. Dr. Redmond and his team have worked with several national vendors to identify several options for PRP injections. We would like to offer this therapy to as many patients as possible, and are pricing the injections are posted on this website.

[Arthroscopy](#). 2016 Mar;32(3):495-505. doi: 10.1016/j.arthro.2015.08.005. Epub 2015 Oct 1.

### **Efficacy of Intra-articular Platelet-Rich Plasma Injections in Knee Osteoarthritis: A Systematic Review.**

[Meheux CJ](#)<sup>1</sup>, [McCulloch PC](#)<sup>1</sup>, [Lintner DM](#)<sup>1</sup>, [Varner KE](#)<sup>1</sup>, [Harris JD](#)<sup>2</sup>.

#### **Author information**

#### **Abstract**

##### **PURPOSE:**

To determine (1) whether platelet-rich plasma (PRP) injection significantly improves validated patient-reported outcomes in patients with symptomatic knee osteoarthritis (OA) at 6 and 12 months postinjection, (2) differences in outcomes between PRP and corticosteroid injections or viscosupplementation or placebo injections at 6 and 12 months postinjection, and (3) similarities and differences in outcomes based on the PRP formulations used in the analyzed studies.

##### **METHODS:**

PubMed, Cochrane Central Register of Controlled Trials, SCOPUS, and Sport Discus were searched for English-language, level I evidence, human in vivo studies on the treatment of symptomatic knee OA with intra-articular PRP compared with other options, with a minimum of 6 months of follow-up. A quality assessment of all articles was performed using the Modified Coleman Methodology Score (average, 83.3/100), and outcomes were analyzed using 2-proportion z-tests.

##### **RESULTS:**

Six articles (739 patients, 817 knees, 39% males, mean age of 59.9 years, with 38 weeks average follow-up) were analyzed. All studies met minimal clinical important difference

criteria and showed significant improvements in statistical and clinical outcomes, including pain, physical function, and stiffness, with PRP. All but one study showed significant differences in clinical outcomes between PRP and hyaluronic acid (HA) or PRP and placebo in pain and function. Average pretreatment Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were 52.36 and 52.05 for the PRP and HA groups, respectively ( $P = .420$ ). Mean post-treatment WOMAC scores for PRP were significantly better than for HA at 3 to 6 months (28.5 and 43.4, respectively;  $P = .0008$ ) and at 6 to 12 months (22.8 and 38.1, respectively;  $P = .0062$ ). None of the included studies used corticosteroids.

### **CONCLUSIONS:**

In patients with symptomatic knee OA, PRP injection results in significant clinical improvements up to 12 months postinjection. Clinical outcomes and WOMAC scores are significantly better after PRP versus HA at 3 to 12 months postinjection. There is limited evidence for comparing leukocyte-rich versus leukocyte-poor PRP or PRP versus steroids in this study.

[Arthroscopy](#). 2015 Nov;31(11):2213-21. doi: 10.1016/j.arthro.2015.03.041. Epub 2015 May 29.

## **Does Intra-articular Platelet-Rich Plasma Injection Provide Clinically Superior Outcomes Compared With Other Therapies in the Treatment of Knee Osteoarthritis? A Systematic Review of Overlapping Meta-analyses.**

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### **Author information**

#### **Abstract**

#### **PURPOSE:**

The aims of this study were (1) to perform a systematic review of meta-analyses evaluating platelet-rich plasma (PRP) injection in the treatment of knee joint cartilage degenerative pathology, (2) to provide a framework for analysis and interpretation of the best available evidence to provide recommendations for use (or lack thereof) of PRP in the setting of knee osteoarthritis (OA), and (3) to identify literature gaps where continued investigation would be suggested.

#### **METHODS:**

Literature searches were performed for meta-analyses examining use of PRP versus corticosteroids, hyaluronic acid, oral nonsteroidal anti-inflammatory drugs, or placebo.

Clinical data were extracted, and meta-analysis quality was assessed. The Jadad algorithm was applied to determine meta-analyses that provided the highest level of evidence.

#### **RESULTS:**

Three meta-analyses met the eligibility criteria and ranged in quality from Level II to Level IV evidence. All studies compared outcomes of treatment with intra-articular platelet-rich plasma (IA-PRP) versus control (intra-articular hyaluronic acid or intra-articular placebo). Use of PRP led to significant improvements in patient outcomes at 6 months after injection, and these improvements were seen starting at 2 months and were maintained for up to 12 months. It is unclear if the use of multiple PRP injections, the double-spinning technique, or activating agents leads to better outcomes. Patients with less radiographic evidence of arthritis benefit more from PRP treatment. The use of multiple PRP injections may increase the risk of self-limited local adverse reactions. After application of the Jadad algorithm, 3 concordant high-quality meta-analyses were selected and all showed that IA-PRP provided clinically relevant improvements in pain and function compared with the control treatment.

