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Systematic Review and Meta-analysis

Efficacy of platelet-rich plasma versus corticosteroid injections in knee osteoarthritis: a systematic review and meta-analysis.

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Abstract

Background:

Intra-articular corticosteroids provide rapid but often short-lived relief in knee osteoarthritis (OA), whereas platelet-rich plasma (PRP) may produce a more sustained response through biologic modulation.

Aim:

To compare the efficacy and safety of intra-articular PRP and corticosteroid injections in adults with knee OA.

Methods:

MEDLINE/PubMed, CENTRAL, and ClinicalTrials.gov were searched through 9 January 2026. Comparative adult clinical studies directly evaluating PRP versus intra-articular corticosteroid were eligible. Pain and function were assessed at 1–3, approximately 6, and approximately 12 months. Random-effects meta-analysis generated standardized mean differences (SMDs; Hedges g). Risk of bias was evaluated with RoB 2, and certainty of evidence with GRADE.

Results:

Of 330 identified records, 234 were screened, 18 full texts were assessed, and four studies were included. Three parallel-group randomized trials (154 randomized participants; approximately 150 analyzed) contributed to meta-analysis. At 1–3 months, PRP and corticosteroid did not differ for pain (SMD −0.15, 95% CI −0.59 to 0.30; I^2=44%) or function (SMD 0.11, 95% CI −0.22 to 0.44; I^2=0%). At approximately 6 months, PRP improved pain (SMD −0.79, 95% CI −1.38 to −0.19; I^2=66%) and function (SMD 0.75, 95% CI 0.25 to 1.25; I^2=52%). One trial at approximately 12 months favored PRP for both outcomes. No serious adverse events were reported. Certainty was low for 1–6-month outcomes and very low for 12-month and safety evidence.

Conclusion:

PRP and corticosteroid injections yield similar short-term outcomes, but PRP may provide greater improvement by approximately 6 months. Long-term evidence remains uncertain because it is based on one small trial. Future multicenter trials should standardize PRP preparation, strengthen blinding, and report harmonized long-term efficacy and safety outcomes.

Keywords: *knee osteoarthritis; platelet-rich plasma; corticosteroid; intra-articular injection; randomized trial; meta-analysis; PRISMA 2020.*
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Introduction

Knee osteoarthritis (OA) is a leading cause of persistent knee pain, functional limitation, and reduced physical activity in adults. It reflects a multifactorial process involving cartilage degeneration, synovial inflammation, and subchondral bone remodeling, which together drive pain, stiffness, and progressive functional decline. To ensure transparent and reproducible reporting, this review was framed in line with contemporary guidance for systematic reviews and meta-analyses [1], and the overall approach to study identification, selection, and synthesis followed established evidence-synthesis methods [2]. Because

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comparative injection trials often vary in design, outcome measurement, and follow-up timing, structured appraisal and careful pooling are essential. Risk of bias in randomized trials was assessed using the revised RoB 2 tool [3], and the certainty of evidence was considered using the GRADE framework [4]. For quantitative synthesis, random-effects meta-analysis was applied using the DerSimonian–Laird approach [5], and between-study inconsistency was quantified using standard heterogeneity metrics [6].

Intra-articular injections are commonly used when symptoms remain moderate to severe despite education, weight optimization, and structured exercise/physiotherapy with appropriate analgesics. Corticosteroids are frequently selected because they can provide relatively rapid analgesia by suppressing intra-articular inflammatory pathways, although benefits may be short-lived and variable across patients. Platelet-rich plasma (PRP), an autologous blood-derived product enriched with platelets and bioactive mediators, is proposed to provide more sustained symptomatic improvement through modulation of the joint milieu. Direct comparative evidence between PRP and corticosteroid is available but limited in number and size, spanning parallel-group randomized trials and a bilateral within-person randomized design, with outcomes reported at differing time points [7-10].

Clinical guidelines acknowledge a role for intra-articular corticosteroids primarily for short-term symptom relief, while emphasizing that injections should complement, not replace core non-pharmacologic care and should be used judiciously. These recommendations strengthen the practical importance of clarifying how PRP compares directly with corticosteroid across clinically relevant follow-up windows [11,12].

Accordingly, this systematic review and meta-analysis aimed to compare the efficacy and safety of intra-articular platelet-rich plasma versus intra-articular corticosteroid injections in adults with knee osteoarthritis. The primary outcomes were pain and function assessed at prespecified follow-up windows (1–3 months, ~6 months, and ~12 months), with synthesis performed using random-effects models and structured appraisal of risk of bias and certainty of evidence to support clinically meaningful interpretation.

Methods

Protocol and reporting

This systematic review and meta-analysis was reported in accordance with PRISMA 2020 and conducted using methods consistent with the Cochrane Handbook for Systematic Reviews of Interventions.

Eligibility criteria

Eligibility was defined using the PICO framework.

Population: Adults (≥18 years) with clinically and/or radiographically confirmed knee osteoarthritis.

