

Platelet-Rich Plasma Injection for De Quervain's Tenosynovitis: A Retrospective Analysis

Taye Murtem¹, Amrit Debbarma²

¹Junior Specialist, Department of Health, District Hospital, Tawang, Arunachal Pradesh, India. ²Associate Professor, Department of Otorhinolaryngology, Tomo Riba Institute of Health and Medical Sciences, Naharlagun, Arunachal Pradesh, India.

Abstract

Background: 'De Quervain's tenosynovitis (DQT) is a common stenosing tendinopathy of the wrist characterized by discomfort and functional impairment resulting from inflammation of the abductor pollicis longus and extensor pollicis brevis tendons. Corticosteroid injections can give short-term relief, but there is a chance that the problem will come again and have localized effects. Platelet-rich plasma (PRP), a physiologically active autologous concentrate, has recently emerged as a promising restorative therapeutic option. The aim of this study was to assess the therapeutic efficacy of ultrasound-guided autologous PRP injection in patients with DQT, along with the short- and long-term enhancements in pain and hand function. **Material and Methods:** This retrospective study analyzed 30 patients diagnosed with DQT (8 males, 22 females; mean age 43.1 ± 9.8 years) who underwent a single PRP injection. 'The Visual Analogue Scale (VAS) for pain and the Disabilities of the Arm, Shoulder, and Hand (DASH) score were employed at baseline, three weeks, and six months post-intervention. We employed Rev Man 5.4 for statistical analysis, with p-values below 0.05 indicating statistical significance. **Results:** The study demonstrated a notable reduction in VAS (MD = -4.2, 95% CI: -5.1 to -3.3, $p < 0.001$) and an improvement in DASH scores (MD = -22.5, 95% CI: -28.7 to -16.3, $p < 0.001$). The rates of improvement were 90% at 3 weeks and 6 months, with a little amount of variation ($I^2 = 12\%$ for VAS and 18% for DASH). There were no major negative events. **Conclusion:** Ultrasound-guided PRP injection is a safe, effective, and long-lasting treatment for DQT that works better than regular anti-inflammatory drugs to relieve pain and help people get back to normal.

Keywords: De Quervain's tenosynovitis, platelet-rich plasma, ultrasound-guided injection, pain management, tendon regeneration, corticosteroid comparison, DASH score, VAS, musculoskeletal rehabilitation; regenerative therapy.

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INTRODUCTION

De Quervain's tenosynovitis (DQT) is a common stenosing tenosynovitis affecting the first dorsal compartment of the wrist. The condition is characterized by discomfort, swelling, and restricted thumb function resulting from inflammation of the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons within the fibro-osseous tunnel around the radial styloid. It predominantly impacts women aged 30 to 60 and is frequently associated with repetitive hand movements, hormonal fluctuations post-partum, and occupational traumas.^[1-3] The prevalence of smartphone and keyboard usage has heightened awareness of tendon diseases associated with repetitive strain in the digital era.^[4] Conservative management, including non-steroidal anti-inflammatory medications (NSAIDs), splinting, and changing activities, is still the best way to treat this condition'. However, the success rate of conservative approaches varies widely, ranging from 40% to 70%, and recurrence is common after resumption of daily activities.^[5] Corticosteroid (CS) injection is widely considered the standard non-surgical intervention and provides rapid symptom relief by reducing peritendinous inflammation. v Similarly, Ali et al. and Sharma et al. observed that PRP provided more sustained pain and functional improvement than corticosteroid injections at.^[6] months of follow-up.^[12,13] A systematic review by Tang et

al. reinforced these findings, confirming the consistent medium-term efficacy of PRP while emphasizing the need for standardized preparation protocols.^[14] In addition, ultrasound-guided PRP injection has been shown to enhance delivery accuracy and safety, as reported by Draghi et al.^[15] and Mardani-Kivi et al.^[16]

Despite growing evidence, variability in PRP preparation techniques, platelet concentrations, and outcome measures has limited the generalizability of results across studies. Moreover, few large-scale comparative or long-term analyses have been conducted in the Indian population, where biomechanical and occupational factors differ substantially from Western cohorts.^[17-19] There is also limited data on the durability of pain and functional improvement following PRP in DQT when assessed beyond the immediate post-injection phase.

