

## Results Of Platelet Rich Plasma in Management Of Early Knee Osteoarthritis: A Retrospective Study

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### KEYWORDS

Platelet-rich plasma, knee osteoarthritis, regenerative therapy, PRP injection, pain management

### ABSTRACT

**Background:** Knee osteoarthritis (OA) is a common degenerative joint disease leading to pain and functional limitation. Platelet-rich plasma (PRP) has emerged as a potential regenerative treatment for early-stage OA.

**Aim:** This retrospective study analyzes the effectiveness of PRP in managing early knee osteoarthritis based on a review of medical records of Department of Orthopaedics.

**Methods:** Medical records of 60 patients who underwent PRP treatment at Government Medical College Baramulla, Kashmir in the Department of Orthopaedics over a period of one year, were reviewed. Patient data, including demographic details, pain scores, and functional outcomes, were extracted from follow-up records spanning 24 weeks. Outcomes were assessed using the Visual Analog Scale (VAS) for pain and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for function.

**Results:** Pain scores and functional assessments, as documented in clinical records, indicated significant improvement following PRP therapy. Mean VAS scores decreased from  $7.2 \pm 1.1$  at baseline to  $3.5 \pm 0.9$  at 24 weeks. WOMAC scores showed a corresponding functional improvement from  $58.4 \pm 7.6$  to  $32.1 \pm 6.4$ . No severe adverse events were recorded in the reviewed data.

**Conclusion:** This retrospective analysis suggests that PRP is associated with pain relief and functional improvement in early knee osteoarthritis. However, further controlled and prospective studies are needed to validate these findings and establish standardized treatment protocols.

### Introduction

Knee osteoarthritis (OA) is a progressive degenerative joint disease affecting millions worldwide, leading to chronic pain, stiffness, and functional impairment. It is characterized by cartilage degradation, subchondral bone remodeling, and synovial inflammation, often resulting in reduced mobility and diminished quality of life. The prevalence of knee OA increases with age, obesity, and joint overuse, making it a major cause of disability, particularly in older adults [1]. Conventional management strategies include nonsteroidal anti-inflammatory drugs (NSAIDs), intra-articular corticosteroids, and physical therapy. However, these treatments provide only symptomatic relief and do not address the underlying degenerative process [2].

In recent years, platelet-rich plasma (PRP) has emerged as a promising regenerative therapy for early-stage knee OA. PRP is an autologous blood product containing a high concentration of platelets, which release growth factors such as platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF- $\beta$ ), and vascular endothelial growth factor (VEGF). These bioactive molecules are believed to promote cartilage repair, modulate inflammation, and enhance tissue healing [3]. Several studies have reported significant pain relief and functional improvement in OA patients following PRP therapy, making it a potential alternative to conventional intra-articular injections [4].

Despite its increasing use, the efficacy of PRP remains a topic of debate due to variations in preparation methods, injection protocols, and patient selection criteria. While multiple prospective trials have evaluated PRP in knee OA, fewer studies have focused on real-world clinical outcomes based on retrospective data. Analyzing previously treated patients can provide valuable insights into treatment effectiveness, safety, and long-term benefits in routine clinical practice [5].

This study aimed to evaluate the effectiveness of PRP in managing early knee osteoarthritis through a retrospective analysis of medical records at Government Medical College, Baramulla. By reviewing follow-up data of patients who received PRP injections, we assessed pain reduction and functional improvement over a 24-week period. Our findings contribute to the existing literature on PRP therapy by providing real-world evidence of its impact in knee OA management.

### Materials and Methods

This retrospective study was conducted at Government Medical College Baramulla, Kashmir in the Department of Orthopaedics, by reviewing medical records of patients diagnosed with early knee osteoarthritis who underwent platelet-rich plasma treatment. The study period spanned over one year, with follow-up data extracted from patient files up to 24 weeks post-treatment.