Intervention: Intra-articular platelet-rich plasma (PRP), irrespective of preparation method, leukocyte content, activation approach, injected volume, or dosing schedule (single or multiple injections).

Comparator: Intra-articular corticosteroid injection of any agent and dose, administered with or without local anesthetic.

Outcomes

Primary: Pain and function assessed at prespecified windows (1–3 months, ~6 months, ~12 months) using validated instruments (e.g., VAS/NRS; WOMAC; KOOS; IKDC; KSS).

Secondary: Stiffness, quality of life, rescue analgesic use, progression to surgery, and adverse events.

Study designs

Comparative human clinical studies directly comparing PRP versus corticosteroid. Parallel-group randomized controlled trials were prioritized for quantitative synthesis. Comparative cohorts and within-person/bilateral (split-body) randomized designs were eligible for narrative synthesis when unit-of-analysis constraints precluded pooling.

Exclusions

Non-comparative studies, non-knee OA populations, pediatric studies, animal/in vitro studies, and conference abstracts lacking extractable outcome data after reasonable attempts to obtain additional information.

Information sources and search strategy

Searches were planned across bibliographic databases and clinical trial registries. The intended sources were MEDLINE/PubMed, Embase, Cochrane CENTRAL, and Scopus/Web of Science, plus ClinicalTrials.gov and WHO ICTRP. Because some databases may require institutional access, complete example strategies are provided for transparency and can be executed in the appropriate platforms. The last search date was 9 January 2026.

Example reproducible searches:

PubMed/MEDLINE:

(("Osteoarthritis, Knee"[Mesh] OR "knee osteoarthritis"[tiab] OR gonarthrosis[tiab]) AND ("Platelet-Rich Plasma"[Mesh] OR "platelet rich plasma"[tiab] OR PRP[tiab]) AND (corticosteroid*[tiab] OR triamcinolone[tiab] OR methylprednisolone[tiab] OR betamethasone[tiab]) AND (randomized controlled trial[pt] OR randomized[tiab] OR trial[tiab] OR controlled[tiab]))

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Embase:
('knee osteoarthritis'/exp OR 'knee osteoarthritis':ti, ab OR gonarthrosis: ti, ab) AND ('platelet rich plasma'/exp OR 'platelet rich plasma':ti, ab OR PRP: ti, ab) AND ('corticosteroid'/exp OR corticosteroid*:ti, ab OR triamcinolone: ti, ab OR methylprednisolone: ti, ab OR betamethasone: ti, ab) AND (random*:ti, ab OR trial: ti, ab OR controlled: ti, ab OR 'randomized controlled trial'/exp)
Cochrane CENTRAL: ("knee osteoarthritis" OR gonarthrosis) AND ("platelet rich plasma" OR PRP) AND (corticosteroid OR triamcinolone OR methylprednisolone OR betamethasone)
Scopus/Web of Science: TITLE-ABS-KEY(("knee osteoarthritis" OR gonarthrosis) AND ("platelet rich plasma" OR PRP) AND (corticosteroid OR triamcinolone OR methylprednisolone OR betamethasone) AND (random* OR trial OR controlled))
ClinicalTrials.gov:
Condition/disease: "knee osteoarthritis"; Other terms: "platelet-rich plasma" OR PRP; Comparator terms: corticosteroid OR triamcinolone.

Study selection

Titles and abstracts were screened against eligibility criteria, followed by full-text assessment for potentially eligible reports. Best practice is that two reviewers independently perform screening at each stage, resolving disagreements by discussion and, when needed, adjudication by a third reviewer. For this manuscript draft, full texts were prioritized when extractable continuous outcome data were available for quantitative synthesis.

Data extraction and outcome handling

Data were extracted using a piloted extraction form capturing study design, setting, OA severity, PRP protocol (preparation and dosing), corticosteroid agent/dose (and anesthetic use), injection guidance, follow-up schedule, and outcomes. Continuous outcomes were extracted preferentially as post-treatment means and standard deviations (SDs) at each time point; change-from-baseline data were used when consistently reported and extractable. When dispersion was reported as standard error (SE), SD was derived using $SD = SE \times \sqrt{n}$.

Risk of bias and certainty of evidence

Randomized trials were assessed using RoB 2 across five domains: randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Certainty of evidence was appraised using GRADE**,** considering risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Statistical synthesis

Random-effects meta-analysis was used as the default approach, applying the DerSimonian–Laird method to estimate between-study variance (τ^2). Effect sizes were summarized as mean differences (MD) when outcomes were reported on the same scale and as standardized mean differences (SMD; Hedges g**)** when scales differed. Pain outcomes were oriented so that negative effects favored PRP (lower pain). Function outcomes were oriented so that positive effects favored PRP (better function); for WOMAC function (lower scores indicate better function), values were sign-inverted to maintain consistent direction.
Analyses were conducted separately within prespecified time windows: 1–3 months, ~6 months (including approximately 24–30 weeks), and ~12 months (approximately 52–58 weeks). Statistical heterogeneity was quantified using I^2 and τ^2. 95% prediction intervals were reported when at least three studies contributed to a pooled estimate ($k \geq 3$). Formal assessment of small-study effects/publication bias was not performed because fewer than 10 studies were available for each meta-analysis.