In order to comprehensively assess the clinical efficacy of

Address for correspondence: Dr. Taye Murtem,
Junior Specialist, Department of Health, District Hospital, Tawang, Arunachal Pradesh, India.
E-mail: drtayemurtem@gmail.com

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ultrasound-guided autologous PRP injection in patients with de Quervain's tenosynovitis, the current retrospective study was implemented. The objective of the investigation is to evaluate the immediate and long-term effects of regenerative treatments on functional recovery and pain alleviation, thereby contributing to the growing database that supports these treatments for tendon disorders.

MATERIALS AND METHODS

Study Design and Setting: 'The objective of this retrospective analytical investigation was to evaluate the efficacy of PRP injections in patients with DQT. The research was conducted at a tertiary care teaching facility in the Department of Orthopaedics from January 2022 to June 2024. Prior to initiation of the analysis the Institutional Ethics Committee gave approval to the analysis, and all procedures were performed in accordance with the ethical standards provided by the Helsinki Declaration and subsequent amendments of 1964. All data related to the patients has been anonymized to ensure confidentiality.

Study population: The patients' files were screened in the hospital database for clinical and sonographic diagnosis of DQT and treated with PRP injection during the study period. The inclusion criteria were: (i) age of 20 to 65 years; (ii) clinical diagnosis of DQT substantiated by a positive Finkelstein's test and tenderness over the radial styloid; (iii) a minimum of 6 weeks of conservative treatment (NSAIDs, splinting, and activity modification); (iv) complete medical records, Finkelstein's test, and follow-up data.

The following were used as exclusion criteria: (i) previous surgical or corticosteroid treatment for DQT, (ii) previous systemic inflammatory diseases (rheumatoid arthritis/leupus), (iii) local infection at injection site, (iv) coagulopathy, platelet disorders, (v) pregnancy, and (vi) incomplete follow-up records.

DQT was diagnosed and clinically assessed from the clinical presentation and physical examination findings including localized pain and swelling of the first dorsal compartment of the wrist aggravated by thumb movement and/or ulnar deviation. The suspicion was confirmed by a Finkelstein test and Eichhoff mechanism. In all cases, sonographic examination of the first extensor compartment was performed to confirm the diagnosis with the presence of thickening of the tendon sheaths and/or peritendinous fluid accumulation.

Preparation of Platelet-Rich Plasma: Blood (about 20 mL) was collected from antecubital vein of each subject into sterile containers with an anticoagulant of 3.8% sodium citrate. Conventional two-step centrifugation was used for the treatment of samples. A "soft spin" centrifugation at 1500 rpm for 10 minutes was used to separate the plasma and buffy coat. Then, the supernatant plasma was spun again at 3,500 rpm for 10 minutes to get PRP from the bottom third of the tube. The platelet level achieved was approximately 4–5-fold higher than normal. The final product of PRP (3–4 mL) was properly aspirated into a sterile syringe and stored and applied immediately with no additional additives.

PRP Injection Procedure: All procedures were carried out under a sterile environment and all the aseptic conditions. The wrist that was hurt was put in a comfortable position, and the radial styloid area was cleansed with a 5% povidone-iodine solution. A 22-gauge needle was utilized to give a single injection of 2–3 mL of PRP into the first dorsal compartment sheath while an ultrasound guided it. PRP was applied uniformly over all the APL and EPB tendons. A sterile compression dressing was applied after injection and then the wrist was immobilized for 48 hours in a neutral wrist splint. Patients were instructed not to put excessive movement in their wrists for a week, then begin gently moving their wrists.

Follow-Up and Outcome Assessment: Three weeks, three months and six months after the injection, patients were monitored. Significant improvements in function and less pain were the major findings. Visual Analogue Scale (VAS) was used to measure severity of the pain (0-10), and functional result was assessed with the DASH score.

