

Serial High-Concentration Platelet-Rich Plasma for Resolution of Tibial Osteochondral Defect and Partial Cartilage Healing: A Case Report

Dr. Hassan Mubark*

Rheumatologist, Auckland Regenerative Clinic, Ormiston Specialist Centre, 125 Ormiston Road, Flat Bush, Auckland, New Zealand.

*Correspondence:

Dr. Hassan Mubark, Rheumatologist, Auckland Regenerative Clinic, Ormiston Specialist Centre, 125 Ormiston Road, Flat Bush, Auckland, New Zealand, Phone: +64 9 271 3305, Mobile: +64 21 843 513.

Received: 13 Jan 2026; Accepted: 24 Feb 2026; Published: 07 Mar 2026

Citation: Hassan Mubark. Serial High-Concentration Platelet-Rich Plasma for Resolution of Tibial Osteochondral Defect and Partial Cartilage Healing: A Case Report. J Med - Clin Res & Rev. 2026; 10(3): 1-4.

ABSTRACT

Focal osteochondral and cartilage defects of the knee are increasingly recognized in physically active adults and represent an important precursor to early osteoarthritis. Conventional conservative treatments frequently fail to restore function, while surgical options such as microfracture demonstrate variable durability. Platelet-rich plasma (PRP) and mesenchymal stem cell-based therapies have therefore emerged as biologic strategies aimed at joint preservation.

We report the case of a 42-year-old physically active male who presented with persistent anterior and lateral knee pain, weakness, and functional limitation following repetitive snowboarding jumps without direct traumatic impact. Serial magnetic resonance imaging demonstrated progression of tibial cartilage fissuring, osteochondral defect formation, lateral tibiofemoral full-thickness cartilage degeneration, and associated synovial changes. The patient failed to improve with rehabilitation, corticosteroid injection, and standard-concentration PRP. Arthroscopic microfracture was recommended; however, the patient elected to proceed with a series of high-concentration leukocyte-poor PRP injections combined with soluble hyaluronic acid. Three treatment sessions administered over four months resulted in gradual clinical improvement, restoration of quadriceps strength and knee stability, and interval MRI evidence of osteochondral defect healing with early cartilage infilling.

This case illustrates the potential role of repetitive high-concentration PRP combined with hyaluronic acid as a joint-preserving option in carefully selected patients with focal cartilage injury, demonstrating both symptomatic improvement and radiologic healing of osteochondral pathology with concomitant cartilage repair. Randomized controlled trials are warranted to validate these findings.

Keywords

Osteochondral defect, Knee cartilage injury, Focal chondral lesion, Platelet-rich plasma, Leukocyte-poor PRP, Hyaluronic acid, Joint preservation, MRI cartilage healing, Nonoperative management, Biologic injections.

Introduction

Osteochondral defects and cartilage injuries of the knee are recognized causes of persistent joint pain, swelling, mechanical symptoms, and functional limitations, especially in young and

physically active individuals. These lesions include damage to the articular cartilage with or without involvement of the subchondral bone, which can be caused by repetitive micro-trauma, acute sporting activities, and biomechanical overload. Due to the poor intrinsic healing capacity of articular hyaline cartilage, untreated defects can lead to subchondral bone changes and early osteoarthritis (OA) in later stages. Early diagnosis with MRI and stage-appropriate treatment are critical for optimal preservation and functional recovery [1].

The initial management measures include physiotherapy, modification of activities, non-steroidal anti-inflammatory drugs, and corticosteroid injections. Though these measures help in alleviating the symptoms, the disease process in the cartilage persists. Surgical interventions, including microfracture, chondroplasty, and osteochondral grafting, are recommended in cases that fail conservative management. However, the long-term results are still unpredictable, especially in athletic individuals, as the fibrocartilaginous repair tissue is known to be non-durable under heavy demands [2].

Similarly, the aim of the microfracture technique is to stimulate the marrow-derived progenitor cells by creating perforations in the subchondral bone, but there are several studies showing the deterioration of the outcomes beyond two to five years, especially for larger lesions and high-demand patients [3]. This has led to an increased interest in biologic therapies, especially for the modulation of the inflammatory process and tissue regeneration.

Platelet-rich plasma (PRP) is an autologous biologic product with a high concentration of platelets, which have growth factors with the capacity to affect chondrocyte proliferation, matrix synthesis, angiogenesis, and inflammatory signaling [4]. Recent systematic reviews have shown that PRP offers better symptomatic relief than hyaluronic injections or placebo in early degenerative knee disease [5]. New imaging-based evidence also points to the potential changes that may occur in the structure of cartilage following PRP, especially with serial and focal injections [6]. Combination therapy with hyaluronic acid may also create a greater biomechanical and biologic synergy, improving joint lubrication and cellular signaling.

The purpose of this report is to describe in detail the longitudinal case of progressive symptomatic osteochondral defect in the tibia with associated cartilage damage and the onset of the process of OA in a physically active adult and treat it with serial PRP and hyaluronic acid injections.