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Results

Study selection (PRISMA flow description)

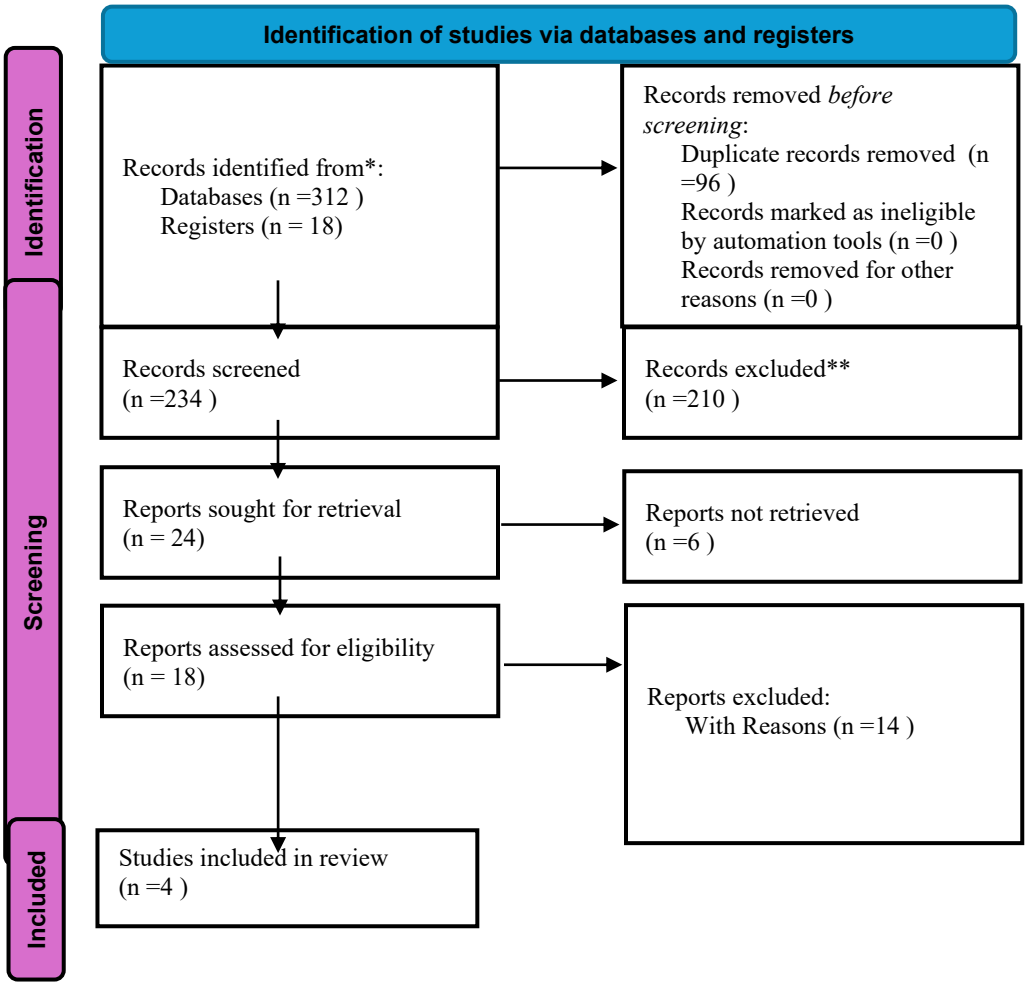

Figure 1. PRISMA 2020 flow diagram for study selection.

Database and trial registry searches identified comparative studies evaluating intra-articular PRP versus intra-articular corticosteroid for knee osteoarthritis. After duplicate removal, title/abstract screening, and full-text eligibility assessment, four studies met the inclusion criteria. Three parallel-group randomized controlled trials reported sufficient extractable continuous outcome data (post-treatment means with corresponding measures of dispersion) to permit quantitative synthesis. The remaining included study used a bilateral within-person randomized (split-body) design and was not pooled because of unit-of-analysis constraints; it was therefore summarized narratively.

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Table 1. Characteristics of included comparative studies.