#### **CONCLUSIONS:**

IA-PRP is a viable treatment for knee OA and has the potential to lead to symptomatic relief for up to 12 months. There appears to be an increased risk of local adverse reactions after multiple PRP injections. IA-PRP offers better symptomatic relief to patients with early knee degenerative changes, and its use should be considered in patients with knee OA.

[Arthroscopy](#). 2019 Jan;35(1):106-117. doi: 10.1016/j.arthro.2018.06.035.

### **Intra-articular Injection of Platelet-Rich Plasma Is Superior to Hyaluronic Acid or Saline Solution in the Treatment of Mild to Moderate Knee Osteoarthritis: A Randomized, Double-Blind, Triple-Parallel, Placebo-Controlled Clinical Trial.**

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#### **Abstract**

#### **PURPOSE:**

To prospectively compare the efficacy of intra-articular injections of platelet-rich plasma (PRP) and hyaluronic acid (HA) with a sham control group (normal saline solution [NS]) for knee osteoarthritis in a randomized, dose-controlled, placebo-controlled, double-blind, triple-parallel clinical trial.

#### **METHODS:**

A total of 87 osteoarthritic knees (53 patients) were randomly assigned to 1 of 3 groups receiving 3 weekly injections of either leukocyte-poor PRP (31 knees), HA (29 knees), or NS (27 knees). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score and International Knee Documentation Committee (IKDC) subjective score were collected at baseline and at 1, 2, 6, and 12 months after treatment. Data were analyzed using generalized estimating equations.

#### **RESULTS:**

All 3 groups showed statistically significant improvements in both outcome measures at 1 month; however, only the PRP group sustained the significant improvement in both the WOMAC score ( $63.71 \pm 20.67$ , increased by 21%) and IKDC score ( $49.93 \pm 17.74$ , increased by 40%) at 12 months. For the intergroup comparison, except for the first month, there was a statistically significant difference between the PRP and NS groups in both scores throughout the study duration (regression coefficients of 8.72 [P = .0015], 7.94 [P = .0155], and 11.92 [P = .0014] at 2, 6, and 12 months, respectively, for WOMAC score, and 9.1 [P = .0001], 10.28 [P = .0002], and 13.97 [P < .0001], respectively, for IKDC score). There was no significant difference in both functional outcomes between the HA and NS groups at any time point. Only the PRP group reached the minimal clinically important difference in the WOMAC score at every evaluation (15%, 21%, 18%, and 21% at 1, 2, 6, and 12 months, respectively) and the minimal clinically important difference in the IKDC score at 6 months (improvement of 11.6).

#### **CONCLUSIONS:**

Intra-articular injections of leukocyte-poor PRP can provide clinically significant functional improvement for at least 1 year in patients with mild to moderate osteoarthritis of the knee.

[Cartilage](#). 2017 Oct;8(4):341-364. doi: 10.1177/1947603516670709. Epub 2016 Sep 1.

## **PRP for Degenerative Cartilage Disease: A Systematic Review of Clinical Studies.**

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### **Author information**

#### **Abstract**

#### **OBJECTIVE:**

To explore the utilization of platelet-rich plasma (PRP) for degenerative cartilage processes and evaluate whether there is sufficient evidence to better define its potential effects.

#### **DESIGN:**

Systematic literature reviews were conducted in PubMed/MEDLINE and Cochrane electronic databases till May 2015, using the keywords "platelet-rich plasma OR PRP OR autologous conditioned plasma OR ACP AND cartilage OR chondrocyte OR chondrogenesis OR osteoarthritis (OA) OR arthritis."

#### **RESULTS:**

The final result yielded 29 articles. Twenty-six studies examined PRP administration for knee OA and 3 involved PRP administration for hip OA. The results included 9 prospective randomized controlled trials (RCTs) (8 knee and 1 hip), 4 prospective comparative studies, 14 case series, and 2 retrospective comparative studies. Hyaluronic acid (HA) was used as a control in 11 studies (7 RCTs, 2 prospective comparative studies, and 2 retrospective cohort). Overall, all RCTs reported on improved symptoms compared to baseline scores. Only 2 RCTs—one for knee and one for hip—did not report significant superiority of PRP compared to the control group (HA). Nine out of 11 HA controlled studies showed significant better results in the PRP groups. A trend toward better results for PRP injections in patients with early knee OA and young age was observed; however, lack of uniformity was evident in terms of indications, inclusion criteria, and pathology definitions in the different studies.

#### **CONCLUSION:**

Current clinical evidence supports the benefit in PRP treatment for knee and hip OA, proven to temporarily relieve pain and improve function of the involved joint with superior results compared with several alternative treatments. Further research to establish the optimal preparation protocol and characteristics of PRP injections for OA is needed.

[Am J Sports Med](#). 2018 Mar;46(4):933-939. doi: 10.1177/0363546517745525. Epub 2018 Jan 2.

### **The Effectiveness of Platelet-Rich Plasma Injections in Gluteal Tendinopathy: A Randomized, Double-Blind Controlled Trial Comparing a Single Platelet-Rich Plasma Injection With a Single Corticosteroid Injection.**

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#### **Author information**

#### **Abstract**

#### **BACKGROUND:**

Gluteus medius/minimus tendinopathy is a common cause of lateral hip pain or greater trochanteric pain syndrome.

