e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 2536-2540

Original Research Article

To Compare The Clinical and Radiological Outcomes of Intra-Articular PRP and Corticosteroid Injections in Patients With Knee Osteoarthritis

Arjun Jagadish Bhoomraddi[1], Jagadish V. Bhoomraddi[2], Mahantesh Patil[3], Sudha[4]

[1]Fellowship in Ganga Hospital, Dept. of Orthopaedics, Coimbatore, Tamil Nadu, India
[2]Assistant Professor, Dept. of Orthopaedics, KHPIMS, Gadag, Karnataka, India
[3]Professor & Head, Dept. of Orthopaedics, KHPIMS, Gadag, Karnataka, India
[4]Postgraduate Resident, Department of Orthopaedics, K H PATIL Institute of Medical Sciences, Gadag, Karnataka, India

Received: 24-04-2026 / Revised: 17-05-2026 / Accepted: 11-06-2026
Corresponding Author: Dr. Sudha
Conflict of interest: Nil

Abstract:

Knee osteoarthritis (OA) was a common degenerative joint disorder causing pain, stiffness, and functional limitation in individuals aged 45–65 years. Intra-articular corticosteroids had been widely used for short-term symptomatic relief, while platelet-rich plasma (PRP) had emerged as a biological therapy with potential regenerative benefits. Comparative evidence regarding their clinical and radiological outcomes remained limited.

Methodology: A prospective comparative study was conducted at a tertiary care centre involving patients aged 45–65 years diagnosed with knee OA based on clinical and radiographic criteria. Participants were divided into two groups: one group received intra-articular PRP injections, and the other received corticosteroid injections. Clinical outcomes were assessed using the Visual Analog Scale (VAS) and functional scores such as WOMAC at baseline and at regular follow-up intervals. Radiological evaluation was performed using standard knee radiographs graded by the Kellgren–Lawrence classification. Statistical analysis was carried out to compare outcomes between the two groups.

Results: Both groups showed improvement in pain and functional scores following treatment. However, the PRP group demonstrated significantly greater and sustained improvement in VAS and WOMAC scores at later follow-ups compared to the corticosteroid group. Radiological progression was slower in the PRP group, whereas minimal changes were observed in the corticosteroid group.

Conclusions: Intra-articular PRP injections provided superior and longer-lasting clinical improvement with a potential to delay radiological progression compared to corticosteroids in patients with knee osteoarthritis. PRP may be considered a more effective therapeutic option for long-term management.

Keywords: Osteoarthritis, Knee; Platelet-Rich Plasma; Injections, Intra-Articular; Adrenal Cortex Hormones; Pain Measurement; Treatment Outcome; Radiography.

DOI: 10.25258/ijcpr.18.6.394

Introduction

Knee osteoarthritis has increasingly become a condition that quietly reshapes the everyday life of millions of adults, especially those entering the age range where mobility begins to compete with the cumulative weight of physical wear. For individuals between 45 and 65 years of age, this disorder often represents a pivotal intersection between an active, productive lifestyle and progressive structural degeneration of one of the body's most essential joints. What begins as an intermittent sense of stiffness or a dull ache after routine activity gradually evolves into a persistent, activity-limiting discomfort that challenges not only physical movement but emotional well-being.[1] The knee joint, with its intricate interplay of cartilage, synovium, subchondral bone, and stabilizing soft tissues, is particularly vulnerable to degenerative pathology, and osteoarthritis emerges as a slow but relentless process that undermines joint congruity and function. As the disease advances, the mismatch between symptom severity and the limited options for long-term relief becomes increasingly apparent, prompting clinicians and patients alike to search for treatments that do more than temporarily silence pain. [1,2]

Over the last two decades, intra-articular therapies have gained prominence within the spectrum of nonsurgical treatment strategies. They serve as a middle ground, offering relief when oral medications fail but surgery is neither indicated nor desired. Among these, corticosteroids and platelet-

rich plasma have drawn particular attention due to their contrasting but potentially complementary mechanisms. Corticosteroids have long been regarded as the dependable, familiar option—fast, predictable, and effective in quelling the inflammatory cascades that flare within the osteoarthritic joint.[2] They have been used for generations, and most patients enter the clinical setting already aware that a steroid injection can provide timely relief, especially during exacerbations. Yet, the very dependability of corticosteroids is tempered by well-known limitations. Their benefits, while genuine, are short-lived, often waning after weeks to a few months. Repeated injections raise concerns about possible cartilage damage and diminishing therapeutic effect. Thus, while corticosteroids may soothe the joint in moments of symptomatic intensity, they rarely influence the broader trajectory of structural degeneration. [2,3]

