Section: Orthopaedics

Original Research Article

EVALUATION OF CLINICAL AND FUNCTIONAL EFFICACY OF AUTOLOGOUS PRP INJECTION COMBINED WITH ADJUVANT DRY NEEDLING IN CHRONIC OR RECURRENT IDIOPATHIC LATERAL EPICONDYLITIS OF THE HUMERUS

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ABSTRACT

Background: Lateral epicondylitis is characterized by chronic degeneration of the common extensor tendon attachment to the lateral epicondyle of the humerus. It is a prevalent overuse injury, frequently seen in primary care, affecting between 1% to 3% of the general population. This can result in a significant social and economic burden, as it often leads to lost workdays and may incapacitate some patients for several weeks. This study presents our experience in evaluating the clinical & functional outcomes following local administration of autologous platelet-rich plasma (PRP) injection supplemented with adjuvant dry needling for the management of chronic or recurrent idiopathic tennis elbow.

Materials and Methods: The study was carried out over a period of 18 months at Maharaja Agrasen Medical College, Agroha, in 35 patients of age 18 years and above with lateral epicondylitis for more than 3 months and already managed with brace, analgesics, various physiotherapy modalities & with or without local injections. The patients were injected with a single dose of PRP with adjuvant dry needling. Assessment of the clinical and functional outcomes was done by the PRTEE (Patient-Rated Tennis Elbow Evaluation) score at the end of 4th week,12th week and 24th week.

Results: Most participants were male, with mean age of 42.6±4.8 years. Most patients presented with involvement of the right side with average pain duration of 12.2 months. The assessment was done using the PRTEE score. Pain score decreased from mean of 40.6 to 5.4 (p-value <0.001) and functional score decreased from mean of 40.2 to 4.1 (p-value <0.001) over a 24-week follow-up period. There were no post procedure complications.

Conclusion: This study underscores the considerable therapeutic potential of combining autologous platelet-rich plasma (PRP) injection with adjuvant dry needling in the management of chronic or recurrent idiopathic lateral epicondylitis of humerus. Significant improvements in clinical and functional outcomes were demonstrated by reduction in PRTEE score with no significant post procedure complications.

Keywords: Chronic lateral epicondylitis, PRP (Platelet rich plasma), Dry Needling, PRTEE (Patient-Rated Tennis Elbow Evaluation) score, MTrPs (Myofascial trigger points).

INTRODUCTION

Lateral epicondylitis (LE), or tennis elbow, is a common overuse injury characterized by pain and tenderness over the lateral elbow, primarily due to microtears and degeneration at the origin of the extensor carpi radialis brevis (ECRB) tendon. It is often seen in individuals performing repetitive wrist extension and forearm rotation, such as athletes, mechanics, and manual workers. Patients typically report localized pain radiating to the forearm, worsened by grasping or resisted wrist dorsiflexion, leading to significant functional limitations.[1]

Conventional treatments—including rest, NSAIDs, physiotherapy, and corticosteroid injections—often provide only short-term relief. Corticosteroids, while effective initially, show inconsistent long-term benefits and may weaken tendon structure. Platelet-rich plasma (PRP), derived from the patient's own blood, offers a biologic alternative. PRP incites a transient but substantial inflammatory process in fibroblasts within the diseased tendon, subsequently inducing signaling pathways involved in tendon regeneration. It delivers concentrated growth factors that stimulate tissue repair, angiogenesis and collagen synthesis, addressing the degenerative pathology at a cellular level.[2]

Myofascial pain is a common complaint encountered in clinical practice, typically associated with the presence of one or more myofascial trigger points (MTrPs) in the affected muscles. An MTrP is defined as the most hyperirritable spot within a taut band of skeletal muscle, likely caused by the accumulation of sensitized nociceptors. While latent MTrPs—tender but not spontaneously painful—are present in nearly all adults, they may become active due to central sensitization, often triggered by a neural or musculoskeletal lesion either locally or remotely. Active MTrPs are spontaneously painful or elicit pain during movement involving the associated muscle.

