

The Efficacy of Platelet-Rich Plasma in Treating Osteochondral Lesions of the Talus: A Comprehensive Review of Clinical and Animal Studies

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INTRODUCTION:

Platelet-rich plasma (PRP) as biologic adjuvant has gained significant attention in recent years in the management of osteochondral lesions of the talus (OLT). However, no formal evidence-based treatment guidelines currently exist. While these treatments are frequently used as part of conservative management or to augment surgical interventions, their effectiveness remains unclear, particularly for PRP in OLTs.

METHODS:

A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive literature search was performed across PubMed, Scopus, and Cochrane to identify studies comparing PRP to other conservative treatment modalities for OLTs. The following keywords and Medical Subject Headings (MeSH) terms were used in the search strategy: "platelet-rich plasma," "osteochondral lesions," "talus," "PRP," "treatment outcomes," "biological therapies," and "regenerative medicine." The search was conducted using COVIDENCE systematic review software for screening, data extraction, and duplicate removal. Two independent reviewers screened titles, abstracts, and full-text articles, resolving discrepancies through consensus with a third senior reviewer. Studies were included if they evaluated the use of PRP in OLTs and met other predefined inclusion criteria.

RESULTS:

A total of 8 human studies and 27 animal studies were included in the review, encompassing various outcome measures such as clinical, tissue repair, imaging, and functional outcomes.

In **human studies**, 8 studies evaluated clinical outcomes, with 7 reporting statistically significant improvements in PRP-treated patients compared to controls. 6 studies evaluated pain scores, with 5 showing significant improvements, and 4 studies assessed radiographic outcomes, with 3 demonstrating significant reductions in functional and radiographic deterioration in PRP-treated patients compared to controls. These studies indicated improved cartilage repair and less joint degeneration, highlighting PRP's potential to prevent further deterioration in OLT patients.

In **animal studies**, 27 studies focused on tissue repair and cellular outcomes, with 22 reporting significant improvements in cartilage repair, collagen production, and tissue integration in PRP-treated animals. 19 studies evaluated imaging outcomes, with 12 reporting enhanced bone mineralization and trabecular bone regeneration in PRP-treated models, while others showed no significant differences. Finally, 20 studies assessed functional outcomes, with 18 reporting significant improvements in lameness, gait, and tissue regeneration in PRP-treated animals.

DISCUSSION AND CONCLUSION:

Overall, PRP demonstrated significant benefits across clinical, tissue repair, imaging, and functional outcomes in both human and animal studies. However, the heterogeneity of study designs and outcome measures highlights the need for standardized protocols in future research.

Study Type	PRP Effect	Outcome Category	# of Studies Evaluated	# of Studies Finding Significance	# of Studies Finding No Significance	Primary Finding
Human	Clinical	Pain reduction, functional recovery	8	7	1	Significant improvements in pain relief and functional recovery in PRP-treated patients compared to controls.
Human	Clinical	Radiographic outcomes	4	3	1	Significant reductions in radiographic deterioration in PRP-treated patients.
Animal	Tissue Repair	Histology, collagen production	27	22	5	PRP significantly improved tissue repair, collagen production, and tissue integration compared to controls.
Animal	Imaging	μCT, Radiographic scores	19	12	7	Mixed results: some studies showed improved bone mineralization, others showed no significant difference.
Animal	Functional	Lameness, gait improvement, tissue regeneration	20	18	2	Significant improvements in functional recovery, including gait and mobility, in PRP-treated animals.