Case Presentation

A 42-year-old physically active male patient complained of persistent pain, weakness, and functional limitation in the right anterior and lateral knee pain following a snowboarding session in November 2023. During the session, there was no direct trauma, but multiple jumps were involved in the activity. He experienced progressive pain, weakness, and inability to climb stairs, and was even unable to run, jump, and participate in sport activities with limitation of knee flexion.

-Pain was measured using the visual analogue scale (VAS).

- Walking and cycling: 5/10
- Running and jumping: 9/10
- Stair climbing: 8/10

The primary care assessment resulted in radiography and a referral to sports medicine. The MRI taken in March 2024 revealed partial thickness chondral loss, chondral delamination of the trochlear groove, synovitis, and grade 3 fissuring of the posterior lateral

tibial plateau cartilage (Figure 1).



Figure.1 Grade 3 fissuring of cartilage over the posterior margin of the lateral tibial plateau.

A rehabilitation plan was formulated, and this included physiotherapy. However, other forms of treatment, such as acupuncture and cupping therapy, did not demonstrate any significant improvement. In August 2024, an intra-articular corticosteroid was administered, and this demonstrated minimal improvement. However, an MRI scan in October 2024 demonstrated a large osteochondral defect (OCD) in the lateral tibial area, along with cartilage damage in the lateral tibiofemoral area. A standard concentration PRP was administered in December 2024, demonstrating partial improvement in the imaging, but the symptoms remained the same. A further MRI scan was conducted in March 2025, demonstrating a mild reduction in the size of the lateral OCD, but the traumatic cartilage damage and degeneration remained the same. The patient was then referred to an orthopaedic surgeon, who recommended arthroscopic microfracture surgery. However, the patient was then motivated to seek further alternatives, and he consulted us in April 2025 for a second opinion, where he was assessed for alternative treatment options for his knee condition. The assessment demonstrated the presence of patellofemoral tenderness, lateral joint line tenderness, pain with deep flexion, and mild wasting of the quadriceps muscle.

After considering all treatment modalities that were available, the patient decided to undergo a series of high-concentration leukocyte-poor PRP with soluble hyaluronic acid as he could not afford the fat-derived expanded mesenchymal stem cell therapy. The treatment was given on three occasions: 12th June, 23rd

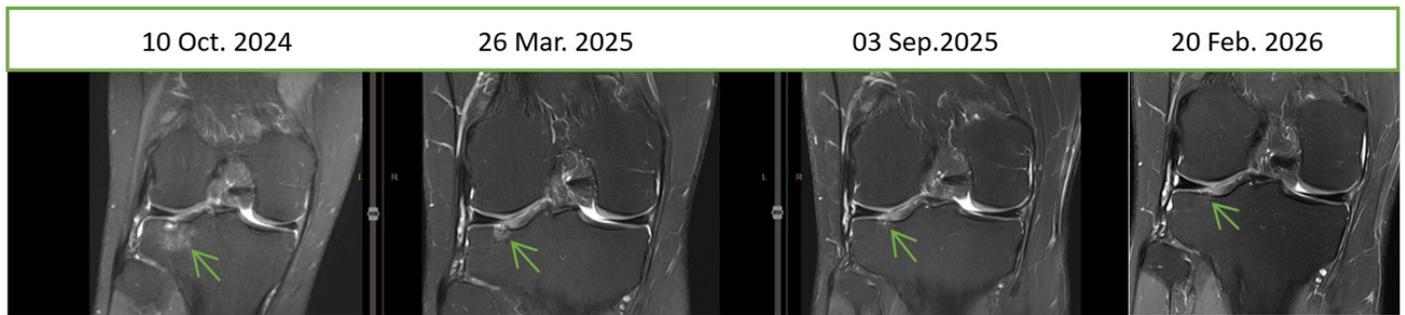


Figure 2. Coronal T2-weighted MRI demonstrating interval resolution of the osteochondral defect following repeated platelet-rich plasma therapy.

September, and 22nd October 2025. For each treatment, 50 mL of autologous blood was drawn and processed into high concentration PRP with hyaluronic acid and injected intra-articularly under ultrasound guidance using sterile technique. Local anaesthetic was given before each treatment, which was 0.2% ropivacaine, and injection into the osteochondral lesion of the lateral tibial plateau was given during the final treatment.

A structured rehabilitation regime that included quadriceps strengthening, proprioception, and loading was continued. Post-treatment, the patient noticed progressive relief of lateral and anterior knee pain, improved quadriceps strength, and enhanced stability. The pain scores were:

- Walking and cycling: 0/10
- Running and jumping: 4/10
- Stair climbing: 4/10

-Full range of motion and flexion of the knee were achieved.

Follow-up MRI showed that there was an improvement in the tibial osteochondral lesion with early lateral cartilage infilling (Figure 2). The patellofemoral partial thickness chondral loss is unchanged.

Discussion

PRP has a high concentration of bioactive growth factors, such as platelet-derived growth factor, transforming growth factor-beta, and vascular endothelial growth factor, which can affect chondrocyte metabolism, matrix production, vascularization, and inflammatory response modulation, as described in literature [7].