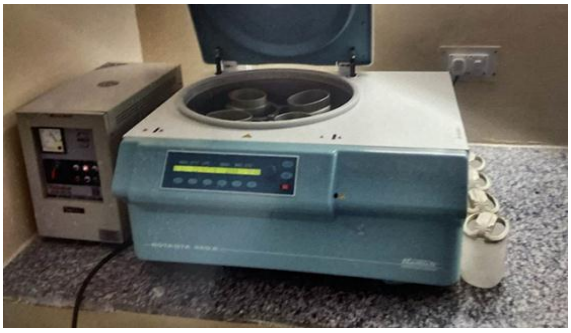
Dry needling, a minimally invasive technique used to disrupt myofascial trigger points, may further enhance tendon healing by improving local circulation and relieving muscle tension. However, evidence supporting its role in LE is limited, especially in combination with PRP therapy. This study aims to evaluate the effectiveness of autologous PRP injection combined with dry needling in patients with lateral epicondylitis, focusing on pain reduction and functional improvement over time.[2]

MATERIALS AND METHODS

This prospective observational study was conducted at Maharaja Agrasen Medical College, Agroha, Hisar, on 35 adult patients with age 18 years and above presenting with tennis elbow. The study was started after ethical approval by the Institutional Ethics Committee. Written informed consent was obtained from all participants.

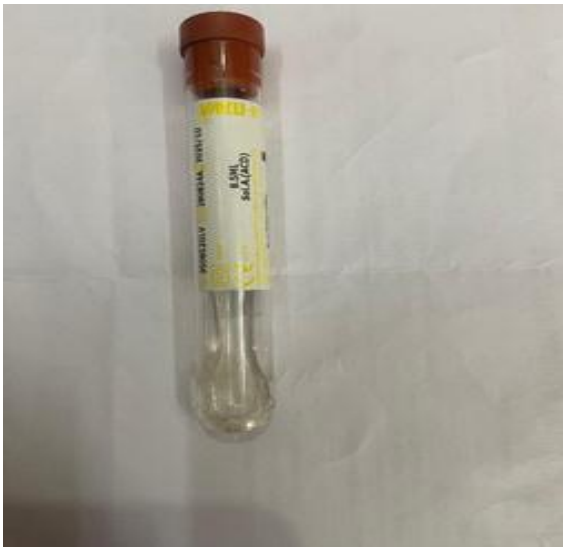
The study included patients over 18 years of age with lateral epicondyle pain lasting more than three months & confirmed by positive Cozen's or Mill's test. Only those subjects with platelet counts above 1.5 lakh/µL and gave written informed consent were considered. Patients were excluded if they had conditions like radiohumeral arthritis, osteonecrosis, cervical radiculopathy, elevated blood sugar, prior surgery for lateral epicondylitis, poor skin condition, or declined participation.

Under aseptic conditions, 20 mL of patient blood was drawn into acid citrate dextrose tubes and centrifuged using a two-step process (soft spin at 2000 rpm, followed by hard spin at 3000 rpm).[3] All PRP samples were tested for platelet counts prior to injection. Patients were seated and the point of maximum tenderness over the lateral epicondyle was identified. After skin preparation, dry needling was performed by senior physiotherapy consultant trained in dry needling. Five sterile needles inserted 3–5 mm into the trigger points and rotated before being left for 10 minutes.[4] Subsequently, 2 mL of autologous PRP was injected at the marked site using a no-touch technique.[5] Patients were advised 48 hours of rest and monitored for complications. Follow-up assessments were done at 4 weeks, 12 weeks, and 24 weeks using PRTEE scores.