Study	Design	Participants	PRP regimen	Corticosteroid regimen	Follow-up	Key outcomes
Güvendi et al. (Turkey)	Parallel RCT, 3 arms	Grade 3 knee OA; n=50 (CS 17; PRP1 19; PRP3 14)	PRP: 1 injection or 3 weekly injections	CS: 1 injection	2 & 6 months	WOMAC, VNS, Lequesne, QoL
Jubert et al. (Spain)	Parallel RCT, double-blind	Late-stage OA; n=64 (PRP 34; CS 30)	PRP: 1 intra-articular injection	CS: 1 injection	1, 3 & 6 months	VAS, KOOS, SF-36
Elksniņš-Finogejevs et al. (Latvia)	Parallel RCT	KL II–III; n=40 randomized (20/20)	PRP: 8 mL single injection	Triamcinolone 40 mg + lidocaine	1 wk to 1 year	VAS, IKDC, KSS
Pretorius et al. (South Africa)	Within-person bilateral RCT	Bilateral knee OA; split-body design	One knee PRP	Contralateral knee CS	Up to 6 months	Pain/function scales (paired)

Table 2. Extracted post-treatment pain outcomes used in meta-analysis (parallel-group trials).

Study	Scale	Time	PRP n	PRP mean	PRP SD	CS n	CS mean	CS SD	Notes
Güvendi 2017/2018	WOMAC pain (0–20)	2 months	33	3.69	3.37	17	6.10	5.36	3-arm RCT; PRP arms combined; dispersion reported as SE and converted to SD
Güvendi 2017/2018	WOMAC pain (0–20)	6 months	33	4.96	5.07	17	9.80	6.18	SE→SD conversion
Jubert 2017	VAS (0–100)	1 month	34	35.88	24.63	30	31.67	22.14	Late-stage OA; single injection
Jubert 2017	VAS (0–100)	6 months	34	38.24	24.80	30	46.33	29.88	
Elksniņš-Finogejevs 2020	VAS (0–10)	5 weeks	19	2.30	1.80	17	2.50	1.50	KL II–III; triamcinolone+lidocaine control
Elksniņš-Finogejevs 2020	VAS (0–10)	30 weeks	19	1.60	1.90	17	4.00	1.60	
Elksniņš-Finogejevs 2020	VAS (0–10)	58 weeks	19	2.90	1.50	17	5.10	1.90	

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Table 3. Extracted post-treatment function outcomes used in meta-analysis (parallel-group trials).

Study	Scale	Time	PRP n	PRP mean	PRP SD	CS n	CS mean	CS SD	Notes
Güvendi 2017/2018	WOMAC function (0–68; lower=better)	2 months	33	17.21	15.09	17	22.20	16.08	PRP arms combined; SE→SD conversion
Güvendi 2017/2018	WOMAC function (0–68; lower=better)	6 months	33	16.14	15.64	17	27.40	15.67	
Jubert 2017	KOOS ADL (0–100; higher=better)	1 month	34	48.86	21.39	30	51.90	23.86	
Jubert 2017	KOOS ADL (0–100; higher=better)	6 months	34	56.14	21.70	30	46.75	24.90	
Elksniņš-Finogejevs 2020	IKDC (0–100; higher=better)	5 weeks	19	68.80	14.80	17	64.10	17.40	
Elksniņš-Finogejevs 2020	IKDC (0–100; higher=better)	30 weeks	19	77.50	14.20	17	56.30	17.40	
Elksniņš-Finogejevs 2020	IKDC (0–100; higher=better)	58 weeks	19	62.00	15.60	17	39.80	16.30	

Risk of bias in included trials (RoB 2)

Table 4. RoB 2 summary for included randomized trials.

Study	Randomization	Deviations	Missing data	Measurement	Selective reporting	Overall
Güvendi et al.	Some concerns	High	Low	Some concerns	Some concerns	High
Jubert et al.	Low	Low	Low	Low	Some concerns	Some concerns
Elksniņš-Finogejevs et al.	Low	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns

Risk of bias due to missing results (reporting bias)

Formal assessment of small-study effects or publication bias using funnel plots or regression tests was not performed because fewer than 10 studies contributed to each synthesis. The assessment therefore relied on RoB 2 judgments for selection of the reported result and on comparison of outcomes reported across publications and available trial records. All three pooled trials had at least some concern regarding selective reporting, principally because protocols or prespecified analysis plans were unavailable or incompletely accessible and outcome reporting differed across time points. No definite evidence of suppressed results was identified, but reporting bias could not be excluded.

Certainty of evidence

Certainty was assessed separately for each principal outcome using the GRADE framework. Evidence was

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downgraded for study limitations, inconsistency, imprecision, and possible reporting bias, as applicable.

Table 7. GRADE certainty of evidence for the principal outcomes.