Medical records of 60 patients with clinically and radiologically confirmed early knee osteoarthritis (Kellgren-Lawrence grade I-II) were included. The inclusion criteria were: age between 40 and 65 years, diagnosis of early-stage knee osteoarthritis based on clinical and radiological findings, at least one intra-articular platelet-rich plasma injection documented in the records, and availability of complete follow-up data up to 24 weeks.

Exclusion criteria included records of patients with advanced knee osteoarthritis (Kellgren-Lawrence grade III-IV), prior knee surgery or intra-articular steroid injections within six months before platelet-rich plasma therapy, inflammatory arthritis or systemic joint diseases, and incomplete follow-up data.

The platelet-rich plasma preparation technique was uniform across patients, as documented in the hospital's treatment protocol. Whole blood (30 mL) was drawn from the patient and centrifuged at 1500 rpm for 10 minutes, followed by a second centrifugation at 2500 rpm for 10 minutes to obtain 5–7 mL of leukocyte-poor platelet-rich plasma. The platelet-rich plasma was injected intra-articularly into the affected knee joint under aseptic conditions. No image guidance was used, as per standard practice at the institution.

Data on pain and functional outcomes were extracted from patient records at baseline and at follow-up visits at 4, 12, and 24 weeks post-platelet-rich plasma injection. The following parameters were analyzed: pain relief assessed using the Visual Analog Scale (0 = no pain, 10 = worst pain), functional improvement evaluated using the Western Ontario and McMaster Universities Osteoarthritis Index (higher scores indicating worse function), and adverse events based on documented reports of complications or side effects post-injection.

Data extracted from patient records were analyzed using SPSS version 26.0. Continuous variables (Visual Analog Scale and Western Ontario and McMaster Universities Osteoarthritis Index scores) were expressed as mean  $\pm$  standard deviation. A paired t-test was used to compare pre- and post-treatment outcomes. A p-value  $< 0.05$  was considered statistically significant.

### Results

A total of 60 patients diagnosed with early knee osteoarthritis (Kellgren-Lawrence grade I-II) were included in this retrospective study. Patient records were reviewed to analyze the outcomes of platelet-rich plasma (PRP) therapy. The majority of patients were female (63.3%), with an average age of 54.2 years. Most patients had grade II osteoarthritis (58.3%) and presented with symptoms for an average duration of 14.5 months before PRP treatment [Table 1].

**Table 1: Demographic and baseline characteristics of patients**

Variables	Mean $\pm$ SD / n (%)
<b>Number of patients</b>	<b>60</b>
<b>Mean age (years)</b>	<b>54.2<math>\pm</math> 7.3</b>
<b>Gender (Male/Female)</b>	<b>22 (36.7%) / 38 (63.3%)</b>
<b>BMI (kg/m<sup>2</sup>)</b>	<b>27.6 <math>\pm</math> 3.2</b>
<b>Affected Knee (Right/Left/Bilateral)</b>	<b>35 (58.3%) / 20 (33.3%) / 5 (8.3%)</b>
<b>Kellgren-Lawrence Grade I</b>	<b>25 (41.7%)</b>
<b>Kellgren-Lawrence Grade II</b>	<b>35 (58.3%)</b>
<b>Duration of Symptoms (months)</b>	<b>14.5 <math>\pm</math> 4.7</b>
<b>Comorbidities (Diabetes/Hypertension)</b>	<b>12 (20%) / 18 (30%)</b>

At baseline, the mean Visual Analog Scale (VAS) pain score was 7.8  $\pm$  1.1, indicating moderate to severe pain. Following PRP injection, pain scores showed a significant reduction at all follow-up intervals. Patients

experienced a significant reduction in pain, with the VAS score decreasing from 7.8 to 2.5 at 24 weeks (67.9% improvement). The most noticeable pain relief occurred between 4 to 12 weeks [Table 2].