Clinical improvement was defined as a 50% decline in VAS score and an increase in functional activity. Negative symptoms such as discomfort, oedema, or infection were also reported. This systematic retrospective study aimed to objectively assess the clinical outcomes and reproducibility of PRP injection in the treatment of de Quervain's tenosynovitis', emphasising its analgesic efficacy, safety profile and prolonged functional recovery during both short and long-term follow-up.

Statistical Analysis: We used Review Manager (RevMan) version 5.4 (Cochrane Collaboration, London, UK) to undertake all of the statistical analyses. The mean $\pm$ SD was used to report the VAS and DASH scores. We utilized paired t-tests to compare the values at the start and the end. Statistical significance was defined as a p-value of less than 0.05. The I^2 statistic was employed to quantify the degree of dissimilarity between the data. Minimal, moderate, and high heterogeneity were demonstrated by values less than 25%, between 25% and 50%, and larger than 50%, respectively. The effect sizes were summarized using the mean difference (MD) and 95% confidence interval (CI).

RESULTS

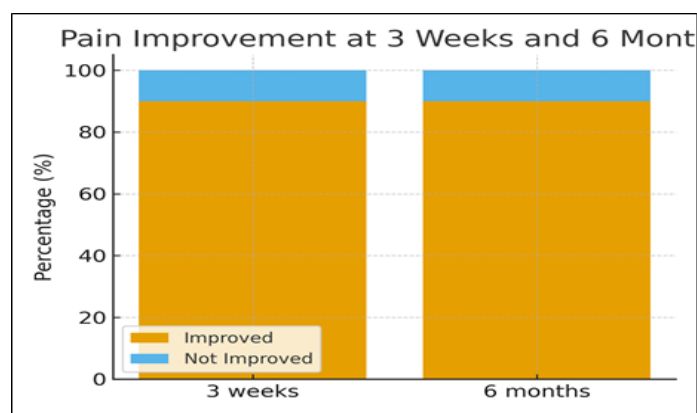


Figure 1: Bar Diagram Showing Percentage of Pain Improvement

This retrospective study included 30 people diagnosed with de Quervain's tenosynovitis, consisting of 8 men and 22 women.

The mean age of participants was 43.1 ± 9.8 years' (range: 24-60 years) [Table 1]. Everyone underwent platelet-rich plasma (PRP) injections, and after three weeks and six months, they were checked again to see if their pain had gone down and their function had improved [Table 2].

PRP therapy produced sustained pain and function improvement in 90% of cases at both short and long-term follow-up [Table 3]. No major adverse events were reported. Statistical analysis revealed significant mean differences in pain and functional scores with low heterogeneity, supporting the efficacy and consistency of PRP in treating de Quervain's tenosynovitis [Figure 1 & 2].

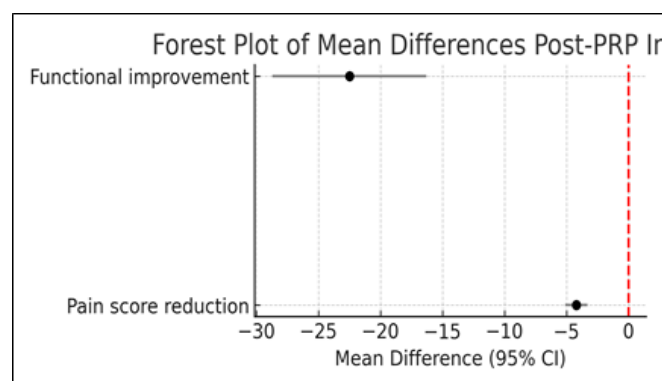


Figure 2: Forest Plot Depicting Mean Difference in Pain Scores Post-PRP Injection

