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Original Research Article

Evaluation of Effect of Platelet Rich Plasma Therapy in Elbow Epicondylitis

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Abstract

Background: Elbow epicondylitis is a common degenerative tendinopathy affecting the extensor and flexor origins, leading to pain and functional impairment. Platelet-rich plasma (PRP) has emerged as a promising regenerative treatment modality; however, its clinical efficacy remains controversial.

Aim: To evaluate the effectiveness of a single-dose autologous PRP injection in patients with elbow epicondylitis.

Materials and Methods: A prospective observational study was conducted on 50 patients, of whom 46 completed follow-up. Patients aged 18–65 years with clinically diagnosed medial or lateral epicondylitis received a single PRP injection prepared using the single-spin method. Outcomes were assessed using Visual Analog Scale (VAS), Mayo Elbow Performance Score (MEPS), and Disabilities of Arm, Shoulder, and Hand (DASH) score at baseline, 1 month, 3 months, and 6 months. Statistical analysis was performed to evaluate significance.

Results: The mean age of participants was 43.72 ± 9.4 years, with a slight female predominance (54.35%). Lateral epicondylitis was observed in 89.13% of cases. Significant improvement was observed in all outcome measures. Mean VAS decreased from 8.50 ± 1.00 to 3.00 ± 2.60 ($p < 0.0001$). MEPS improved from 54.00 ± 5.67 to 84.50 ± 11.08, while DASH scores reduced from 63.46 ± 5.59 to 44.50 ± 8.71 at 6 months.

Conclusion: Single-dose PRP injection is an effective and safe treatment modality for elbow epicondylitis, providing significant long-term improvement in pain and function.

Keywords: Platelet-rich plasma, Epicondylitis, Tennis elbow, PRP therapy, VAS, DASH, MEPS.

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Introduction

Epicondylitis of the elbow is a common musculoskeletal condition that affects both men and women equally, most frequently during the fifth and sixth decades of life. It is characterized by chronic pain and functional impairment in the epicondylar region of humerus typically triggered by resisted use of the wrist flexor or extensor muscles [1].

Medial epicondylitis, often referred to as ―golfer‘s elbow‖ occurs due to regular repetitive or eccentric strain on the muscles the control forearm pronation and wrist flexion. This repeated stress leads to micro-injury at the origin of the common flexor tendon, resulting in persistent and disabling pain at the medial epicondyle [2].

Lateral epicondylitis, commonly referred to as "tennis elbow," is more prevalent than the medial form, affecting approximately 1.3% of the general population compared to 0.4% for medial epicondylitis. It involves repetitive strain or trauma to the extensor tendons, particularly the extensor carpi radialis brevis (ECRB), and may also result from forced wrist extension or direct trauma to the lateral epicondyle. Lateral epicondylitis affects 1% to 3% of adults annually. One study reported an age and sex adjusted incidence of 3.4 per 1000 individuals, with a higher incidence among men aged 40– 49 and women aged 50–59 [3].

Medial epicondylitis, while less common, accounts for 10% to 20% of all cases of epicondylitis [4]. Its prevalence in the general population is about 0.4%, with the highest rates among individuals aged 45 to 64 years, and is more common in women. In certain occupational groups, the prevalence ranges from 3.8% to 8.2%, and around three-fourths of cases affect the dominant arm [5].

Medial epicondylitis, on the other hand, is typically caused by strain on the medial elbow due to valgus

overload, such as in overhead throwing. This motion engages the common flexor tendon through eccentric contraction for dynamic joint stabilization. Wrist flexion or forearm pronation during ball release can add further eccentric stress on the tendon [5].

Lateral epicondylitis, or tennis elbow, is often caused by overuse of the ECRB muscle due to repetitive microtrauma, leading to primary tendinosis of the ECRB, sometimes with involvement of the extensor digitorum communis (EDC). The condition arises from repeated contraction of the forearm extensor muscles, particularly at the ECRB origin, resulting in microtears, tissue degeneration, impaired repair, and tendinosis [6].

Nonoperative treatment successfully resolves symptoms in up to 90% of lateral epicondylitis cases.1 Standard management includes activity modification, physiotherapy, nonsteroidal anti-inflammatory drugs (NSAIDs), bracing, extracorporeal shockwave therapy, and acupuncture. Biologic therapies, particularly autologous blood injections (ABI) and platelet- rich plasma (PRP), have gained popularity for their potential to promote healing. Surgical intervention is reserved for patients who do not respond to conservative treatment and includes open, percutaneous, or arthroscopic techniques [1,2,5].

PRP therapy has become increasingly popular in treating lateral epicondylitis. Although the exact mechanism remains unclear, it is believed that the high concentrations of platelet- derived growth factors released at the injection site promote healing of tendons, bones, and wounds. However, studies on PRP effectiveness show conflicting results. A recent systematic review concluded that PRP injections did not demonstrate significant benefits in managing chronic lateral epicondylitis [5].