CENTRIFUGE (Rotanta 460 R, Germany)
(with lid open showing centrifugation chambers)

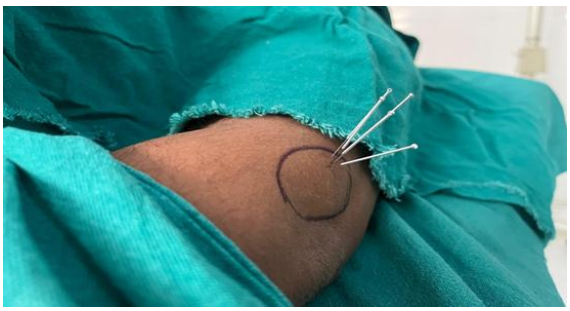
Dry needles



Acid citrate dextrose tube

Tube to collect final PRP

Syringe containing PRP



Dry Needling

Local PRP Injection

RESULTS

The mean age was 42.6±4.8 years in our study. Most of the participants (42.9%) were below 40 years, with a slightly higher male representation (62.9%). Most participants were labourer (34.2%), farmer (25.7%) and homemaker (20%) by occupation with right hand dominance (74.2%). In 68.6% of cases the right side was affected likely reflecting hand dominance. The participants in the study reported a mean duration of pain 12.2 months prior to receiving treatment, with a standard deviation of 5.9 months. This suggests that most individuals were experiencing symptoms of lateral epicondylitis for over a year, highlighting the chronic and resistant nature of the condition. All participants (100%) presented with tenderness, while reduced range of motion was observed in 42.9 and swelling in 25.7%. Cozen's and Mill's tests were positive in all. The commonest comorbidity in the patients was hypertension (11.4%) followed by asthma (5.7%) respectively. 74.3% of patients reported a prior history of lateral epicondylitis affecting the same side which were non symptomatic for at least 3 months between 2 episodes, indicating a recurrent and potentially chronic pattern of the condition localized to one elbow. This suggests that most cases in this cohort were not isolated incidents but rather part of a relapsing clinical course. In contrast, 25.7% of participants presented with lateral epicondylitis for the first time and had symptoms for more than 1 year are chronic resistant. Patients were previously managed conservatively (analgesics, brace, various physiotherapy modalities and with or without previous local injections).

Smoking was reported by 34.3% of participants and alcohol consumption by 25.7%, suggesting potential lifestyle-related risk factors.

There was a significant increase in the platelet count of the participant's autologous Platelet Rich Plasma as shown in [Table 1 and Figure 1].

Table 1: Platelet count (n=35)

Platelet count (lakh/cc)	Mean	SD (Standard deviation)
Blood sample	2.1	0.4
PRP	6.6	3.1

There was a statistically significant reduction in pain scores over the course of the study, with the mean score decreasing from 40.6 at baseline (pre-injection) to 5.4 at 6 months post-intervention ($p < 0.001$) as shown in [Table 2 and Figure 2].

Table 2: Distribution of participants according to their PRTEE pain score over time (n=35)

PRTEE pain score	Mean	SD	p-value
Pre-procedure	40.6	5.7	
Post-procedure 4 weeks	31.6	5.6	
Post-procedure 12 weeks	14.6	4.9	
Post-procedure 24 weeks	5.4	2.2	<0.001

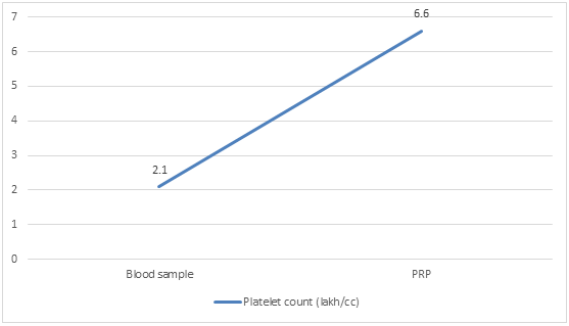


Figure 1: Platelet count (n=35)

There was a statistically significant reduction in function scores over the course of the study, with the mean score decreasing from 40.2 at baseline (pre-injection) to 4.1 at 6 months post-intervention ($p < 0.001$) as shown in [Table 3 and Figure 3].

