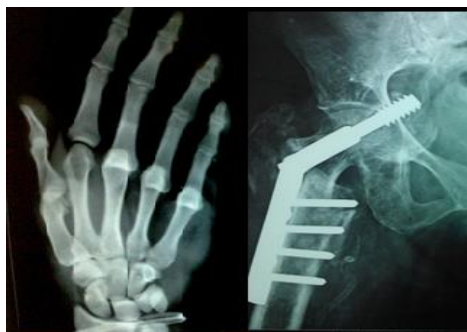




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Corticosteroid injection versus platelet-rich plasma in the management of knee osteoarthritis: A comparative clinical study

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Abstract

Background: Knee osteoarthritis (OA) is a prevalent degenerative joint disorder causing pain and disability. Intra-articular corticosteroid (CS) injections provide short-term relief, while platelet-rich plasma (PRP) has emerged as a regenerative option with potentially longer benefits.

Objective: To compare the efficacy of intra-articular corticosteroid versus PRP injections in patients with symptomatic knee osteoarthritis.

Methods: A prospective randomized comparative study was conducted on 60 patients with Kellgren-Lawrence grade II-III knee OA. Group A (n = 30) received a single intra-articular corticosteroid injection (triamcinolone acetonide 40 mg). Group B (n = 30) received three PRP injections at weekly intervals. Outcomes were assessed using the Visual Analogue Scale (VAS) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) at baseline, 6 weeks, 3 months, and 6 months.

Results: Both groups showed significant pain reduction at 6 weeks. Group A improved from 7.2 ± 1.0 to 3.1 ± 1.2 , while Group B improved from 7.4 ± 1.1 to 3.4 ± 1.0 ($p > 0.05$). At 3 and 6 months, PRP maintained superior improvement (VAS 2.1 ± 0.9 ; WOMAC 34.2 ± 6.5) compared to corticosteroid (VAS 4.5 ± 1.2 ; WOMAC 51.7 ± 8.3) ($p < 0.01$).

Conclusion: Corticosteroid injection provides faster short-term relief, but PRP offers sustained pain relief and functional improvement in knee osteoarthritis.

Keywords: Knee osteoarthritis, corticosteroid injection, platelet-rich plasma, intra-articular injection, pain management

Introduction

Knee osteoarthritis (OA) is a leading cause of disability, affecting over 250 million people worldwide [1]. It is characterized by cartilage degeneration, osteophyte formation, and chronic pain. Conventional management includes NSAIDs, physiotherapy, and intra-articular injections. Corticosteroid injections have been widely used for short-term pain relief due to their strong anti-inflammatory effect. However, evidence suggests their benefits diminish within weeks and repeated use may accelerate cartilage damage [2].

Platelet-rich plasma (PRP), an autologous preparation enriched with platelets and growth factors, has gained popularity as a regenerative therapy. PRP promotes healing by stimulating chondrocyte proliferation, enhancing matrix synthesis, and modulating inflammation [3].

Several randomized controlled trials have compared CS and PRP injections in knee OA, suggesting PRP may offer longer-term efficacy [4-7]. This study was designed to compare the short- and mid-term outcomes of CS and PRP in Indian patients with knee OA.

Materials and Methods

Study Design

A prospective randomized comparative study conducted in the Department of Orthopaedics, [SGT Hospital & Research Institute Budhera Gurugram Haryana], between [2025 Aug- 2025 Sep].

Participants

- **Inclusion criteria:** Age 40-70 years, symptomatic knee OA, Kellgren- Lawrence grade II-III, unresponsive to conservative therapy.
- **Exclusion criteria:** Previous knee surgery, intra-articular injection in last 3 months, systemic inflammatory arthritis, uncontrolled diabetes, bleeding disorders, or advanced OA (grade IV).

Intervention

- **Group A (n = 30):** Single intra-articular injection of triamcinolone acetonide 40 mg (1 mL) mixed with 1 mL of 2% lignocaine.
- **Group B (n = 30):** Three intra-articular injections of PRP (4-5 mL prepared by double-spin centrifugation) at weekly intervals.

Outcome Measures

- **Pain:** Visual Analogue Scale (VAS, 0-10).
- **Function:** Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).
- Assessments at baseline, 6 weeks, 3 months, and 6 months.

Statistical Analysis

SPSS v25 used. Continuous variables expressed as mean $\pm$ SD. Paired t-test for intra-group, independent t-test for inter-group comparisons. $p < 0.05$ considered statistically significant.

Results

Demographics

60 patients (36 female, 24 male), mean age 56.2 years (range 42-68). No significant baseline difference between groups.

VAS Scores

- **Group A:** 7.2 ± 1.0 (baseline) $\rightarrow$ 3.1 ± 1.2 (6 weeks) $\rightarrow$ 4.5 ± 1.2 (6 months).
- **Group B:** 7.4 ± 1.1 (baseline) $\rightarrow$ 3.4 ± 1.0 (6 weeks) $\rightarrow$ 2.1 ± 0.9 (6 months).