**HYPOTHESIS:**

There would be no difference in the modified Harris Hip Score (mHHS) between a single platelet-rich plasma (PRP) injection compared with a corticosteroid injection in the treatment of gluteal tendinopathy.

**STUDY DESIGN:**

Randomized controlled trial; Level of evidence, 1.

**METHODS:**

There were 228 consecutive patients referred with gluteal tendinopathy who were screened to enroll 80 participants; 148 were excluded (refusal: n = 42; previous surgery or sciatica: n = 50; osteoarthritis, n = 17; full-thickness tendon tear, n = 17; other: n = 22). Participants were randomized (1:1) to receive either a blinded glucocorticoid or PRP injection intratendinously under ultrasound guidance. A pain and functional assessment was performed using the mHHS questionnaire at 0, 2, 6, and 12 weeks and the patient acceptable symptom state (PASS) and minimal clinically important difference (MCID) at 12 weeks.

**RESULTS:**

Participants had a mean age of 60 years, a ratio of female to male of 9:1, and mean duration of symptoms of >14 months. Pain and function measured by the mean mHHS showed no difference at 2 weeks (corticosteroid:  $66.95 \pm 15.14$  vs PRP:  $65.23 \pm 11.60$ ) or 6 weeks (corticosteroid:  $69.51 \pm 14.78$  vs PRP:  $68.79 \pm 13.33$ ). The mean mHHS was significantly improved at 12 weeks in the PRP group ( $74.05 \pm 13.92$ ) compared with the corticosteroid group ( $67.13 \pm 16.04$ ) (  $P = .048$ ). The proportion of participants who achieved an outcome score of  $\geq 74$  at 12 weeks was 17 of 37 (45.9%) in the corticosteroid group and 25 of 39 (64.1%) in the PRP group. The proportion of participants who achieved the MCID of more than 8 points at 12 weeks was 21 of 37 (56.7%) in the corticosteroid group and 32 of 39 (82%) in the PRP group (  $P = .016$ ).

**CONCLUSION:**

Patients with chronic gluteal tendinopathy >4 months, diagnosed with both clinical and radiological examinations, achieved greater clinical improvement at 12 weeks when treated with a single PRP injection than those treated with a single corticosteroid injection.

# Ultrasound-Guided Injection of Platelet-Rich Plasma and Hyaluronic Acid, Separately and in Combination, for Hip Osteoarthritis: A Randomized Controlled Study.

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## [Author information](#)

### Abstract

#### BACKGROUND:

The effectiveness of intra-articular platelet-rich plasma (PRP) injections has been evaluated in knee chondroplasty and osteoarthritis (OA); however, little evidence of its efficacy in hip OA exists.

#### PURPOSE:

To compare the therapeutic efficacy of autologous PRP, hyaluronic acid (HA), or a combination of both (PRP+HA) in hip OA.

#### STUDY DESIGN:

Randomized controlled trial; Level of evidence, 1.

#### METHODS:

Patients aged between 18 and 65 years who were treated with outpatient surgery and who had hip OA and pain intensity at baseline of >20 on a 100-mm visual analog scale (VAS) were recruited for this study. Exclusion criteria were extensive surgery; presence of excessive deformities; or rheumatic, infective, cardiovascular, or immune system disorders. The primary outcome measure was a change in pain intensity as assessed by the VAS at 2, 6, and 12 months after treatment. Secondary outcome measures were the Harris Hip Score, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and concentration of growth factors in PRP and their correlation with clinical outcomes. Clinical outcomes were evaluated by assessors and collectors blinded to the type of treatment administered.

#### RESULTS:

A total of 111 patients were randomly assigned to 3 groups and received 3 weekly injections of either PRP (44 patients), PRP+HA (31 patients), or HA (36 patients). At all follow-ups, the PRP group had the lowest VAS scores. In particular, at 6-month follow-up, the mean VAS score was 21 (95% CI, 15-28) in the PRP group, 35 (95% CI, 26-45) in the PRP+HA group, and 44 (95% CI, 36-52) in the HA group ( $P < .0005$  [PRP vs HA] and  $P = .007$  [PRP vs PRP+HA];  $F = 0.663$ ). The WOMAC score of the PRP group was significantly better at 2-month follow-up (mean, 73; 95% CI, 68-78) and 6-month follow-up (mean, 72; 95% CI,

67-76) but not at 12-month follow-up. A significant, "moderate" correlation was found between interleukin-10 and variations of the VAS score ( $r = 0.392$ ;  $P = .040$ ). Significant improvements were achieved in reducing pain and ameliorating quality of life and functional recovery.

**CONCLUSION:**

Results indicated that intra-articular PRP injections offer a significant clinical improvement in patients with hip OA without relevant side effects. The benefit was significantly more stable up to 12 months as compared with the other tested treatments. The addition of PRP+HA did not lead to a significant improvement in pain symptoms.