

Platelet-Rich Plasma (PRP) in Knee Osteoarthritis

Evidence Overview

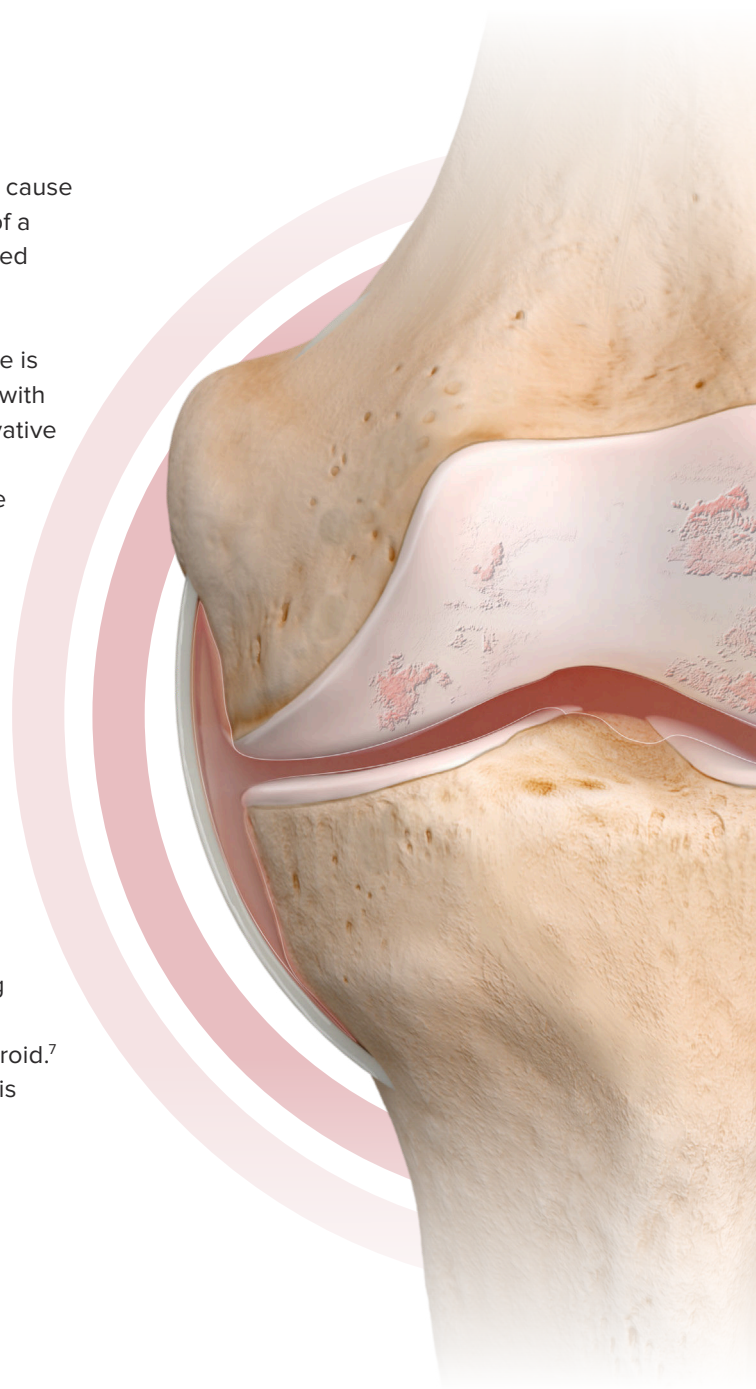
Introduction

Knee osteoarthritis (OA) is a common condition and a leading cause of disability.¹ The disease negatively affects several aspects of a patient's life, including mobility, sleep, mood, and health-related quality of life (HRQoL).

Despite the clinical and economic burden of the disease, there is a recognized "treatment gap" in the management of patients with knee OA; where the individual no longer responds to conservative management but is considered inappropriate for surgical interventions.³ Intra-articular injections may be an appropriate treatment option for these patients. Despite the current use of intra-articular cortisone injection in some patients, there is a growing body of evidence that shows it offers only short-term pain relief for patients and may also be associated with disease progression.^{4,5}

Platelet-Rich Plasma (PRP)

PRP intra-articular injection is an established treatment option for individuals with mild to moderate knee OA. PRP contains biologically active proteins (platelet and plasma derived growth factors), which have inflammation-reducing properties.⁶ There is a substantial body of evidence, including over 34 randomized controlled trials (RCTs), which shows the benefit of PRP over placebo, hyaluronic acid (HA), and steroid.⁷ Several key papers within this evidence base are set out in this document.^{4,8-11}