In contrast, platelet-rich plasma emerged from the realm of regenerative medicine with promises that reach beyond symptom suppression. The idea that the body's own platelets—concentrated and reintroduced into the diseased joint—could orchestrate a cascade of reparative processes captured both scientific curiosity and clinical optimism. PRP is built on the premise that growth factors released from activated platelets can modulate inflammation, encourage matrix synthesis, and perhaps even influence chondrocyte behavior in ways that counter the degenerative environment.[3] For many patients in the midlife age group, the appeal of PRP lies in its biological logic: instead of relying on an external pharmacological agent, it uses autologous material to potentially restore the joint to a healthier balance. Yet, despite compelling theoretical justification, PRP remains an area where evidence continues to evolve, and variations in preparation techniques have historically led to inconsistent outcomes. Still, it represents a meaningful shift in how clinicians conceptualize intra-articular treatment—not simply as a measure of relief, but as an intervention that might influence the biology of osteoarthritis itself. [3,4]

Methodology

The study was designed as an observational, comparative study. Its primary aim was to compare the clinical and radiological outcomes between two intra-articular therapeutic interventions for knee osteoarthritis. The design was prospective and longitudinal, following participants over a defined period to assess the evolution of their symptoms and joint structure.

Inclusion Criteria:

- Patients diagnosed with primary osteoarthritis of the knee for at least one year.
- Radiological evidence of Kellgren-Lawrence (KL) grade II or III osteoarthritis on standing X-rays taken within the last six months.
- Age between 45 and 65 years.
- Persistent symptoms despite conservative management, including physical therapy, oral NSAIDs, or hyaluronic acid injections.
- Patients who were not willing to undergo or were not immediate candidates for Total Knee Arthroplasty (TKA).
- Patients who provided written, informed consent to participate in the study.

Exclusion Criteria:

- Patients with a previous history of any surgical operation on the affected knee.
- Patients with a diagnosis of tumour, metastatic disease, or active local/systemic infection.
- Patients with uncontrolled diabetes mellitus, peripheral vascular disease, inflammatory arthritis (e.g., rheumatoid arthritis), post-traumatic arthritis, or metabolic arthritis (e.g., gout).
- Patients on any anti-platelet medication.
- Patients who had received any intra-articular injection (corticosteroid, hyaluronic acid, or PRP) in the affected knee within a period prior to enrolment (as specified by the protocol).
- Patients who did not provide consent or were unwilling to comply with the follow-up schedule.

Results

Baseline Characteristics of Study Participants: The baseline characteristics of the study participants were largely comparable between the PRP and corticosteroid groups. There were no statistically significant differences with respect to age, body mass index (BMI), duration of symptoms, baseline VAS score, WOMAC total score, Kellgren–Lawrence (KL) grade, hypertension, or diabetes status ($p > 0.05$). However, a statistically significant difference was observed in gender distribution, with a higher proportion of females in the PRP group compared to the corticosteroid group ($p = 0.033$). Overall, the two groups were comparable at baseline, allowing for a valid comparison of treatment outcomes.

Table 1: Baseline Characteristics of Study Participants

Variable	PRP Group (n=65)	Steroid Group (n=65)	p-value
Age (years)	53.86 ± 6.19	55.54 ± 6.28	0.128
BMI (kg/m²)	29.27 ± 2.82	29.17 ± 2.88	0.832
Duration (years)	2.38 ± 1.26	2.61 ± 1.08	0.263
VAS Baseline	6.69 ± 1.01	6.84 ± 0.98	0.390
WOMAC Total Baseline	57.50 ± 11.25	58.33 ± 10.68	0.665
Gender (Female)	56 (86.2%)	46 (70.8%)	**0.033***
Gender (Male)	9 (13.8%)	19 (29.2%)	
KL Grade 2	41 (63.1%)	35 (53.8%)	0.286
KL Grade 3	24 (36.9%)	30 (46.2%)	
Hypertension (Yes)	32 (49.2%)	22 (33.8%)	0.075
Hypertension (No)	33 (50.8%)	43 (66.2%)	
Diabetes (Yes)	14 (21.5%)	12 (18.5%)	0.661
Diabetes (No)	51 (78.5%)	53 (81.5%)	

Distribution of Occupation Among Study Participants: The occupational distribution of the study participants showed that the majority were housewives (27.7%), followed by farmers (16.9%) and retired individuals (16.2%). Other occupations included shopkeepers (13.8%), office workers (10%), teachers (7.7%), and manual laborers (6.2%), while a small proportion were drivers (1.5%). This distribution indicates a diverse occupational background among the participants, with a predominance of non-working and semi-skilled groups.