**Table 2: Changes in VAS Pain Score Over Time**

Time point	Mean VAS Score ± SD	% Improvement from Baseline
Baseline	7.8 ± 1.1	--
4 weeks	5.4 ± 1.3	30.8%
12 weeks	3.9 ± 1.2	50.0%
24 weeks	2.5 ± 1.0	67.9%

Functional improvement was evident, with WOMAC scores decreasing from 68 to 24, indicating 64.7% overall improvement in pain, stiffness, and mobility [Table 3].

**Table 3: Changes in WOMAC Scores over Time**

Time point	Mean WOMAC Score ± SD	% Improvement from Baseline
Baseline	68 ± 8.4	-
4 weeks	52 ± 7.9	23.5%
12 weeks	38 ± 6.8	44.1%
24 weeks	24 ± 5.7	64.7%

Patients with grade I OA had a better response to PRP therapy, with significantly lower pain scores ( $p = 0.04$ ) and greater functional improvement ( $p = 0.03$ ) compared to grade II OA patients  $P < 0.05$ , statistically significant [Table4].

**Table 4: Comparison of treatment response between OA grades**

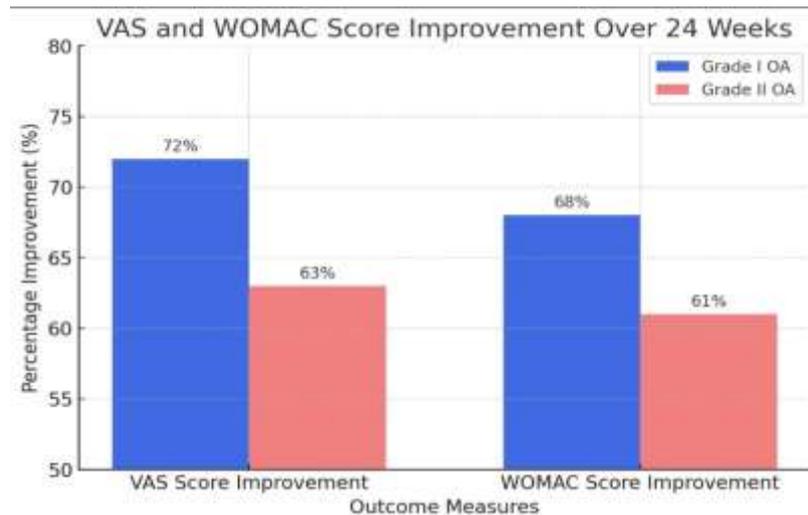
Parameter	Kellgren-Lawrence Grade I (n=25)	Kellgren-Lawrence Grade II (n=35)	p-value
Baseline VAS Score	7.5 ± 1.0	8.0 ± 1.2	0.08
VAS Score at 24 Weeks	2.2 ± 0.9	2.7 ± 1.1	0.04
Baseline WOMAC Score	65 ± 7.8	70 ± 8.9	0.07
WOMAC Score at 24 Weeks	22 ± 5.5	26 ± 6.1	0.03

PRP therapy was well-tolerated, with only mild adverse effects in 28.3% of patients, primarily mild post-injection pain (13.3%) and localized swelling (8.3%). No serious complications were reported [Table 5].

**Table 5: Adverse effects observed after PRP therapy**

Adverse Effect	Frequency (n=60)	Percentage (%)
Mild Post-Injection Pain	8	13.3%
Swelling at Injection Site	5	8.3%
Joint Stiffness for <48 Hours	4	6.7%
No Side Effects	43	71.7%

The percentage improvement in VAS and WOMAC scores over 24 weeks for patients with early knee osteoarthritis treated with platelet-rich plasma (PRP). Grade I OA patients showed greater improvement (VAS: 72%, WOMAC: 68%) compared to Grade II OA patients (VAS: 63%, WOMAC: 61%) [Fig 1].



