



RESEARCH ARTICLE

Platelet-Rich Plasma (PRP) Augmentation in Arthroscopic Knee Meniscal Repair

Arvind Kumar Anal¹, Adnan Qamar^{1*}, Manish Ranjan², Rakesh Choudhary²

ABSTRACT

Background: Meniscal injuries are among the most common orthopaedic issues, especially in young, physically active people. The meniscus is essential for load transfer, stress absorption, joint stability, and knee joint lubrication. However, its inherent healing capacity is limited, particularly in the inner avascular zones, resulting in unsatisfactory outcomes after restoration. In recent years, biological augmentation treatments such as platelet-rich plasma (PRP) have gained popularity due to their capacity to improve tissue recovery. PRP includes a high concentration of growth factors that increase cellular proliferation, angiogenesis, and extracellular matrix synthesis, which may improve meniscus repair outcomes.

Objective: To determine the efficacy of PRP augmentation in improving healing rates, lowering discomfort, and improving functional results in patients following arthroscopic meniscal repair.

Methods: A prospective observational study was undertaken over 11 months, with 50 patients undergoing arthroscopic meniscal repair. Patients were separated into two groups: the PRP group (n=25), who got PRP augmentation during surgery, and the control group (n=25), who had routine repair without PRP. Meniscal healing was clinically and radiologically evaluated, pain was measured using the Visual Analogue Scale (VAS), and functional ability was assessed using the Lysholm knee score method. Statistical analysis was conducted using suitable comparative tests, with a p-value <0.05 indicating statistical significance.

Results: The PRP group showed considerably greater healing rates than the control group (82% vs 62%, p<0.05). Furthermore, patients who received PRP reported reduced postoperative pain levels and improved functional results, as evidenced by higher Lysholm scores. These findings imply that PRP promotes biological healing and improves clinical recovery.

Conclusion: PRP augmentation in arthroscopic meniscal repair increases healing rates, decreases postoperative pain, and improves functional outcomes. It is a promising supplementary therapy in meniscus preservation techniques, with the potential to improve patient recovery and long-term joint health.

Keywords: Meniscus preservation techniques, meniscal repair, arthroscopic, Lysholm scores, Visual Analogue Scale (VAS)
Indian J. Pharm. Biol. Res. (2026): <https://doi.org/10.30750/ijpbr.14.3.03>

INTRODUCTION

Meniscal injuries are among the most common intra-articular knee injuries seen in orthopaedics, especially in young and active people. The meniscus is essential for load transfer, stress absorption, joint stability, and lubrication. Meniscal tissue preservation is critical in the prevention of early degenerative changes and osteoarthritis. Arthroscopic meniscal repair has emerged as the preferred treatment option over meniscectomy; however, its success is heavily dependent on the meniscus's vascular supply[1]

The outer third of the meniscus is strongly vascularized and has excellent healing potential, but the interior avascular zone has poor regenerative power. As a result, failure rates remain high, particularly for tears in the core zones. To address this issue, biological augmentation approaches have been developed to improve healing[2]. Platelet-rich plasma

¹Senior Resident, Department of Orthopaedics, Patna Medical College and Hospital, Patna, Bihar, India

²Professor, Department of Orthopaedics, Patna Medical College and Hospital, Patna, Bihar, India

Corresponding Author: Adnan Qamar, Senior Resident, Department of Orthopaedics, Patna Medical College and Hospital, Patna, Bihar, India.

How to cite this article: Anal AK, Qamar A, Ranjan M, Choudhary R. Platelet-Rich Plasma (PRP) Augmentation in Arthroscopic Knee Meniscal Repair. Indian J. Pharm. Biol. Res. 2026;14(3):13-15.

Source of support: Nil

Conflict of interest: None.

Received: 08/05/2026 **Revised:** 22/05/2026 **Accepted:** 03/06/2026 **Published:** 20/06/2026

(PRP) is an autologous concentration of platelets with growth factors like PDGF, TGF- β , and VEGF that promote cell proliferation, angiogenesis, and tissue regeneration. PRP is increasingly being used in orthopaedic operations to improve recovery outcomes[3].

