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The Efficacy of Platelet-rich Plasma (PRP) Therapy in the Treatment of Tendinopathies

Daniel Brooks*

Department of Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom

Corresponding author: Daniel Brooks, Department of Musculoskeletal Sciences, University of Oxford, Oxford, United Kingdom, E-mail: danie.broks@ace.uk

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Introduction

Tendinopathies represent a broad spectrum of tendon disorders characterized by pain, swelling, impaired function, and histological degeneration of tendon tissue. They are commonly associated with overuse injuries in athletes, repetitive strain in workers, and age-related degeneration in the general population. Traditional treatment strategies such as rest, physical therapy, nonsteroidal anti-inflammatory drugs, corticosteroid injections, and surgery have varying levels of success. In recent years, regenerative medicine has focused on platelet-rich plasma therapy as a biologically driven treatment for enhancing tendon healing and function. PRP is an autologous blood derivative obtained through centrifugation, which concentrates platelets and growth factors beyond baseline physiological levels. Platelets release bioactive molecules such as platelet-derived growth factor, vascular endothelial growth factor, and transforming growth factor-beta, which play key roles in tissue repair. By delivering these mediators directly to the injury site, PRP therapy aims to stimulate tendon regeneration, reduce inflammation, and accelerate recovery [1].

Description

Biomechanically, tendons have limited intrinsic healing capacity due to their hypovascular nature. PRP seeks to overcome this limitation by providing a concentrated source of growth factors and cytokines that promote angiogenesis, fibroblast proliferation, and extracellular matrix synthesis. This biological approach contrasts with traditional therapies that often focus on symptom management rather than addressing the underlying pathology. Clinical studies have explored the efficacy of PRP in a wide range of tendinopathies, including lateral epicondylitis (tennis elbow), Achilles tendinopathy, patellar tendinopathy, and rotator cuff disease. Among these, lateral epicondylitis has been one of the most extensively studied. This dual action enhances its therapeutic potential in both acute and chronic tendinopathies [2].

In Achilles tendinopathy, results have been more mixed. Some trials report significant improvements in pain and function following PRP injections, while others show no difference compared to placebo or eccentric exercise therapy. These discrepancies may be attributed to variations in PRP preparation methods, injection protocols, and patient selection criteria. Nonetheless, the potential of PRP to improve outcomes in chronic, refractory cases of Achilles tendinopathy remains promising [3].

For patellar tendinopathy (jumper's knee), PRP has demonstrated beneficial effects in athletes who failed conservative management. Clinical improvements in pain and return-to-sport rates have been reported, particularly when PRP is combined with structured rehabilitation programs. Similarly, in rotator cuff tendinopathy and partial tears, PRP has been shown to enhance tendon healing and reduce retear rates when used as an adjunct to surgical repair. Despite these encouraging findings, the heterogeneity of evidence remains a challenge. Differences in PRP formulations (leukocyte-rich vs. leukocyte-poor), number of injections, activation methods, and injection techniques create variability in outcomes. Standardization of PRP preparation and administration is necessary to establish clear treatment protocols and ensure reproducibility across clinical settings [4].

Another consideration is the safety profile of PRP therapy. Since PRP is autologous, the risk of adverse reactions is minimal compared to corticosteroids or synthetic injectables. Reported side effects are usually limited to transient pain, swelling, or bruising at the injection site. This favorable safety profile makes PRP an attractive option for patients seeking non-surgical interventions with minimal systemic risks. The mechanistic role of PRP is not limited to tendon regeneration but also includes modulation of the inflammatory response. PRP has been shown to downregulate catabolic enzymes such as matrix metalloproteinases while upregulating anabolic processes, thereby restoring the balance between degeneration and repair [5].

Conclusion

PRP therapy represents a promising regenerative strategy for the management of tendinopathies, offering biological repair potential beyond conventional treatments. Evidence supports its efficacy in lateral epicondylitis, patellar tendinopathy, and as an adjunct in rotator cuff repair, while results in Achilles tendinopathy remain inconclusive. Although methodological variability complicates definitive conclusions, the overall safety and regenerative capacity of PRP justify its growing clinical use. With advances in standardization, patient selection, and combination therapies, PRP is poised to become a cornerstone in the non-surgical management of chronic tendon disorders.

Acknowledgement

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Conflict of Interest

None.

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