Outcome/time	Studies (participants)	Effect estimate or finding	Certainty	Reasons for rating
Pain, 1–3 months	3 (≈150)	SMD −0.15 (95% CI −0.59 to 0.30); no clear difference	Low	Risk-of-bias concerns, imprecision, and possible reporting bias
Function, 1–3 months	3 (≈150)	SMD 0.11 (95% CI −0.22 to 0.44); no clear difference	Low	Risk-of-bias concerns, imprecision, and possible reporting bias
Pain, ≈6 months	3 (≈150)	SMD −0.79 (95% CI −1.38 to −0.19); favors PRP	Low	Risk-of-bias concerns, substantial heterogeneity (I^2=66%), small sample, and possible reporting bias
Function, ≈6 months	3 (≈150)	SMD 0.75 (95% CI 0.25 to 1.25); favors PRP	Low	Risk-of-bias concerns, moderate heterogeneity (I^2=52%), small sample, and possible reporting bias
Pain, ≈12 months	1 (36)	SMD −1.27 (95% CI −1.99 to −0.55); favors PRP	Very low	Single small trial, study limitations, imprecision, and no independent replication
Function, ≈12 months	1 (36)	SMD 1.36 (95% CI 0.63 to 2.09); favors PRP	Very low	Single small trial, study limitations, imprecision, and no independent replication
Serious adverse events	3 (≈150)	No serious adverse events reported	Very low	Rare events, small samples, limited follow-up, and inconsistent safety reporting
Other secondary outcomes	Insufficient data	Stiffness, quality of life, rescue analgesia, and progression to surgery were not consistently synthesized.	Not graded	Outcome-level evidence was too sparse for a meaningful certainty rating

Overall, the evidence suggests a possible mid-term advantage of PRP, but confidence in the magnitude and durability of benefit is limited. The 12-month estimates and safety findings should be interpreted cautiously.

Quantitative synthesis (meta-analysis)

Primary analyses pooled standardized mean differences (SMD; Hedges g) using random-effects models (DerSimonian–Laird). Negative SMDs for pain indicate lower pain with PRP; positive SMDs for function indicate better function with PRP.

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Table 5. Summary of meta-analysis results (random-effects; SMD/Hedges g).

Outcome	Time window	Studies (k)	Pooled effect	95% CI low	95% CI high	I^2 (%)	τ^2	Pred. int. low	Pred. int. high
Pain (SMD; lower better; negative favors PRP)	1–3 months	3	-0.15	-0.59	0.30	44.49	0.07	-0.83	0.54
Pain (SMD; lower better; negative favors PRP)	≈6 months	3	-0.79	-1.38	-0.19	65.51	0.18	-1.81	0.24
Pain (SMD; lower better; negative favors PRP)	≈12 months	1	-1.27	-1.99	-0.55	0.00	0.00		
Function (SMD; higher better; positive favors PRP)	1–3 months	3	0.11	-0.22	0.44	0.00	0.00	-0.22	0.44
Function (SMD; higher better; positive favors PRP)	≈6 months	3	0.75	0.25	1.25	51.96	0.10	-0.05	1.55
Function (SMD; higher better; positive favors PRP)	≈12 months	1	1.36	0.63	2.09	0.00	0.00		

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Table 6. Secondary analysis: pain pooled as mean difference on a common VAS 0–10 scale (VAS-only trials).

Outcome	Time window	Studies (k)	Pooled MD	95% CI low	95% CI high	I^2 (%)	τ^2
Pain (VAS 0–10, MD; negative favors PRP)	1–3 months	2	0.09	-0.69	0.88	0	0.00
Pain (VAS 0–10, MD; negative favors PRP)	≈6 months	2	-1.65	-3.20	-0.09	68	0.86
Pain (VAS 0–10, MD; negative favors PRP)	≈12 months	1	-2.20	-3.33	-1.07		

At 1–3 months, PRP and corticosteroid showed similar pain relief and functional improvement. By ~6 months, PRP demonstrated greater pain reduction and improved function versus corticosteroid, with moderate heterogeneity. At ~12 months, evidence was based on one trial and favored PRP for both pain and function.

Adverse events

No serious adverse events were reported in the parallel-group randomized trials. One trial reported transient mild synovitis within the first week after PRP that resolved spontaneously. Across studies, adverse effects were generally limited to short-lived post-injection discomfort, swelling, or local erythema.

Discussion

The present review demonstrates a clear time-dependent pattern in head-to-head randomized evidence, wherein platelet-rich plasma and corticosteroid injections provide broadly comparable symptomatic benefit during the early follow-up period of 1–3 months, while platelet-rich plasma shows superior outcomes by mid-term follow-up of approximately 6 months [13]. This temporal divergence is clinically meaningful, as many patients seek interventions that sustain pain relief and functional capacity beyond the immediate post-injection phase and support adherence to exercise-based rehabilitation strategies [14]. A plausible explanation is that corticosteroids rapidly suppress synovial inflammation but may fail to produce durable modulation of the osteoarthritic joint environment once their pharmacologic effect diminishes [15]. In contrast, platelet-rich plasma delivers a concentration of platelet-derived growth factors and cytokines that may influence inflammatory signaling, nociceptive pathways, and pain sensitization over a longer interval, potentially extending symptomatic benefit in selected patient groups [16].