Despite promising results from prior studies, the therapeutic efficacy of PRP in meniscal healing is variable. The purpose of this study is to see how PRP augmentation affects healing rates, pain reduction, and functional results in patients receiving arthroscopic meniscal repair.

METHODS

Study Design

Prospective observational study

Duration

11 months

Sample Size

50 patients

Inclusion Criteria

- Age 18–50 years
- Traumatic meniscal tear
- Arthroscopic repair candidates

Exclusion Criteria

- Advanced osteoarthritis
- Previous knee surgery
- Systemic disease

Groups

- PRP Group (n=25)
- Control Group (n=25)

Outcome Measures

- Healing rate
- Pain (VAS score)
- Functional outcome (Lysholm score)

Statistical Analysis

- t-test, Chi-square
- $p < 0.05$ significant

RESULTS

Table 1: Baseline Characteristics

Parameter	PRP Group	Control Group	p-value
Mean Age	29 \pm 4	30 \pm 5	0.58
Male (%)	72%	68%	0.75

Table 2: Healing Outcomes

Outcome	PRP Group	Control Group	p-value
Healing Rate (%)	82%	62%	<0.05
Failure (%)	18%	38%	<0.05

Table 3: Clinical Outcomes

Parameter	PRP Group	Control Group	p-value
VAS Score	3 \pm 1	5 \pm 2	<0.01
Lysholm Score	88 \pm 6	72 \pm 7	<0.01

DISCUSSION

This study assessed the efficacy of PRP augmentation in arthroscopic meniscal repair and found that the PRP group had higher healing rates and better clinical results than the control group. The PRP group had a much higher healing rate (82%) than the control group (62%), demonstrating that biological augmentation is advantageous. PRP contains growth factors such as PDGF, TGF- β , and VEGF, which contribute to better healing outcomes[4]. These factors promote cellular proliferation, collagen formation, and angiogenesis, which improves the healing capacity of the comparatively avascular meniscus[5].

Lower VAS values demonstrated that the PRP group reduced pain much more effectively. This could be related to PRP's anti-inflammatory characteristics and enhanced tissue repair, which leads to less nociceptive stimulation. The Lysholm knee score was used to assess functional outcomes, and the PRP group had considerably higher results, indicating better knee function restoration and patient satisfaction[6].

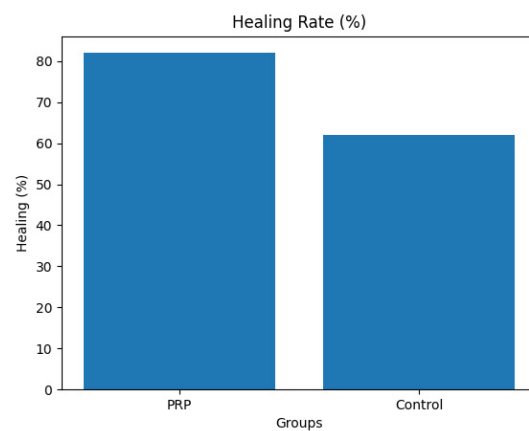


Figure 1: Healing rate (%)

