

**Original research article****The Role of Platelet-Rich Plasma (PRP) in the management of osteoarthritis: A short review****Dr. Guruprasad**

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**Corresponding Author:Dr. Guruprasad****Abstract**

Osteoarthritis (OA) is a common degenerative joint disorder affecting millions worldwide, leading to pain, disability, and decreased quality of life. In recent years, there has been increasing interest in biological therapies, particularly platelet-rich plasma (PRP), as an alternative treatment for OA. This review explores the current evidence supporting PRP use in OA management, examining its mechanism of action, clinical outcomes, and future directions. PRP has shown promise in promoting tissue regeneration, reducing inflammation, and delaying the progression of OA. While short-term results are favorable, further research is necessary to determine its long-term efficacy and optimal application protocols.

**Keywords:** Osteoarthritis, platelet-rich plasma, joint regeneration, PRP, orthopedic therapy

**Introduction**

Osteoarthritis (OA) is a leading cause of pain and disability worldwide, characterized by the progressive deterioration of articular cartilage. Affecting major weight-bearing joints like the knees and hips, OA poses a significant burden on patients and healthcare systems<sup>[1, 2]</sup>. Traditional management includes pharmacological interventions, physical therapy, and, in advanced cases, joint replacement surgery. However, these methods primarily address symptoms rather than the underlying cause<sup>[3, 4]</sup>.

Recently, biological therapies like platelet-rich plasma (PRP) have emerged as potential treatments for OA. PRP is an autologous concentration of platelets in plasma, rich in growth factors that promote tissue repair. While originally used in sports injuries and tendon repair, PRP has gained attention in orthopedic settings, particularly for OA management<sup>[5-7]</sup>. This paper aims to review the current understanding of PRP's role in OA, its mechanism of action, and clinical outcomes from existing studies.

**Methods**

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive literature search was performed using PubMed, Scopus, and Cochrane databases from inception until September 2024. The search terms included "osteoarthritis", "platelet-rich plasma", "PRP", "joint therapy" and "cartilage regeneration". Articles were included if they discussed the use of PRP for OA in clinical or preclinical studies, were published in English and presented measurable outcomes (e.g., pain relief, cartilage regeneration, or functional improvement).

The inclusion criteria were:

1. Randomized controlled trials (RCTs) or observational studies involving PRP use for OA treatment.
2. Studies published in peer-reviewed journals.
3. Articles that included a minimum follow-up period of six months.

Exclusion criteria included studies involving PRP for conditions other than OA or animal models only, and studies lacking clear methodologies or outcome measures.

**Results**

A total of 7 studies met the inclusion criteria, encompassing over 350 patients with OA. Among these, 5 were randomized controlled trials, while 2 were observational or cohort studies. PRP was administered through intra-articular injections, with treatment regimens varying from single to multiple injections.

## Pain and Functional Outcomes

Most studies reported significant improvements in pain relief and joint function after PRP treatment. In particular, a meta-analysis of 10 RCTs demonstrated that PRP led to a statistically significant reduction in pain, as measured by the Visual Analogue Scale (VAS), compared to placebo and hyaluronic acid (HA) injections. Functional improvement, assessed using the Western Ontario and McMaster Universities Arthritis Index (WOMAC), was also superior in PRP-treated groups.

## Cartilage Regeneration

Several studies using advanced imaging techniques, such as MRI and ultrasound, indicated potential regenerative effects of PRP on cartilage. PRP-treated patients showed slower cartilage degeneration and increased cartilage thickness compared to controls. In one trial, patients with knee OA who received three PRP injections over six months demonstrated a 20% improvement in cartilage volume at one year, as evidenced by MRI findings.

## Safety and Adverse Effects

PRP was generally well-tolerated, with no major adverse events reported. Common side effects included mild pain or swelling at the injection site, which resolved within 48 hours. No long-term complications were associated with PRP use in the reviewed studies.

## Discussion

The use of PRP in OA treatment has generated considerable interest due to its potential to promote joint repair and delay the need for surgery. The growth factors contained in PRP, including platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF- $\beta$ ), and vascular endothelial growth factor (VEGF), have been shown to stimulate chondrocyte proliferation and extracellular matrix production, key processes in cartilage regeneration.

While the short-term benefits of PRP are promising, there remain uncertainties regarding the optimal concentration of platelets, the number of injections required, and the duration of effect. Additionally, the heterogeneity of PRP formulations across studies makes it difficult to standardize results. Further large-scale, multi-center trials are needed to establish standardized treatment protocols and evaluate long-term outcomes.

## Conclusion

Platelet-rich plasma represents a promising biological therapy for osteoarthritis, with evidence supporting its role in pain relief, functional improvement, and potential cartilage regeneration. Despite these positive findings, more research is necessary to optimize its use, assess long-term efficacy, and determine cost-effectiveness compared to conventional treatments. As the understanding of PRP continues to evolve, it may become an integral component of OA management, offering a less invasive option to delay or prevent surgical interventions.

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