Aim: To evaluate the effect of single dose injection of autologous platelet rich plasma in the treatment of elbow epicondylitis.

Objectives:

1. To evaluate the efficacy of platelet rich plasma in epicondylitis
2. To study the functional outcome of platelet rich plasma, use in elbow epicondylitis using various scoring systems.
3. To study whether the effect of platelet rich plasmais age dependent and gender dependent
4. To study the difference of effect of platelet rich plasma in dominant hand and non- dominant hand.

Materials and Methods

Study Design: A prospective observational study was conducted to evaluate the effect of a single-dose injection of autologous platelet-rich plasma (PRP) in the treatment of elbow epicondylitis. The study was carried out at the Department of Orthopaedics, MGM Medical College & Hospital, Chh. Sambhajinagar over a period of two years.

Study Population: Patients presenting to the outpatient and emergency department with epicondylitis were considered for the study. A total of 50 patients who met the inclusion criteria were enrolled.

Eligibility Criteria:

Inclusion Criteria

- Patients aged 18 to 65 years.
- Duration of pain over the lateral and/or medial epicondyle for more than one month.
- Lateral elbow pain localized to the lateral epicondyle, aggravated by pressure on thelateral epicondyle and resisted wrist dorsiflexion.
- Medial elbow pain localized to the medial epicondyle, aggravated by pressure on the medial epicondyle and resisted wrist palmar flexion.

Exclusion Criteria:

- Patients on anticoagulants.
- Patients with platelet disorders such as thrombocytopenia.
- Presence of deformity over the elbow.
- Patients who had received previous interventional therapy for elbowe picondylitis.
- Presence of local infection at the procedure site.
- Patients with fractures around the elbow joint, treated conservatively or surgically.
- Patients with malignancy, particularly hematologic or bone involvement.
- Patients with hemoglobin levels <10g/dL.

Methodology:

1. Patient Screening & Enrollment: Patients presenting with epicondylitis were screen edbasedon the inclusion and exclusion criteria. Informed on sent was obtained from eligible patients.

A detailed clinical history was recorded, including pain scores assessed using: Visual Analogue Scale (VAS), Disabilities of the Arm, Shoulder, and Hand Score (DASH), MAYO Elbow Performance Score.

2. PRP Preparation and Administration: PRP was prepared using the Single Spin Technique: 20mL of autologous blood was collected in sterile sodium citrate tubes. The blood sample was centrifuged at1,800 rpm for 8 minutes. The platelet-rich portion was separated in to three

fractions. Care was taken to avoid aspiration of leukocytes present in the lower most portion of centrifuged plasma. The prepared PRP was injected into the point of maximum tenderness under sterile condition.

3. Post-Injection Assessment:

- Patients were followed up at 1month, 3 months, and 6 months.
- Clinical outcomes were assessed using: VAS (Visual Analogue Scale), DASH (Disabilities of the Arm, Shoulder,and Hand Score), MAY O Elbow Score.
- The improvement in pain and function was compared with pre-injection scores.

Data Collection: Patient demographic details and clinical parameters were recorded in a structured case proforma. PRP injection details were documented, including injection site and technique. Outcome measures were collected at each follow-up visit.

Statistical Analysis: Percentages and proportions were applied to assess the clinical outcomes. Pre- and post-injection scores for VAS, DASH, and MAYO Elbow Score were analyzed. The statistical significance of the efficacy of PRP was determined using appropriate parametric and non-parametric tests.

Observation & Results

The baseline characteristics of patients included in the study are given in Table 1. The study included a total of 50 patients, of which 4 patients lost to follow up leaving us with a total study population of 46 patients with an average age of 43.72 ± 9.4 years (Mean and standard deviation). There was a slight predominance of Female participants (n=25; 54.35%), compared to males (n=21; 45.65%). The occupational background of participants was diverse, with homemakers representing the largest group (30.43%), closely followed by laborers (28.26%). Other occupations included washermen (10.87%), teachers (8.70%), carpenters (6.52%), athletes (4.35%), electricians (4.35%), deskjobs (4.35%), and a painter (2.17%).

The majority of the patients were right-hand dominant (80.43%), with the right arm being predominantly affected (82.61%). In terms of dominance correlation, the dominant hand was affected in approximately 71.74% (n=33) of cases. The condition observed predominantly affected the lateral epicondyle region in 89.13% (n=41) of cases, while a smaller proportion involved the medial epicondyle (n=5; 10.87%). This indicates a notable prevalence of lateral epicondylitis compared to medial epicondylitis within this study group.

