



TMI Sports Medicine and Orthopedics

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Superdose Platelet-Rich Plasma (PRP) for Knee Osteoarthritis

Patient Utilization Summary Sheet

Key Clinical Evidence

1. Bansal & Preotesa – *Scientific Reports*, 2021

- Study Design: Randomized controlled trial comparing 10 billion platelet PRP vs. hyaluronic acid.
- Population: Majority KL grade 3 (moderate-severe OA); 84.3% of PRP group.
- Key Findings:
 - Significant improvements in multiple functional outcome scores and six-minute pain-free walking distance, superior to hyaluronic acid group.
 - IL-6 and TNF-alpha levels (inflammatory markers) significantly decreased in PRP group at 1 month.
 - MRI Analysis: Cartilage thickness preserved in 82.8% of PRP group vs. 61.7% control at 1 year.
 - Authors concluded evidence for chondroprotective structural benefit and emphasized that absolute platelet count (not just concentration) is critical for clinical efficacy.
 - Duration of Effectiveness: Maintained at 12 months after a single injection.

2. Patel & Dhillon – *Orthopaedic Journal of Sports Medicine*, 2024

- Study Design: Prospective randomized trial comparing conventional PRP (~2.8 billion platelets) vs. superdose PRP (~5.6 billion platelets).
- Key Findings:



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- Patient Satisfaction: 96% at 6 months in the superdose group vs. 68% in conventional dose group.
 - Both groups demonstrated significant improvement from baseline in all PROs (Patient-Reported Outcomes) and pain scores.
 - Superdose PRP group had significantly superior results across all measured domains.
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3. Matthias & Maccauro – *Journal of Clinical Medicine*, 2024

- Study Design: High-dose PRP (>4 billion platelets) in mild to moderate knee OA.
 - Key Findings:
 - Significant improvement in pain scores and functional outcomes at 6 & 12months.
 - Lowest pain scores observed at 6 months.
 - KL Grade 2 patients demonstrated the most pronounced improvements.
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4. Barrigan & Lansdowne – *Journal of Arthroscopy*, 2025

- Study Design: Systematic review of 29 studies examining PRP for knee OA.
 - Key Findings:
 - 28 of 29 studies demonstrated statistically significant improvement at 6 months compared to controls.
 - Of 18 studies with 12-month data, 16 showed positive outcomes; those with average platelet doses >5 billion had superior results.
 - Patient Demographics: Mean age 58 years; average KL grade 2.3.
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5. Peng & Chen – *Knee Surgery and Related Research*, 2025

- Study Design: Systematic review of 12 randomized controlled trials comparing leukocyte-poor PRP vs. hyaluronic acid.
 - Key Findings:
 - WOMAC total scores and physical function scores favored leukocyte-poor PRP at 6 and 12 months.
 - Visual Analog Scale (VAS) pain scores significantly better in PRP group at 6 and 12 months.
 - Functional knee scores superior in PRP group at 6 months.
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6. Jubert & Navarro – *American Journal of Sports Medicine*, 2017

- Study Design: Prospective randomized trial comparing PRP vs. corticosteroid injection in late-stage (KL grade 3–4) knee OA.
 - Key Findings:
 - Single PRP injection demonstrated pain relief and improved activities of daily living and quality of life comparable to corticosteroid injection.
 - No PRP dose documentation available, but positive outcomes support PRP's efficacy even in late-stage OA.
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Summary of Key Clinical Insights

- Higher absolute platelet count (>4–5 billion) consistently associated with better clinical outcomes.
- Superdose PRP (>5 billion platelets) shows:
 - Superior improvements in pain relief, functional status, and patient satisfaction.



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- Maintenance of clinical benefit for up to 12 months or longer post-injection.
 - Potential chondroprotective effect with maintenance of cartilage thickness on MRI.
 - Leukocyte-poor PRP formulations outperform hyaluronic acid in head-to-head trials.
 - Best outcomes are typically seen in patients with KL grade 2 osteoarthritis, though benefit extends into KL grade 3.
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Clinical Application in Patient Selection

- Ideal candidates:
 - Age range: ~50–65 years.
 - Radiographic OA: KL Grade 2–3.
 - Mild to moderate functional impairment without major mechanical symptoms.
- Injection Recommendations:
 - Single injection protocol with ≥ 5 billion platelets per dose.
 - Leukocyte-poor preparation preferred.
- Expected Outcomes:
 - Peak clinical response at 6 months.
 - Sustained benefit through at least 12 months.