Numerous randomized studies and meta-analyses have confirmed that PRP is superior to hyaluronic acid or placebo in promoting symptomatic relief in knee cartilage pathology [8]. In addition, MRI studies have revealed that partial defect filling and signal normalization occur after treatment with PRP, especially in focal cartilage lesions and early degenerative stages [6].

The addition of hyaluronic acid may also help in improving outcomes by promoting viscoelasticity of the joint and allowing for the retention of growth factors and cell interactions within the joint space [9]. There is also evidence that suggests that repeat

injections of PRP may offer more lasting benefits than single injections of PRP due to its biologic stimulation effect [10].

Patient selection is still an important factor, and the size, location, and alignment of the lesions, as well as the general status of the joint, are important determinants of the outcome, with more severe degeneration showing less responsiveness to biologic treatment [11]. In the present case, the osteochondral defect in the tibia and the patellofemoral injury made the patient highly susceptible to early osteoarthritis, and though microfracture was recommended, doubts regarding the durability of the repair led to the search for biologic treatment.

The clinical improvement and infilling of cartilage, as depicted on the MRI, indicate that the use of repeated PRP with hyaluronic acid could potentially be a significant joint-preserving strategy, especially with a rehabilitation protocol [9]. We hypothesize that mesenchymal stem cell (MSC) therapy with PRP could potentially yield better regenerative effects compared to PRP alone in the management of osteochondral defects.

MSCs possess the ability for chondrogenesis and paracrine activities, which are useful for cartilage and subchondral bone repair, with clinical trials showing pain relief, functional improvement, and MRI-documented restoration of cartilage after the implantation of MSCs [12]. However, the cost factor associated with cell therapy restricts its clinical applicability, and PRP is more accessible and cost-effective for the first line of treatment.

Conclusion

This case demonstrates symptomatic improvement and radiologic signs of nearly full resolution of the tibial osteochondral defect early cartilage repair following serial PRP combined with hyaluronic acid in an active middle-aged adult with focal knee cartilage injury. Biologic therapy may provide a valuable joint-preserving strategy prior to surgery in selected patients, emphasizing the importance of early diagnosis, stage-appropriate intervention, and multidisciplinary rehabilitation.

Acknowledgments

The authors sincerely thank the patient for consenting to publication

of this case. Appreciation is extended to the radiology team for imaging acquisition and interpretation, the rehabilitation team for structured physiotherapy support, and Ormiston Specialist Centre for clinical coordination and ongoing patient care.

References

1. Gomoll AH, Farr J, Gillogly SD, et al. Surgical management of articular cartilage defects of the knee. *J Bone Joint Surg Am.* 2010; 92: 2470-2490.
2. Migliorini F, Eschweiler J, Schenker H, et al. Surgical management of focal chondral defects of the knee a Bayesian network meta-analysis. *J Orthop Surg Res.* 2021; 16: 543.
3. Kreuz PC. Long-term outcomes after microfracture of knee cartilage defects. *Cartilage.* 2023; 14: 45-54.
4. Xie X, Zhang C, Tuan RS, et al. Biology of platelet-rich plasma and its clinical application in cartilage repair. *Arthritis Res Ther.* 2014; 16: 204.
5. Belk JW. Platelet-rich plasma versus hyaluronic acid for knee cartilage lesions. *Am J Sports Med.* 2024; 52: 98-108.
6. Sekiya I, Katano H, Mizuno M, et al. 3D-MRI analysis of cartilage thickness changes after PRP injection in medial knee osteoarthritis A preliminary report. *PLoS One.* 2025; 20: e0321067.
7. Wu WS, Chen LR, Chen KH, et al. Platelet-rich plasma PRP Molecular mechanisms actions and clinical applications in human body. *Int J Mol Sci.* 2025; 26: 10804.
8. Laver L, Marom N, Dnyanesh L, et al. PRP for degenerative cartilage disease A systematic review of clinical studies. *Cartilage.* 2016; 8: 341-364.
9. Ciapini G, Simonetti M, Giuntoli M, et al. Is the combination of platelet-rich plasma and hyaluronic acid the best injective treatment for grade II–III knee osteoarthritis A prospective study. *Adv Orthop.* 2023; 2023: 1868943.
10. Filardo G, Di Matteo B, Kon E, et al. Multiple PRP injections are more effective than single injections and hyaluronic acid in knees with early osteoarthritis a randomized double-blind placebo-controlled trial. *Knee Surg Sports Traumatol Arthrosc.* 2017; 25: 958-965.
11. Budhiparama NC, Putramega D, Lumban-Gaol I, et al. Orthobiologics in knee osteoarthritis dream or reality. *Arch Orthop Trauma Surg.* 2024; 144: 3937-3946.
12. Kim YS, Choi YJ, Lee SW, et al. Assessment of clinical and MRI outcomes after mesenchymal stem cell implantation in patients with knee osteoarthritis a prospective study. *Osteoarthritis Cartilage.* 2016; 24: 237-245.