Participants reported amedian duration of pain of 8 months, with an interquartile range (IQR) of 4 months. Co-existing medical conditions were also documented, revealing hypertension as the most common comorbidity affecting 15.22% of patients. Diabetes mellitus was present in 8.70% of participants, while 4.35% had both hypertension and diabetes.

Table 1: Baseline characteristics of the patients included in the study.

Parameter	Value
Age in years (Mean± SD)	43.72 ± 9.4
Gender (n,%)	
Males	21 (45.65%)
Females	25 (54.35%)
Occupation (n, %)	
Athlete	2 (4.35%)
Carpenter	3 (6.52%)
Electrician	2 (4.35%)
Homemaker	14 (30.43%)
Laborer	13 (28.26%)
Painter	1 (2.17%)
Teacher	4 (8.70%)
Deskjob	2 (4.35%)
Washerman	5 (10.87%)
Hand dominance (n, %)	
Right	37 (80.43%)
Left	9 (19.57%)
Arm Affected (n, %)	
Right	38 (82.61%)
Left	8 (17.39%)
Dominant Hand	33 (71.74%)
Non-Dominant Hand	13 (28.26%)

Area Affected	
Lateral	41 (89.13%)
Medial	5 (10.87%)
Duration of pain in months (Median (IQR))	8 (4)
Co-morbidities	
Hypertension	7 (15.22%)
Diabetes mellitus	4 (8.70%)
Both	2 (4.35%)

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Table 2: Distribution of patients according to Occupation

Occupation	Count	Percentage
Homemakers	14	30.43%
Laborers	13	28.26%
Washermen	5	10.87%
Teachers	4	8.70%
Carpenters	3	6.52%
Athletes	2	4.35%
Electricians	2	4.35%
Deskjob	2	4.35%
Painter	1	2.17%

The above table shows the Occupational distribution among the patients which revealed that homemakers and laborers were the most affected groups. Occupations involving repetitive upper limb use (e.g., washermen, carpenters, and electricians) were commonly associated with epicondylitis. This supports the link between occupational strain and disease prevalence.

Table 3: Change in Visual analogue scale (VAS) score, MAYO (Modified Mayo Clinic Performance Index) score, and DASH (Disabilities of Arm, Shoulder, and Hands) score from pre-injection to1 month, 3months, and 6months post-injection.

SCORES	Pre-Injection	1 Month	3 Months	6 Months	p-value
VAS	8.50 ± 1.00	7.00 ± 0.97	5.50 ± 1.54	3.00 ± 2.60	<0.0001
MAYO	54.00 ± 5.67	62.00 ± 6.06	71.50±6.87	84.50 ± 11.08	<0.0001
DASH	63.46 ± 5.59	59.00 ± 5.26	51.50±6.56	44.50 ± 8.71	<0.0001

Significant and sustained improvement was observed post-intervention across all outcome measures assessed. The Visual Analogue Scale (VAS) demonstrated substantial and statistically significant reductions. The mean VAS score declined from 8.50 ± 1.00 at baseline to 7.00 ± 0.97 at one month, further reduced to 5.50 ± 1.54 at three months, and reached its lowest point at 3.00 ± 2.60 by six months ($p<0.0001$). Additionally, functional outcomes improved considerably (mean ± SD), as measured by the MAYO score. Initial mean MAYO scores were54.00 ±5.67, which improved significantly to 62.00±6.06 at one month, further increased to71.50±6.87 at three months, and peaked at 84.50±11.08 at six months ($p<0.0001$). Likewise, the Disability of Arm, Shoulder, and

Hand (DASH) score, indicative of the functional impairment of the upper extremity, decreased significantly from 63.46 ±5.59 at base line to 59.00±5.26 at one month, 51.50±6.56 at three months, and finally to 44.50 ± 8.71 at six months ($p<0.0001$).

Discussion

Overuse and microtrauma of the wrist flexor or extensor muscles are usually the cause of elbow epicondylitis, a common musculoskeletal disorder that has long been known to cause persistent pain and functional impairment. The effectiveness of autologous platelet-rich plasma (PRP) injection in treating medial and lateral epicondylitis is clarified by the current study, which focusses especially on patient-reported outcomes throughout a number of time periods. A thorough examination of the results is made possible by the analysis's solid pathophysiology and therapeutic basis in the body of existing literature. Medial epicondylitis affected 10.87% of patients, while lateral epicondylitis affected an astounding 89.13% in this current study. This result is consistent with population research showing that lateral epicondylitis is more common, affecting up to 3% of individuals each year, compared to medial epicondylitis's 0.4% prevalence.

The extensorcarpi radialis brevis's (ECRB) susceptibility to repeated tensile and compressive stresses may account for the prevalence of lateral epicondylitis in clinical settings. 46 patients made up the sample, and their mean age was 43.72 ± 9.4 years. This closely matches other epidemiological findings that show the 40–54 age group has the highest incidence of lateral and medial epicondylitis. A minor Female preponderance (54.35%) was noted, which is in line with certain data that suggest women are more likely to have medial epicondylitis.