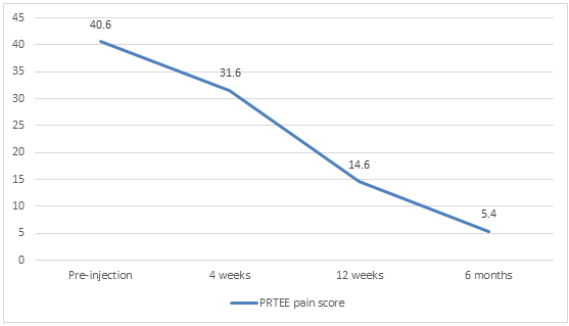


Figure 2: Distribution of participants according to their PRTEE pain score over time (n=35)

Table 3. Distribution of participants according to their PRTEE function score over time (n=35)

PRTEE function score	Mean	SD	p-value
Pre-procedure	40.2	7.5	
Post-procedure 4 weeks	28.3	6.4	
Post-procedure 12 weeks	12.5	6.1	
Post-procedure 24 weeks	4.1	1.9	<0.001

Table 4: Distribution of participants according to their complications (n=35)

Complications	Within 1 week after procedure	4 weeks	12 weeks	6 months
Increase in pain	28	0	0	0
Site tenderness	0	9	6	0
Limitation of movement	26	5	0	0
Infection	0	0	0	0

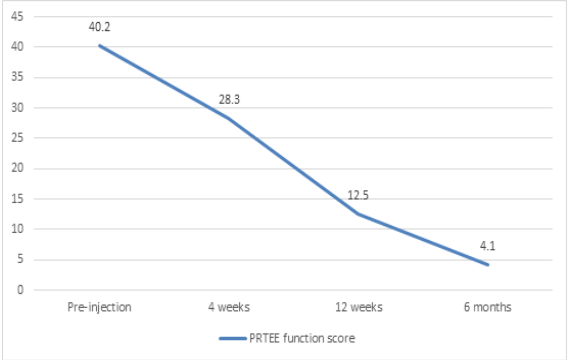


Figure 3: Distribution of participants according to their PRTEE function score over time (n=35)

No long-term complications were noted throughout the follow-up period. Nonetheless, a subset of patients experienced transient side effects, including post-procedural pain in 28 individuals and limited range of motion in 26 individuals. These symptoms were self-limiting, with pain resolving within one week and movement restriction resolving by twelve-week. Site tenderness, which was absent initially, emerged in 9 participants at 4 weeks, reduced to 6 by 12 weeks, and resolved completely by 6 months. These complications subsided spontaneously without the need for additional therapeutic intervention. as shown in [Table 4].

DISCUSSION

This study evaluated the clinical and functional outcomes of autologous platelet-rich plasma (PRP) injection combined with adjuvant dry needling in patients with chronic or recurrent idiopathic lateral epicondylitis at a tertiary care institute. The results demonstrated significant improvements in both pain and function, highlighting the effectiveness of this combined approach. However, there are limited studies available for comparison with the current research of using both modalities together.

The age distribution indicated a higher prevalence of LE among individuals aged below 40 years (42.9%) and 40–49 years (37.1%), aligning with existing epidemiological data suggesting the condition peaks between 35 and 55 years of age. Gosens et al,[7] (2011) emphasized the significant burden of LE in this demographic, likely due to their active engagement in repetitive tasks involving wrist extension and forearm supination. The predominance of male participants (62.9%) over females (37.1%) mirrors findings from Mishra and Pavelko11 (2006) and Waler-bone (2012),[8] who reported higher occupational exposure to repetitive strain injuries among males.

All participants presented with tenderness, a hallmark symptom of LE, while positive Cozen's (100%) and Mill's tests (100%) underscored diagnostic consistency. This supports the diagnostic accuracy of these manoeuvres, as highlighted by Kraushaar and Nirschl's et al.[9] The majority (68.6%) of cases involved the dominant (right) side, consistent with findings from Stenhouse et al (2013),[5] who attributed side prevalence to overuse of the dominant hand in repetitive activities.