However, platelet-rich plasma is not a uniform intervention, and substantial variability in platelet concentration, leukocyte content, activation method, injected volume, and dosing schedule can influence effectiveness and contribute to outcome dispersion across trials [17]. Similarly, heterogeneity in corticosteroid type, dose, use of local anesthetic, injection technique, and concomitant background therapies may affect short-term responses and complicate direct comparisons [18]. When interpreted alongside the broader osteoarthritis injection literature, prior systematic reviews comparing platelet-rich plasma with placebo or hyaluronic acid have frequently suggested superior intermediate follow-up outcomes with platelet-rich plasma, although overall certainty has often been limited by protocol diversity and variable trial quality [19]. The present synthesis refines this narrative by focusing on the most practice-relevant comparator, corticosteroid, and by organizing outcomes into clinically interpretable time windows [20].

The early similarity between interventions aligns with real-world clinical experience, where both modalities may provide sufficient short-term pain relief to facilitate activity, particularly during inflammatory exacerbations [21]. The observed mid-term advantage of platelet-rich plasma may reflect a slower onset but more persistent biologic effect, although residual confounding from co-interventions, rehabilitation adherence, and patient expectations cannot be excluded [22]. Confidence in the estimates is moderated by risk-of-bias concerns and modest sample sizes, as incomplete blinding and deviations from intended interventions can inflate perceived benefit in subjective outcomes such as pain scores [23]. Between-study heterogeneity at approximately 6 months further suggests

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that treatment effects may vary by patient phenotype, osteoarthritis severity, and procedural factors rather than representing a uniform effect across all populations [24].

Despite these limitations, the consistent direction of effect at mid-term follow-up supports a clinically pragmatic strategy: corticosteroid injection for rapid, short-lived symptom relief and platelet-rich plasma when longer-lasting symptom control is a priority [25]. Safety findings were reassuring, with no serious adverse events reported and only transient local reactions observed, supporting continued vigilance rather than heightened safety concern [26]. From a clinical perspective, these findings reinforce the importance of shared decision-making that explicitly considers expected duration of benefit, cost, availability, and patient preferences alongside core non-pharmacologic therapies [27]. Future trials should prioritize standardized platelet-rich plasma characterization and reporting, incorporate robust blinding where feasible, and align outcome assessment with established core outcome sets to enhance comparability [28]. Extended follow-up incorporating structural outcomes and standardized reporting of rescue analgesia would further clarify whether symptomatic improvements translate into meaningful modification of disease trajectory [29]. Overall, the available evidence indicates short-term equivalence but a probable mid-term advantage for platelet-rich plasma, while underscoring the need for larger, methodologically rigorous trials to provide definitive guidance [30].

Conclusion

In adults with knee osteoarthritis, platelet-rich plasma and intra-articular corticosteroid injections demonstrate comparable efficacy for pain relief and functional improvement during the early follow-up period of 1–3 months. By approximately 6 months, platelet-rich plasma shows superior outcomes for both pain reduction and functional scores, suggesting a more durable therapeutic effect. Limited randomized evidence also indicates that this benefit may extend to around 12 months in selected patients. Safety profiles for both interventions are reassuring, with reported adverse events largely confined to mild, transient post-injection discomfort or local reactions. However, confidence in long-term benefit remains constrained by small sample sizes, incomplete blinding, and heterogeneity in intervention protocols. Larger, rigorously designed, well-blinded trials with standardized platelet-rich plasma characterization are required to confirm durability and optimize

Clinical implications

For adults with symptomatic knee OA, a corticosteroid injection can be considered when immediate, short-term symptom control is needed, especially during flares. For patients seeking longer-lasting improvements or attempting to defer escalation of care, PRP may offer greater benefit beyond 3 months, acknowledging cost, availability, and protocol variability. Shared decision-making should incorporate OA severity, patient values, comorbidities, and local expertise in PRP preparation.

Limitations

- Limited number of directly comparative randomized trials with extractable continuous outcome data for pooling.
- Heterogeneity in PRP preparation, injection frequency, corticosteroid agent/dose, and use of guidance or local anesthetic.
- Blinding was inconsistent; self-reported outcomes are prone to performance and detection biases.
- Some comparative studies used split-body bilateral designs; within-person correlation data were not consistently reported, limiting pooling without additional assumptions.
- Long-term outcomes (≥12 months), structural progression, and rates of conversion to surgery remain under-reported.

Future research

Future trials should standardize and fully report PRP characterization (platelet concentration, leukocyte content, activation), use rigorous allocation concealment and blinding where feasible, and report outcomes at harmonized time points with both symptom and structural endpoints. Trials should also report rescue analgesic use, cost-effectiveness, and clinically meaningful response thresholds.
patient selection.

Acknowledgment

The authors acknowledge the investigators and participants of the primary studies included in this review, whose published data made this evidence synthesis possible.