Study 1: Intra-articular Injections of Platelet-Rich Plasma, Hyaluronic Acid, or Corticosteroids for Knee OA⁸

Study objective: Compare the efficacy of intra-articular (IA) PRP, IA cortisone (CS) and IA hyaluronic acid (HA) in patients' knee OA

Study sample size and design: Prospective, randomized trial, n = 120 (40 in each group)

Primary outcome: WOMAC* and VAS scores, follow-ups over 12 months

Results summary: At 3 months, all 3 groups reported similar and statistically significant improvement in WOMAC score. After 3 months, the PRP group showed continual and superior improvement vs. CS and HA. The improvement in the PRP group was maintained at 12 months (67 % reduction).

Link to publication [here](#)

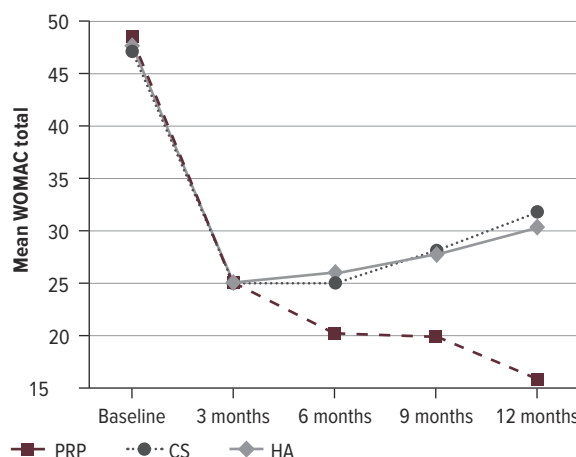


Figure 1. Mean WOMAC Score Over the Duration of the Study. (Cited and adapted from Huang et al (2019). Please note a decrease in WOMAC score denotes an improvement.)

Study 2: Intra-articular Injections of Platelet-Rich Plasma Decrease Pain and Improve Functional Outcomes Than Sham Saline in Patients With Knee OA⁹

Study objective: Evaluate the efficacy of IA PRP on symptoms and joint structure in patients with knee OA

Study sample size and design: RCT, n = 610

Primary outcome: WOMAC, follow-ups over 5 years

Results summary: The PRP group showed statistically significant improvement in all clinical outcome measurements at each follow-up point. The benefit of PRP was clinically significant for the WOMAC pain, WOMAC physical function, and WOMAC total at 6, 12, 24, and 60 months. In addition, the tibiofemoral cartilage volume decreased by a mean value of 1 171 mm³ in the PRP group and 2 311 mm³ in the saline group over 60 months.

Link to publication [here](#)

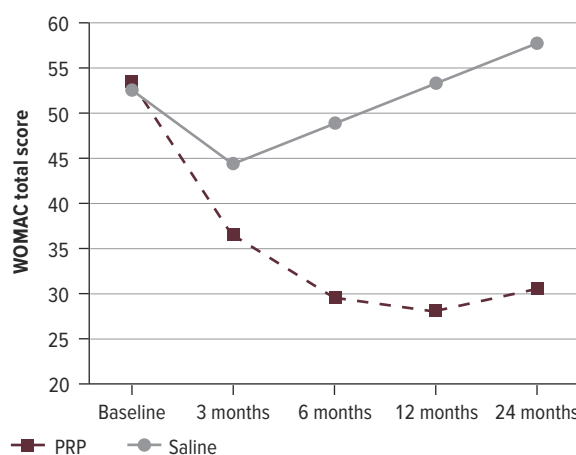


Figure 2. Mean WOMAC Total Score Between PRP and Saline Group. (Improvements at all timepoints were statistically significant, $P < 0.001$)

Study 3: Intra-articular Autologous Conditioned Plasma Injections Provide Safe and Efficacious Treatment for Knee Osteoarthritis¹⁰

Study objective: FDA-sanctioned single-center study to characterize the efficacy of autologous conditioned plasma (ACP) in patients with knee OA

Study sample size and design: RCT, n = 30

Primary outcome: WOMAC, 12-month follow-up

Results summary: Statistically significant improvement in WOMAC score was observed in the ACP group from 2 weeks post injection through to the end of the study. At 12 months, the ACP group reported a 78 % improvement in overall WOMAC score vs. baseline, compared to 7 % in the placebo group.