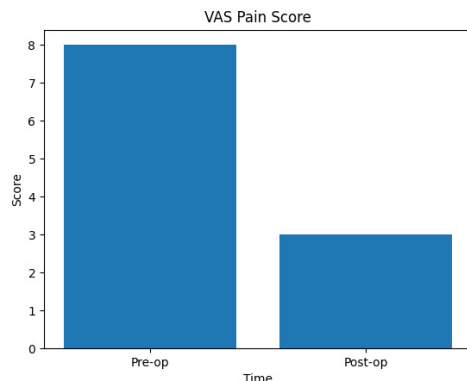


Figure 2: VAS pain score

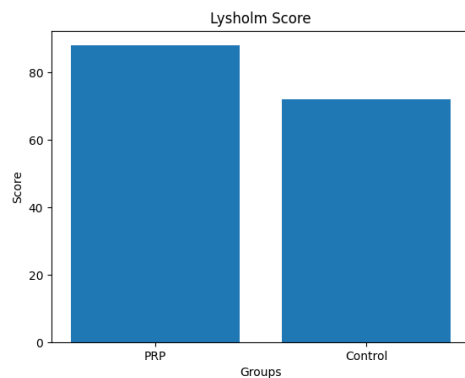


Figure 3: Lysholm score

These findings are consistent with prior research indicating that PRP augmentation improves healing and outcomes in meniscal repair. However, other studies have had varying results, most likely because to changes in PRP preparation methods, patient selection, and tear characteristics. Despite the hopeful findings, this study has some drawbacks. The sample size was limited, and the observational approach limits the capacity to determine causality[7]

Furthermore, long-term follow-up was not provided, which is required to assess the repair's longevity and the danger of re-tear. Future randomised controlled trials with bigger sample sizes and standardised PRP techniques are required to validate these findings and develop definitive treatment guidelines. Overall, PRP appears to be a safe and effective supplement to meniscus healing[8]

CONCLUSION

PRP augmentation in arthroscopic meniscal repair improves healing rates, pain reduction, and functional outcomes

when compared to traditional repair. PRP's biological characteristics enhance tissue regeneration and repair in avascular regions of the meniscus. Although the findings are promising, more large-scale randomised studies with long-term follow-up are needed to establish its efficacy and standardise its application. PRP is a promising adjunct in meniscal preservation techniques, with the potential to improve patient outcomes and lower the risk of long-term degenerative alterations.

REFERENCES

1. Raganathan Narayanaswamy and ISI. Arthroscopic Meniscal Repair With Second-Generation Platelet-Rich Fibrin Clot Augmentation. *Arthrosc Tech* [Internet]. 2022;11(9):e1569–75.
2. Petrie KA, Pratapneni A, Jabara J, Lansdown DA. Operative Techniques : Orthobiologics in the Treatment / Augmentation of Meniscal Injuries. *Oper Tech Orthop* 2025;35(2):101187.
3. Griffin JW, Hadeed MM, Werner BC, Diduch DR, Carson EW, Miller MD. Platelet-rich Plasma in Meniscal Repair : Does Augmentation Improve Surgical Outcomes ? *Clin Orthop Relat Res*. 2015;473:1665–72.
4. Belk JW, Kraeutler MJ, Thon SG, Littlefield CP, Smith JH, Mccarty EC. Augmentation of Meniscal Repair With Platelet-Rich Plasma A Systematic Review of Comparative Studies. *Orthop J Sport Med*. 2020;8(6):1–9.
5. Liang J, Tu M, Li H, Chen W. Efficacy and Safety of Platelet-Rich Plasma for Patients With Meniscal Injury A Systematic Review and Meta-analysis of Randomized. *Orthop J Sport Med*. 2025;13(10):1–16.
6. Migliorini F, Cuzzo F, Cipollaro L, Oliva F, Hildebrand F, Maffulli N. Platelet - rich plasma (PRP) augmentation does not result in more favourable outcomes in arthroscopic meniscal repair : a meta - analysis. *J Orthop Traumatol* [Internet]. 2022;23(8):1–9.
7. Rafal Kaminski , Krzysztof Kulinski, Katarzyna Kozar-Kaminska, Monika Wielgus, Maciej Langner, Marcin K. Wasko, Jacek Kowalczewski and SP. A Prospective, Randomized, Double-Blind, Parallel-Group, Placebo-Controlled Study Evaluating Meniscal Healing, Clinical Outcomes, and Safety in Patients Undergoing Meniscal Repair of Unstable, Complete Vertical Meniscal Tears (Bucket Handle) Augmented wit. *Biomed Res Int*. 2018;1–9.
8. Dai W, Zhang H, Lin Z, Shi Z, Wang J. Efficacy of platelet-rich plasma in arthroscopic repair for discoid lateral meniscus tears. *BMC Musculoskelet Disord*. 2019;20(113):1–7.