The platelet counts in the platelet rich plasma showed a significant increase (6.6 lakh/cc from 2.1 lakh/cc). This phenomenon mirrors that reported in their studies by Uygur et al,[10] and Gaspar et al,[19] both of whom saw similar increase in post preparation platelet count in their sample. Increase in platelet count delivers concentrated growth factors that stimulate tissue repair, angiogenesis and collagen synthesis, addressing the degenerative pathology at a cellular level.

Interestingly, the gradual improvement observed in this study echoes the results of a randomized controlled trial by Mishra and Pavelko et al,[11] (2006), where patients treated with PRP reported a 60% reduction in pain scores at six months compared to only 16% in the control group. The study attributed these improvements to PRP's ability to reduce the expression of pro-inflammatory cytokines and enhance collagen synthesis, thereby promoting tendon repair.

The results of our study are further supported by Tsikopoulos et al,[12] (2016) who conducted a meta-analysis comparing PRP and needling techniques across various tendinopathies, including LE, and found that PRP outperformed dry needling in mid-term outcomes. However, they noted that combining these therapies could amplify their individual benefits, as dry needling primes the tendon for growth factor absorption. This hypothesis is supported by Rha et al (2013),[13] who observed that PRP injections were more effective than dry needling for rotator cuff tendinopathies yet suggested that dry needling could serve as an effective adjunct to PRP for more comprehensive results.

Gungor et al,[14] (2022) evaluated the short-term efficacy of PRP, corticosteroids, and dry needling, concluding that while corticosteroids provided rapid pain relief, dry needling and PRP led to more meaningful functional recovery, supporting their combined use.

Despite the positive outcomes, the variability in protocols for PRP preparation and dry needling techniques across studies underscores the need for standardization. Wong et al,[15] (2022) highlighted inconsistencies in PRP formulations and delivery methods as a significant limitation in comparative studies. Future research should focus on optimizing these variables to maximize the efficacy of this promising combination therapy.

No long-term complications were noted. Increase in pain, limitation of movements and site tenderness during 1st week after procedure are consistent with findings from Smental-Media et al.16 (2020), who reported transient discomfort as the primary side effect of PRP. That might be due to PRP incites a transient but substantial inflammatory process in fibroblasts within the diseased tendon. No infections or severe complications were observed, supporting the safety profile of PRP combined with dry needling, as highlighted by Schoffl et al,[17] (2017).

This study has several limitations. The small sample size (n=35) limits generalizability and statistical power. The absence of a control group prevents direct comparison with PRP or dry needling alone. Variations in patient demographics (e.g., activity level, comorbidities, symptom duration) were not fully controlled, potentially influencing outcomes. The short follow-up period (24 weeks) restricts assessment of long-term efficacy and safety. Conducting the study at a single center may limit external validity, and variability in PRP preparation and needling techniques poses challenges for reproducibility. Future multi-center trials with larger cohorts and standardized protocols are recommended.

This study demonstrates that the combination of autologous PRP injections and dry needling is an effective and safe treatment modality for patients with chronic or recurrent idiopathic lateral epicondylitis (LE). Significant improvements in pain and functional scores were observed over a twenty-week period, highlighting the potential of this synergistic therapy to address the underlying pathology of tendinopathy. In chronic or treatment-resistant cases of lateral epicondylitis, etiopathogenesis should also consider the contribution of MTrPs. As their presence can mimic

or perpetuate symptoms by altering forearm biomechanics, increase central sensitization for pain, and hinder tendon healing. Therefore a comprehensive treatment approach that integrates tendon-targeted therapies like PRP with myofascial interventions such as dry needling is required for complex etiopathogenesis of LE. The study highlights the importance of a multi-faceted approach to managing chronic LE, suggesting that a combination therapy may outperform standalone modalities. Adverse events were minimal, further supporting the safety profile of this combined approach. In conclusion, the integration of PRP and dry needling into clinical practice offers a promising advancement in the management of chronic or recurrent idiopathic LE, addressing both symptomatic relief and functional recovery for patients who have failed conventional treatments.

CONCLUSION

The integration of PRP and dry needling into clinical practice offers a promising advancement in the management of LE, addressing both symptomatic relief and functional recovery for patients who have failed conventional treatments.

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