Link to publication [here](#)

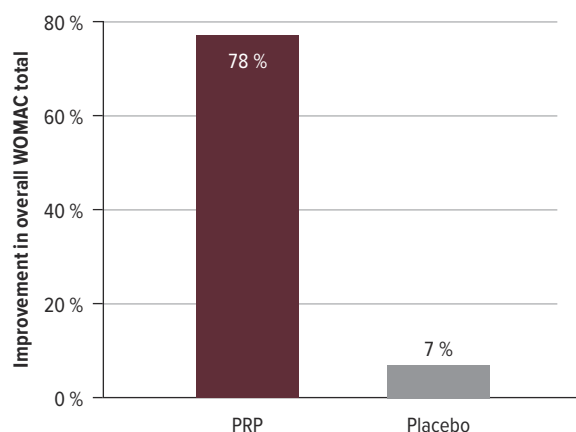


Figure 3. Percentage Improvement in Overall WOMAC Total Score Versus Baseline at 1 Year.

* WOMAC = Western Ontario and McMaster Universities osteoarthritis index

Meta-analysis 1: Intra-articular Platelet-Rich Plasma Injections vs Intra-articular Corticosteroid Injection for Symptomatic Management of Knee OA: Systematic Review and Meta-analysis⁴

Study objective: Investigate the effect of intra-articular (IA) PRP versus IA cortisone (CS) for symptomatic knee OA.

Primary outcome: WOMAC, KOOS* and VAS scores. The review included 8 studies, which contained 648 patients.

Results summary: Compared with CS injections, PRP was significantly better in reducing OA symptoms (pain, stiffness, functionality) at 3, 6, and 9 months post-intervention ($P < 0.01$). The greatest effect was observed at 6 and 9 months. It was reported the observed improvement at 6 months equates to an additional reduction of 9.51 in WOMAC or 0.97 on the VAS pain scales.

Link to publication [here](#)

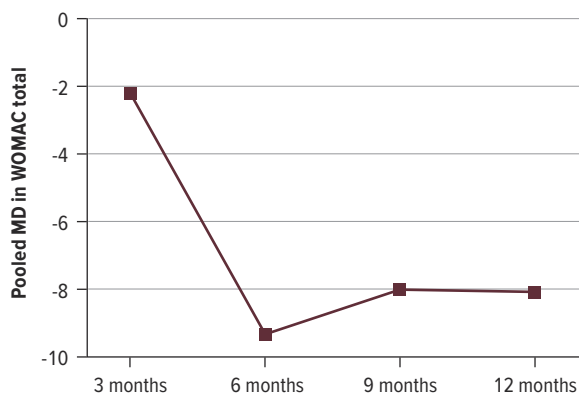


Figure 4. Pooled Mean Difference (MD) in WOMAC Total Score. (Please note negative value denotes an improvement in WOMAC score. Improvements at 6 and 9 months were statistically significant, $P < 0.05$)

Meta-analysis 2: Platelet-Rich Plasma Versus Hyaluronic Acid for Knee Osteoarthritis A Systematic Review and Meta-analysis of Randomized Controlled Trials¹¹

Study objective: Compare the efficacy of PRP and hyaluronic acid (HA) injections for the treatment of knee OA

Primary outcome: VAS for pain, WOMAC, and IKDC**. The review included 18 studies, which contained 1 608 patients

Results summary: Mean improvement in WOMAC total score was significantly higher in the PRP group (44.7 %) compared to the HA group (12.6 %, $P < 0.001$). Of the 11 studies that included VAS, 6 reported PRP patients to have significantly less pain at latest follow-up when compared with HA patients ($P < 0.05$).

Link to publication [here](#)

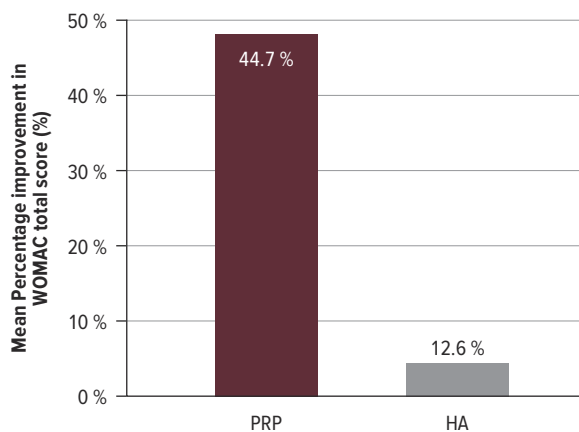


Figure 5. Mean Percentage Improvement in WOMAC Total Score Versus Pre-injection Score at 11 Months.