Table 2: Distribution of Occupation Among Study Participants

Occupation	Frequency (n)	Percentage (%)
Driver	2	1.5
Farmer	22	16.9
Housewife	36	27.7
Manual Laborer	8	6.2
Office Worker	13	10
Retired	21	16.2
Shopkeeper	18	13.8
Teacher	10	7.7
Total	130	100%

Distribution of Side Affected Among Study Participants: The distribution of the side affected showed that the right knee was slightly more commonly involved (53.1%) compared to the left knee (46.9%) among the study participants. Overall, the involvement was nearly balanced between both sides.

Table 3: Distribution of Side Affected Among Study Participants

Side Affected	Frequency (n)	Percentage (%)
Left	61	46.9
Right	69	53.1
Total	130	100%

Overall Distribution of Clinical Outcome at 6 Months: The overall clinical outcomes at 6 months demonstrated that 50% of patients achieved excellent results, while 19.2% and 30.8% of patients had good and fair outcomes, respectively. This indicates that a substantial proportion of patients experienced favorable clinical improvement, with half of the study population achieving optimal outcomes.

Discussion

The present study demonstrated that the baseline characteristics between the platelet-rich plasma (PRP) and corticosteroid groups were largely comparable, with no statistically significant differences observed in age, body mass index, duration of symptoms, baseline pain and functional scores (VAS and WOMAC), Kellgren–Lawrence grading, or associated comorbidities. This baseline homogeneity is of critical methodological importance, as it ensures that the observed differences in treatment outcomes are attributable to the therapeutic intervention rather than confounding

demographic or clinical variables. The absence of baseline disparities enhances the internal validity of the study and allows for a more reliable comparison between PRP and corticosteroid injections in the management of knee osteoarthritis.

The mean age of participants in both groups was in the mid-fifties, aligning with the well-recognized epidemiological peak of symptomatic knee osteoarthritis in the 45–65-year age group. This demographic represents a transitional stage in disease evolution, where structural degeneration has begun but biological responsiveness is still retained. The selection of this age group is supported by existing literature, which suggests that intra-articular therapies such as PRP may demonstrate greater efficacy in patients with mild to moderate osteoarthritis who still possess viable chondrocyte activity and synovial responsiveness. Ayhan et al. emphasized that injectable therapies are often utilized in patients who are not yet candidates for surgical intervention but require symptom control beyond conservative measures, highlighting the clinical relevance of this age group in evaluating non-operative modalities. [5]

Body mass index (BMI) was also comparable between groups, with both cohorts demonstrating values in the overweight range. This is consistent with the known association between increased mechanical load and the development and progression of knee osteoarthritis. Elevated BMI contributes to increased compressive forces across the knee joint, particularly in the medial compartment, accelerating cartilage wear and subchondral bone remodeling. However, the lack of significant difference between groups ensures that mechanical loading did not differentially influence treatment outcomes, thereby strengthening the comparative analysis.

The distribution of Kellgren–Lawrence grades further supports the comparability of disease severity between the two groups. The predominance of grade II and III osteoarthritis indicates that the study population largely consisted of patients with mild to moderate disease. This is particularly relevant when interpreting treatment response, as several studies have demonstrated that PRP exhibits optimal efficacy in early to moderate stages of osteoarthritis. Taniguchi et al. reported significant improvements in pain and function following PRP injections in patients with mild-to-moderate osteoarthritis, suggesting that this disease stage provides a favorable biological environment for regenerative therapies. [5,6] Similarly, Huang et al. observed that while short-term outcomes were comparable across PRP, hyaluronic acid, and corticosteroid groups, PRP demonstrated superior long-term efficacy in patients with early-stage disease, reinforcing the importance of disease severity in determining treatment responsiveness. [6]

A statistically significant difference was observed in gender distribution, with a higher proportion of females in the PRP group compared to the corticosteroid group. While this represents a deviation from complete baseline uniformity, its clinical impact is likely limited. Knee osteoarthritis is known to have a higher prevalence in females, particularly in the post-menopausal age group, due to hormonal influences, altered biomechanics, and differences in cartilage metabolism. The predominance of female participants in the present study therefore reflects the natural epidemiology of the disease rather than a selection bias. Moreover, existing literature does not consistently demonstrate gender as a strong independent predictor of differential response to intra-articular therapies, suggesting that this imbalance is unlikely to significantly confound the comparative outcomes.

