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Clinical Indications for Platelet-rich Plasma Therapy in Various Medical Specialties

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Introduction

Platelet-Rich Plasma (PRP) therapy has emerged as a novel regenerative treatment used across a broad range of medical specialties. Derived from the patient's own blood, PRP is a concentrated source of platelets that, once activated, release growth factors and cytokines responsible for tissue healing and regeneration. The therapy leverages the body's natural healing process and is considered safe due to its autologous nature, reducing the risk of allergic reactions or disease transmission. Over the past two decades, PRP has gained popularity due to its applications in minimally invasive treatments and its potential to accelerate recovery, reduce inflammation and enhance tissue repair. Initially developed for orthopedic conditions, its use has expanded into dermatology, gynecology, sports medicine, dentistry and even cosmetic and aesthetic practices. Despite its increasing adoption, the clinical efficacy of PRP is still being evaluated and its indications are continually evolving based on new research and outcomes. This comprehensive review focuses on the current clinical indications for PRP therapy across various medical specialties, examining its applications, mechanisms of action and emerging roles in patient care [1].

Description

In orthopedics, PRP therapy has been widely used for musculoskeletal injuries, including tendinopathies (such as tennis elbow and Achilles tendinitis), ligament sprains, muscle strains and osteoarthritis. The concentrated growth factors in PRP are believed to stimulate tissue repair, modulate inflammation and improve function in damaged joints and tendons. While some studies have shown PRP to be effective in reducing pain and improving function in osteoarthritis of the knee, others have highlighted inconsistent results due to differences in PRP preparation methods, injection techniques and patient factors. Nonetheless, it remains a widely sought-after treatment, particularly among athletes seeking faster recovery from injury. In dermatology, PRP therapy has found significant traction, particularly in the fields of aesthetic and reconstructive skin care. One of its most well-documented uses is in treating hair loss, particularly androgenetic alopecia, where PRP is injected into the scalp to stimulate hair follicle growth and improve hair density [2].

The growth factors in PRP are thought to extend the anagen (growth) phase of hair and improve follicular vascularization. Additionally, PRP is used in facial rejuvenation either on its own or in combination with microneedling or laser therapies to enhance collagen production, improve skin texture, reduce wrinkles and promote youthful skin. PRP is also employed in wound healing, especially for chronic ulcers and postsurgical healing, demonstrating improved epithelialization and reduced healing time. In gynecology, PRP is increasingly being used in reproductive medicine. Its regenerative potential has been explored for treating thin endometrium, Asherman's syndrome (intrauterine adhesions) and poor ovarian reserve, particularly in women undergoing fertility treatments. PRP injections into the endometrial lining have been shown to improve its thickness and vascularity, potentially enhancing implantation rates in In-Vitro Fertilization (IVF) cycles. Furthermore, PRP has also shown promise in managing stress urinary incontinence and vulvovaginal atrophy by regenerating pelvic floor tissues and improving mucosal health, particularly in postmenopausal women or those who are hormone-intolerant [3].

Dentistry has been another field to quickly adopt PRP therapy, particularly for its role in tissue regeneration. PRP is used in oral and maxillofacial surgeries to enhance soft tissue healing and promote bone regeneration. Its application is common in periodontal treatments, such as bone grafting and sinus lifts, as well as in implantology, where it is used to improve osseointegration and reduce recovery time. The localized delivery of growth factors accelerates wound healing, reduces postoperative discomfort and may improve long-term success of dental implants. The therapeutic mechanisms of PRP therapy are primarily attributed to its high concentration of growth factors like Platelet-Derived Growth Factor (PDGF), Transforming Growth Factor-Beta (TGF-β), Vascular Endothelial Growth Factor (VEGF) and Insulin-Like Growth Factor (IGF) [4].

When PRP is injected into damaged tissue, these bioactive proteins stimulate cell proliferation, collagen production, angiogenesis and extracellular matrix remodeling. This results in enhanced tissue repair, reduced inflammation and faster healing. Furthermore, because PRP is derived from the patient's own blood, it carries minimal risk of immunogenic reaction, making it a safe and biologically compatible option for many patients. Despite its broad applications, one of the main challenges in PRP therapy is the lack of standardization in preparation methods. Differences in centrifugation speeds, platelet concentration and whether leukocytes are included can all impact the effectiveness of the treatment. Additionally, the absence of universally accepted protocols makes it difficult to compare clinical outcomes across studies. As a result, while many practitioners report positive results, further high-quality randomized controlled trials are needed to establish clear guidelines for use in specific conditions [5].

Conclusion

Platelet-Rich Plasma therapy has become a pivotal component of regenerative medicine, offering an innovative, non-surgical solution to a wide variety of medical issues. Its applications in orthopedics, dermatology, gynecology and dentistry exemplify its broad therapeutic potential. In orthopedics, PRP is helping to manage chronic joint and tendon conditions with fewer side effects than traditional treatments. In dermatology and aesthetics, it rejuvenates skin and promotes hair growth, while in gynecology, it provides hope for women facing fertility challenges or menopausal symptoms. Dentists use it to promote healing in complex procedures and reduce downtime. Despite its growing popularity, the variability in preparation and application methods necessitates more research and clinical trials to define its optimal use.

As our understanding of PRP's biological effects deepens, its use is likely to expand further, driven by a desire for treatments that are effective, minimally

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invasive and biologically natural. Future developments may include tailored PRP formulations based on the patient's condition, standardized preparation kits and combination therapies that enhance its efficacy.In conclusion, PRP therapy represents a promising frontier in medicine, with growing evidence supporting its clinical utility across multiple disciplines. Its success lies in its natural, patient-specific design and its ability to leverage the body's intrinsic healing capabilities. With continued research, improved protocols and interdisciplinary collaboration, PRP is poised to become a cornerstone in the future of regenerative and personalized medicine.

Acknowledgement

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Conflict of Interest

None.

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