Summary

Results from meta-analyses and RCTs demonstrate PRP is associated with improved VAS and WOMAC scores versus both cortisone and HA injections in patients with knee OA at 6-, 12-, and 24-month follow-up.^{4,8-11}

The individual study summaries presented in this document report key results and conclusions relevant to this evidence summary report. Please see the referenced articles for full study details.

* KOOS = Knee injury and osteoarthritis

** IKDC = International Knee Documentation

Reference

1. Jackson J, Iyer R, Mellor J, Wei W. The burden of pain associated with osteoarthritis in the hip or knee from the patient's perspective: a multinational cross-sectional study. *Advances in therapy*. 2020 Sep;37(9):3985-99.
2. NICE Clinical Knowledge Summary: Available at [Prevalence | Background information | Osteoarthritis | CKS | NICE](#)
3. Mautner K, Bowers R, Easley K, Fausel Z, Robinson R. Functional outcomes following microfragmented adipose tissue versus bone marrow aspirate concentrate injections for symptomatic knee osteoarthritis. *Stem Cells Translational Medicine*. 2019 Nov;8(11):1149-56.
4. McLarnon M, Heron N. Intra-articular platelet-rich plasma injections versus intra-articular corticosteroid injections for symptomatic management of knee osteoarthritis: systematic review and meta-analysis. *BMC musculoskeletal disorders*. 2021 Dec;22(1):1-3.
5. Wijn SR, Rovers MM, van Tienen TG, Hannink G. Intra-articular corticosteroid injections increase the risk of requiring knee arthroplasty: A multicentre longitudinal observational study using data from the Osteoarthritis Initiative. *The Bone & Joint Journal*. 2020 May;102(5):586-92
6. ESSKA ORBIT Consensus: Use of injectable orthobiologics for the treatment of knee osteoarthritis Part 1: blood-derived products (alias PRP) Retrieved from: https://cdn.ymaws.com/www.esska.org/resource/resmgr/docs/consensus_projects/2203_orbit_brochure_spread.pdf
7. The decision-to-add-PRP-to-my-practice-a-personal-perspective.pdf editorial retrieved from: https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&ved=0CAQw7AJahcKEwiq1fLczJH7AhUAAAAAHQAAAAAQAg&url=https%3A%2F%2Fwww.boa.ac.uk%2Fasset%2FB1C98098-5906-4467-921184A0A9B30137%2F&psig=AOvVaw0TRqnOyXkDC3wa2okIL_K0&ust=1667550526963644
8. Huang Y, Liu X, Xu X, Liu J. Intra-articular injections of platelet-rich plasma, hyaluronic acid or corticosteroids for knee osteoarthritis. *Der Orthopäde*. 2019 Mar;48(3):
9. Chu J, Duan W, Yu Z, Tao T, Xu J, Ma Q, Zhao L, Guo JJ. Intra-articular injections of platelet-rich plasma decrease pain and improve functional outcomes than sham saline in patients with knee osteoarthritis. *Knee Surgery, Sports Traumatology, Arthroscopy*. 2022 Feb 6:1-9.
10. Smith PA. Intra-articular autologous conditioned plasma injections provide safe and efficacious treatment for knee osteoarthritis: an FDA-sanctioned, randomized, double-blind, placebo-controlled clinical trial. *The American journal of sports medicine*. 2016 Apr;44(4):884-91.
11. Belk JW, Kraeutler MJ, Houck DA, Goodrich JA, Dragoo JL, McCarty EC. Platelet-rich plasma versus hyaluronic acid for knee osteoarthritis: a systematic review and meta-analysis of randomized controlled trials. *The American journal of sports medicine*. 2021 Jan;49(1):249-60.

arthrex.com.au

© 2023-03 Arthrex Inc. All rights reserved. DOC20-000990-en-AU_A

Arthrex Australia Pty Ltd | Suite 501, 20 Rodborough Rd, Frenchs Forest, NSW 2086 | Tel: 1800 950 637
Arthrex New Zealand Limited | 6 Fox Street, Parnell, Auckland 1052, New Zealand | Tel: 0800 234 347