The occupational distribution of the study population revealed that a substantial proportion of participants were housewives, farmers, and individuals engaged in manual or semi-skilled labor. This finding provides important insight into the biomechanical environment of the study cohort. Occupations involving prolonged standing, repetitive knee flexion, and weight-bearing activities contribute significantly to cumulative joint stress and may accelerate the progression of osteoarthritis. The inclusion of such a population enhances the external validity of the study, as it reflects real-world patient profiles commonly encountered in clinical practice. Furthermore, the diversity of occupational backgrounds ensures that treatment outcomes are not restricted to a sedentary or highly selective population, thereby improving the generalizability of the findings. The present study demonstrated that both intra-articular platelet-rich plasma (PRP) and corticosteroid injections resulted in statistically significant improvements in pain and functional outcomes at six months compared to baseline values. In the PRP group, the mean Visual Analog Scale (VAS) score showed a substantial reduction, accompanied by a marked decline in WOMAC total score, indicating significant alleviation of pain and improvement in joint function. Similarly, the corticosteroid group also exhibited significant reductions in both VAS and WOMAC scores, although the magnitude of improvement was comparatively lower than that observed in the PRP group. These findings confirm that both therapeutic modalities are clinically effective in the management of knee osteoarthritis, albeit through distinct mechanisms and with differing degrees of impact.

Conclusion

The present study provides a comprehensive comparative evaluation of intra-articular platelet-rich plasma (PRP) and corticosteroid injections in patients aged 45–65 years with knee osteoarthritis. The findings clearly demonstrate that both treatment modalities are effective in improving pain and functional outcomes; however, PRP exhibits significantly superior efficacy compared to corticosteroids at six months of follow-up.

References

1. Filardo G, Di Matteo B, Di Martino A, Merli ML, Cenacchi A, Fornasari P, et al. Platelet-rich plasma intra-articular knee injections show no superiority versus viscosupplementation: a randomized controlled trial. Am J Sports Med. 2015;43(7):1575–1582. doi:10.1177/0363546515582027.
2. Cole BJ, Karas V, Hussey K, Pilz K, Fortier LA. Hyaluronic acid versus platelet-rich plasma: a prospective, double-blind randomized controlled trial comparing clinical outcomes and effects on intra-articular biology for the treatment of knee osteoarthritis. Am J Sports Med. 2017;45(2):339–346. doi:10.1177/0363546516665809.
3. Paterson KL, Hunter DJ, Metcalf BR, Eyles J, Duong V, Kasza J, et al. Efficacy of intra-articular injections of platelet-rich plasma as a symptom- and disease-modifying treatment for knee osteoarthritis: the RESTORE trial protocol. BMC Musculoskelet Disord. 2018;19(1):272. doi:10.1186/s12891-018-2205-5.
4. Bennell KL, Paterson KL, Metcalf BR, Duong V, Eyles J, Kasza J, et al. Effect of intra-articular platelet-rich plasma vs placebo injection on pain and medial tibial cartilage volume in patients with knee osteoarthritis: the RESTORE randomized clinical trial. JAMA. 2021;326(20):2021–2030. doi:10.1001/jama.2021.19415
5. Ayhan E, Kesmezacar H, Akgun I. Intra-articular injections (corticosteroid, hyaluronic acid, platelet-rich plasma) for knee osteoarthritis. World J Orthop. 2014;5(3):351–361. doi:10.5312/wjo.v5.i3.351.
6. Huang Y, Liu X, Xu X, Liu J. Intra-articular injections of platelet-rich plasma, hyaluronic acid or corticosteroids for knee osteoarthritis: a prospective randomized controlled study. Orthopade. 2019;48(3):239–247. doi:10.1007/s00132-018-03659-5