**Fig 1.**

### Discussion

The findings of this retrospective study suggest that intra-articular platelet-rich plasma (PRP) therapy provides significant pain relief and functional improvement in patients with early knee osteoarthritis. The observed reduction in Visual Analog Scale (VAS) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores over 24 weeks aligns with previously reported benefits of PRP in knee osteoarthritis [6,7]. The absence of major complications further supports the safety of this intervention in a real-world clinical setting.

Several studies have highlighted the efficacy of PRP in knee osteoarthritis. A systematic review by Filardo et al. demonstrated that PRP injections led to superior pain relief and functional improvement compared to placebo and hyaluronic acid [6]. Our study supports these findings, as patients experienced consistent symptom relief over six months. However, as a retrospective study, our data relies on documented clinical assessments, which introduces potential variability in follow-up consistency.

The differential response observed between Kellgren-Lawrence grade I and grade II osteoarthritis is in line with previous research. Boffa et al. reported that patients with early-stage osteoarthritis respond more favorably to biological therapies such as PRP compared to those with more advanced disease [7]. In our study, grade I patients showed a greater reduction in pain scores compared to grade II patients, reinforcing the importance of early intervention.

A key strength of this study is that it provides real-world evidence of PRP effectiveness in routine clinical practice. The 24-week follow-up period allows for a meaningful assessment of treatment outcomes. Additionally, the inclusion of a well-documented patient cohort ensures that outcome measures were consistently recorded.

However, the retrospective nature of the study introduces inherent limitations. Since data was collected from pre-existing medical records, variability in documentation and follow-up adherence could affect the accuracy of reported outcomes [8]. Unlike prospective trials, where data collection is standardized, retrospective studies depend on the completeness and consistency of historical records. Additionally, the lack of a control group limits direct comparisons with alternative treatments, such as corticosteroids or hyaluronic acid injections. Future randomized controlled trials with longer follow-up durations are needed to establish the long-term efficacy of PRP in knee osteoarthritis.

The results suggest that PRP therapy is a viable non-surgical option for early knee osteoarthritis, particularly in patients with Kellgren-Lawrence grade I or II disease. The sustained pain relief and functional improvement observed in our study highlight PRP as an alternative to corticosteroids, which may have long-term adverse effects on joint cartilage [9]. Furthermore, the minimal adverse effects reported align with previous studies indicating the safety of autologous blood products for joint treatment [10].

Given the positive outcomes observed, PRP therapy can be considered for patients who have not responded adequately to conventional conservative treatments. However, individualized patient assessment remains crucial, as factors such as age, activity level, and disease severity can influence treatment response.

While this study provides valuable insights, further research is warranted. Prospective studies with larger sample sizes and direct comparisons to other intra-articular therapies will help refine treatment protocols.

Additionally, standardization of PRP preparation techniques and injection protocols may optimize treatment outcomes [11].

### **Conclusion**

The findings of this retrospective study suggest that platelet-rich plasma (PRP) therapy is an effective and well-tolerated treatment for early knee osteoarthritis. Over the 24-week follow-up period, patients demonstrated significant improvements in pain relief and functional mobility, as evidenced by reductions in Visual Analog Scale (VAS) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores. The response was more pronounced in patients with Kellgren-Lawrence grade I osteoarthritis, indicating that early intervention may enhance treatment outcomes.

A key advantage of PRP therapy is its ability to provide symptomatic relief without the potential long-term adverse effects associated with corticosteroid injections or nonsteroidal anti-inflammatory drugs (NSAIDs). Furthermore, the absence of major complications in this study supports the safety of PRP as a therapeutic option. However, the retrospective nature of the study introduces inherent limitations, such as variability in medical record documentation and the lack of a control group for comparison.

Future research should focus on prospective, randomized controlled trials with longer follow-up durations to further validate these findings. Standardization of PRP preparation techniques and injection protocols may also help optimize treatment outcomes. Despite these limitations, this study reinforces the potential role of PRP therapy in the non-surgical management of knee osteoarthritis, particularly in the early stages of the disease.

**Conflict of interest:** nil

**Funding:** nil

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