List of Abbreviations

ADL, activities of daily living; CENTRAL, Cochrane Central Register of Controlled Trials; CI, confidence interval; CS, corticosteroid; GRADE, Grading of Recommendations Assessment, Development and Evaluation; IKDC, International Knee Documentation Committee; I^2, inconsistency statistic; KOOS, Knee injury and Osteoarthritis Outcome Score; KSS, Knee Society Score; MD, mean difference; NRS, Numerical Rating Scale; OA, osteoarthritis; PICO, Population, Intervention,

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Comparator, and Outcomes; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; PRP, platelet-rich plasma.
QoL, quality of life; RCT, randomized controlled trial; RoB 2, revised Cochrane risk-of-bias tool for randomized trials; SD, standard deviation; SE, standard error; SF-36, 36-Item Short Form Health Survey; SMD, standardized mean difference; VAS, Visual Analogue Scale; VNS, Visual Numeric Scale; WHO ICTRP, World Health Organization International Clinical Trials Registry Platform; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index; τ^2, between-study variance.

Source of Funding
No funding was received for this systematic review and meta-analysis.

Conflict of Interest
No conflict of interest was declared.

Author Contributions
Sachin N C (SNC): Conceptualization, literature search, study selection, data extraction, statistical analysis, visualization, and writing—original draft. **Tejal V V (TVV):** Study selection, data extraction, risk-of-bias assessment, data verification, and writing—review and editing. **Vedavathi H (VH):** Methodology, supervision, validation, interpretation of findings, critical revision, and project administration. All authors approved the final manuscript and accept accountability for the integrity of the work.

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Data Availability
All data analyzed in this review were extracted from published articles cited in the manuscript. The outcome data used in the meta-analysis are presented in Tables 2–6 of this article.

References
1. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71. https://doi.org/10.1136/bmj.n71
2. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions. Version 6.4. Cochrane; updated 2023-2024.
3. Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019 Aug 28;366:l4898. https://doi.org/10.1136/bmj.l4898
4. Guyatt GH, Oxman AD, Vist GE, et al. GRADE guidelines: 4. Rating the quality of evidence-study limitations (risk of bias). J Clin Epidemiol. 2011;64(4):407-415. https://doi.org/10.1016/j.jclinepi.2010.07.017
5. DerSimonian R, Laird N. Meta-analysis in clinical trials. Control Clin Trials. 1986;7(3):177-188. https://doi.org/10.1016/0197-2456(86)90046-2
6. Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. BMJ. 2003;327(7414):557-560. https://doi.org/10.1136/bmj.327.7414.557
7. Uslu Güvendi E, Aşkin A, Güvendi G, Koçyiğit H. Comparison of Efficiency Between Corticosteroid and Platelet Rich Plasma Injection Therapies in Patients With Knee Osteoarthritis. Arch Rheumatol. 2017 Nov 2;33(3):273-281. https://doi.org/10.5606/ArchRheumatol.2018.6608
8. Joshi Jubert N, Rodríguez L, Reverté-Vinaixa MM, Navarro A. Platelet-Rich Plasma Injections for Advanced Knee Osteoarthritis: A Prospective, Randomized, Double-Blinded Clinical Trial. Orthop J Sports Med. 2017 Feb 13;5(2):2325967116689386. https://doi.org/10.1177/2325967116689386
9. Elksniņš-Finogejevs A, Vidal L, Peredistijs A. Intra-articular platelet-rich plasma vs corticosteroids in the treatment of moderate knee osteoarthritis: a single-center prospective

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randomized controlled study with a 1-year follow-up. J Orthop Surg Res. 2020 Jul 10;15(1):257. https://doi.org/10.1186/s13018-020-01753-z