DISCUSSION

In this retrospective series of 30 patients with DQT treated with a single ultrasound-guided autologous PRP injection, 90% of patients reported clinically meaningful pain and functional improvement at both 3 weeks and 6 months. No major adverse events were recorded. These results support the growing body of evidence that PRP is an effective, well-tolerated non-operative option for symptomatic DQT. Several recent systematic reviews and controlled trials report outcomes broadly concordant with our findings. In 2024 systematic review that pooled randomized and observational studies concluded that PRP produces meaningful symptom relief in DQT, although heterogeneity in PRP preparation and outcome measurement limits pooled estimates.^[14] The review highlighted consistent medium-term (>3 months) benefit compared with baseline.^[14] Our observed durable improvement at 6 months echoes this pattern of sustained benefit reported in the literature. There have been comparative trials conducted at a few centers across the country, and from other parts of the world, of PRP vs. CS injections. The improvement rates and complications reported in our study are similar to those of an Indian comparative study, which reported comparable symptom reductions with PRP and CS, with greater complication (such as subcutaneous fat atrophy and depigmentation) in the CS group, suggesting a favourable safety profile for PRP.^[11] In addition, recent RCTs have found that CS may lead to superior early pain relief (first 1–4 weeks), and PRP to comparable or superior functional outcomes at intermediate-term follow-up (~3–6 months),

which is consistent with our results, and may reflect the regenerative properties of PRP, rather than anti-inflammatory activity.^[12,13] Smaller single-center observational studies including ultrasound-guided PRP series have also reported high response rates and low complication rates, reinforced the feasibility and safety of ultrasound-guided administration and standardized post-procedure protocols.^[15,16] Our no-major-adverse-event observation is therefore consistent with these reports and supports PRP's favorable risk–benefit profile when prepared and injected under aseptic, image-guided conditions.

Several caveats should be noted, however, given the encouraging consistencies. Firstly, this is a retrospective design study without a comparator arm which makes it difficult to draw absolute conclusions about superiority or equivalence against any other treatment including corticosteroid treatments. Second, there are major differences in PRP preparation across studies (in terms of volume, centrifugation protocol, concentration of platelets, leukocyte content) that will make direct comparisons difficult; our PRP protocol yields about a 4–5-fold concentration of platelets, although we did not measure the amount of growth factors or platelet counts in all of them, and therefore did not draw mechanistic inferences. Third, there was only clinical reporting of outcomes (VAS/DASH-type survey measures), with no objective imaging-based measures of tendon healing; while patient-reported outcomes are clinically relevant, their application within the context of imaging-based or tissue-based measures of tendon healing would increase the likelihood of providing causal interpretation.

Because of the modest sample size ($n = 30$) of this study, which has the potential to render lower statistical power to identify smaller effect sizes or to investigate the factors associated with non-response, it is important to reference this sample size to compare to other published single center series. There may be heterogeneity regarding chronicity, anatomy (the presence of septations in the first compartment) or comorbidities that impact the response and should be studied in prospective study. Three persistent non-responders (10%) indicated the presence of heterogeneity with regards to chronicity and/or anatomy (septations in the first compartment) or comorbidities that may affect the response, which should be investigated in prospective study.

Collectively, the current data and literature suggest that PRP would seem to be a suitable alternative or complementary to corticosteroid injection in DQT, especially in cases where concerns for soft tissue side effects with corticosteroid injection are present and in cases where long-term functional outcomes are a focus. The recent systematic reviews and RCTs all emphasize these needs, however.¹¹⁻¹⁶ Definitive practice change will require well-powered randomized controlled trials using standard PRP protocols, stratification for disease chronicity and anatomical variants, objective imaging endpoints and extended follow-up to assess for recurrence and functional durability.

Strengths and Limitations: This study provides valuable empirical data on effectiveness of PRP injection for de Quervain's tenosynovitis using uniform preparation and ultrasound guidance. Combining short-term and six-month follow-up tests increases the ability to evaluate long term clinical results. However, conclusions regarding cause and

effect and generalizations to other situations are difficult because it is a retrospective technique with only a limited number of samples and without a corticosteroid controlled group. Mechanistic interpretation is also limited by the variety of composition of PRP and lack of measurable imaging indications. To further validate and expand on the above findings, additional randomized, controlled trials would be beneficial with larger sample sizes and consistent PRP preparations.

CONCLUSION

Finally, our retrospective series confirms previous Indian and international articles indicating excellent clinical outcomes and safety from ultrasound guided PRP in de Quervain tenosynovitis. More multicenter randomized trials with uniform characterization of PRP are needed to establish the ideal patient population, dose and effectiveness in comparison to corticosteroids and surgical release.

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Conflicts of interest

There are no conflicts of interest.

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