WOMAC Scores

- **Group A:** 72.8 ± 10.4 (baseline) $\rightarrow$ 48.2 ± 9.1 (3 months) $\rightarrow$ 51.7 ± 8.3 (6 months).
- **Group B:** 73.6 ± 11.2 (baseline) $\rightarrow$ 42.6 ± 8.7 (3 months) $\rightarrow$ 34.2 ± 6.5 (6 months).

Complications

- **CS group:** transient post-injection flare in 3 patients.
- **PRP group:** mild local pain in 4 patients.
- No infection or major adverse events in either group.

Discussion

This study shows both CS and PRP injections provide significant short-term improvement in pain and function in knee OA. Corticosteroids demonstrated faster early relief at 6 weeks, consistent with prior reports [7]. However, PRP maintained superior outcomes at 3 and 6 months, similar to findings by Elksniņš-Finogejevs *et al.* [4] and Patel *et al.* [5]. Pretorius *et al.* [6] reported that while both modalities improved WOMAC scores, PRP maintained benefits longer. Idres *et al.* [9] also confirmed PRP's superiority beyond 3 months. Meta-analyses further support PRP as more effective than corticosteroids for sustained pain and function improvement [8, 10].

Strengths: Prospective randomized design, validated outcome measures. Limitations: Small sample size, limited follow-up, single-center study.

Future multicenter RCTs with larger cohorts and longer follow-up are needed to establish PRP as the standard of care.

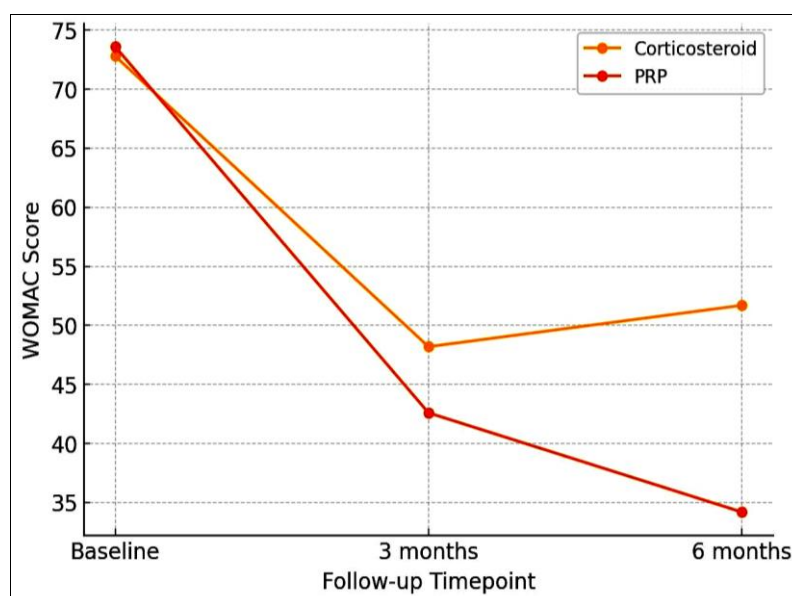


Fig 1: WOMAC score trends in knee OA treatment

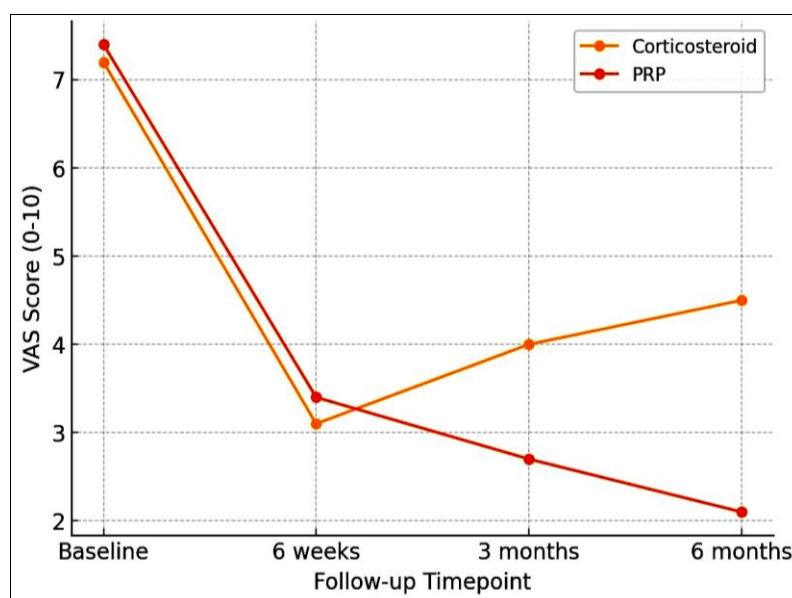


Fig 2: VAS score trends in knee OA treatment

Conclusion

Corticosteroid injections provide rapid short-term pain relief in knee osteoarthritis, while PRP injections offer sustained functional improvement and longer-lasting pain relief. PRP should be considered a superior long-term option, especially for patients with early to moderate OA.

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