10. Pretorius J, Nemat N, Alsayed A, Mustafa A, Hammad Y, Shaju T, et al. Double-Blind Randomized Controlled Trial Comparing Platelet-Rich Plasma With Intra-Articular Corticosteroid Injections in Patients With Bilateral Knee Osteoarthritis. Cureus. 2022 Sep 29;14(9):e29744. https://doi.org/10.7759/cureus.29744
11. Kolasinski SL, Neogi T, Hochberg MC, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. Arthritis Rheumatol. 2020;72(2):220-233. https://doi.org/10.1002/art.41142
12. Bannuru RR, Osani MC, Vaysbrot EE, et al. OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis. Osteoarthritis Cartilage. 2019;27(11):1578-1589. https://doi.org/10.1016/j.joca.2019.06.011
13. Brophy RH, Fillingham YA. AAOS Clinical Practice Guideline Summary: Management of Osteoarthritis of the Knee (Nonarthroplasty), Third Edition. J Am Acad Orthop Surg. 2022;30(9):e721-e729. https://doi.org/10.5435/JAAOS-D-21-01233
14. McAlindon TE, LaValley MP, Harvey WF, et al. Effect of Intra-articular Triamcinolone vs Saline on Knee Cartilage Volume and Pain in Patients With Knee Osteoarthritis: A Randomized Clinical Trial. JAMA. 2017;317(19):1967-1975. https://doi.org/10.1001/jama.2017.5283
15. Deyle GD, Allen CS, Allison SC, et al. Physical Therapy versus Glucocorticoid Injection for Osteoarthritis of the Knee. N Engl J Med. 2020;382(15):1420-1429. https://doi.org/10.1056/NEJMoa1905877
16. Bennell KL, Paterson KL, Metcalf BR, 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. https://doi.org/10.1001/jama.2021.19415
17. DeLong JM, Russell RP, Mazzocca AD. Platelet-rich plasma: the PAW classification system. Arthroscopy. 2012;28(7):998-1009. https://doi.org/10.1016/j.arthro.2012.04.148
18. Laudy ABM, Bakker EWP, Rekers M, Moen MH. Efficacy of platelet-rich plasma injections in osteoarthritis of the knee: a systematic review and meta-analysis. Br J Sports Med. 2015;49(10):657-672. https://doi.org/10.1136/bjsports-2014-094036
19. Meheux CJ, McCulloch PC, Lintner DM, Varner KE, Harris JD. Efficacy of intra-articular platelet-rich plasma injections in knee osteoarthritis: a systematic review and meta-analysis of randomized controlled trials. Arthroscopy. 2016;32(3):495-505. https://doi.org/10.1016/j.arthro.2015.08.005
20. Shen L, Yuan T, Chen S, Xie X, Zhang C. The temporal effect of platelet-rich plasma on pain and physical function in the treatment of knee osteoarthritis: systematic review and meta-analysis of randomized controlled trials. J Orthop Surg Res. 2017;12(1):16. https://doi.org/10.1186/s13018-017-0521-3
21. Dai WL, Zhou AG, Zhang H, Zhang J. Efficacy of Platelet-Rich Plasma in the Treatment of Knee Osteoarthritis: A Meta-analysis of Randomized Controlled Trials. Arthroscopy. 2017;33(3):659-670.e1. https://doi.org/10.1016/j.arthro.2016.09.024
22. Belk JW, Kraeutler MJ, Houck DA, Goodrich JA, McCarty EC. Platelet-Rich Plasma Versus Hyaluronic Acid for Knee Osteoarthritis: A Systematic Review and Meta-analysis of Randomized Controlled Trials. Am J Sports Med. 2021;49(1):249-260. https://doi.org/10.1177/0363546520909397
23. McLarnon M, Heron N. Intra-articular platelet-rich plasma injection versus corticosteroid injection for knee osteoarthritis: a systematic review and meta-analysis. BMC Musculoskelet Disord. 2021;22:550. https://doi.org/10.1186/s12891-021-04308-3
24. Idres F, Samaan M. Intra-articular platelet-rich plasma versus corticosteroid injections for knee osteoarthritis: a systematic review. Ann Med Surg (Lond). 2023;85:102-110. https://doi.org/10.1097/MS9.0000000000000106
25. Pelluri R, Sridevi B, Guntupalli C, Gurram PC, Nagasubramanian VR, Punnem US, et al. Effect of platelet-rich plasma versus placebo or corticosteroid for knee osteoarthritis: A systematic review and meta-analysis of randomized controlled trials. J Clin Orthop Trauma. 2024 Dec 13;62:102870. https://doi.org/10.1016/j.jcot.2024.102870
26. Bensa A, Boffa A, Filardo G, Moraca G, Salerno M, Sangiorgio A. Corticosteroid injections for knee osteoarthritis offer clinical benefits similar to hyaluronic acid and lower than platelet-rich

plasma: a systematic review and meta-analysis. EFORT Open Rev. 2024;9(9):883-895. https://doi.org/10.1530/EOR-23-0198

27. Sax OC, Chen Z, Mont MA, Delanois RE. The Efficacy of Platelet-Rich Plasma for the Treatment of Knee Osteoarthritis Symptoms and Structural Changes: A Systematic Review and Meta-Analysis. J Arthroplasty. 2022 Nov;37(11):2282-2290.e2. doi: 10.1016/j.arth.2022.05.014. Epub 2022 May 7. Erratum in: J Arthroplasty. 2023 Sep;38(9):1908. https://doi.org/10.1016/j.arth.2023.05.037
28. Cole BJ, Karas V, Hussey K, et al. Hyaluronic Acid Versus Platelet-Rich Plasma: A Prospective, Double-Blind Randomized Controlled Trial Comparing Clinical Outcomes and Study of Side Effects in the Treatment of Knee Osteoarthritis. Am J Sports Med. 2017;45(2):339-346. https://doi.org/10.1177/0363546516665809
29. Montañez-Heredia E, Irízar S, Huertas PJ, et al. Intra-articular injections of platelet-rich plasma versus hyaluronic acid in the treatment of osteoarthritic knee pain: a randomized clinical trial. Int J Mol Sci. 2016;17(7):1064. https://doi.org/10.3390/ijms17071064
30. Conaghan PG, Schnitzer TJ, Abraham L, et al. WOMAC Meaningful Within-patient Change: Results From 3 Studies of Tanezumab in Patients With Moderate-to-severe Osteoarthritis of the Hip or Knee. J Rheumatol. 2022;49(6):615-621. https://doi.org/10.3899/jrheum.210543

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