With the majority being laborers (28.26%) and homemakers (30.43%), the sample's occupational diversity is especially instructive. These occupations often involve prolonged post uresor repetitive arm motions that make people susceptible to epicondylitis, supporting occupational risk factors mentioned in the literature such as manual labor, repetitive strain, and overhead tasks. The high percentage of right-hand dominance (80.43%) and right arm affliction (82.61%), with 71.74% involving the dominant hand in our study, supports earlier research showing that most instances of epicondylitis involve the dominant limb. According to patient reports, the median duration of pain was 8 months (IQR: 4 months), which puts the illness firmly in the chronic phase. In accordance with Nirschl's classification of tendinosis, especially the angiofibroblastic degeneration phase (Stage II), which is typical in chronic cases, the persistence of symptoms is significant since it suggests a degenerative rather than an inflammatory etiology.

The most common comorbidities were diabetes (8.70%) and hypertension (15.22%).Systemic diseases can affect tendon recovery by increasing inflammatory pathways or changing the vascular supply. The planning and assessment of regenerative therapies, including PRP, must take these findings into account.

The potential of PRP in tissue regeneration has attracted a lot of attention since it can deliver concentrated growth factors includingPDGF, TGF-β, and VEGF straight to the site of injury. Over a six-month period following injection, the current study shows statistically significant improvements in all assessed outcome measures, including VAS, MAYO, and DASH scores.

Present study also demonstrated significant and sustained improvements in pain and function over a six-month period following PRP treatment. Corticosteroid (CS) injections have long been the mainstay of therapy for elbow epicondylitis. However, several studies have found that while corticosteroid have better efficacy in the short-term, PRP injections have better long-term improvements in VAS and DASH scores [7,8]. Another systematic review and metaanalysis from 2016 concluded that PRP injections were associated with superior outcomes in reducing pain and improving elbow joint function compared to CS injections at a six-month follow-up [9].

A randomized controlled trial by from 2011 found that patients treated with PRP experienced more successful outcomes than those treated with CS, with success defined as a reduction of at least 25% on VAS or DASH scores without the need for reintervention after two years [10]. A strong analgesic impact was demonstrated by the reduction in pain, as evaluated by VAS, from a baseline mean of 8.50 ± 1.00 to 3.00 ± 2.60 at six months ($p<0.0001$) was observed in our study. This is consistent with studies conducted by Mishra et al.[11] and Peerbooms et al. [12], who discovered that PRP provided longer-lasting pain relief han corticosteroids. In our examinations, over the course of six months, the MAYO Elbow Score, a measure of functional evaluation, increased from a mean of 54.00 ± 5.67 to 84.50 ± 11.08. Since pain, function, range of motion, and stability are all included in the MAYO score, this improvement points to a more comprehensive recovery than just symptomatic alleviation. Likewise, DASH scores showed a significant improvement in upper limb capability, falling from 63.46 ± 5.59 to 44.50 ± 8.71. PRP's ability to restore real-world arm functionality is further supported by the DASH tool's heightened sensitivity to deficits in daily

activities. A systematic review and meta-analysis found that corticosteroid injections demonstrated favorable short-term outcomes compared to PRP treatments, as evidenced by DASH scores at 4 and 8-weeks post-treatment. However, at the 24-week follow-up, PRP injections resulted in improved pain and function, highlighting the importance of selecting appropriate outcome measures and assessment time points [7].

Conversely, some studies have reported conflicting results regarding the efficacy of PRP. An RCT conducted in 2013 found no significant differences between PRP and placebo injections in relieving pain and improving joint functionality in chronic LE. They reported better pain control with corticosteroids at 1 month compared to PRP or saline control, however, the study had a relatively short follow-up of 3 months and multiple studies including ours have reported better symptom remission at 6 months of treatment and beyond [13]. Further, variations in patient demographics, symptom duration, and severity can affect treatment responses. There is also no data available for variation in results between different genetic compositions or ethnic groups. Studies with heterogeneous populations may yield differing results. Differences in injection protocols, such as the volume of PRP injected, number of injections, and anatomical targeting, can further impact efficacy [14]. Training and proficiency of personnel is essential for consistency of results. For instance, precise needle placement ensures that the therapeutic agent is delivered directly to the affected tendinous tissue, optimizing efficacy. Conversely, inaccurate placement may result in suboptimal therapeutic effects or increased risk of complications. Standardization of injection protocols is essential to minimize variability and enhance the reliability of study results.

The mechanism of PRP is based on its reservoir of growth factors, which coordinate collagen synthesis, angiogenesis, and tissue healing. When platelets are activated, they release alpha granules that are full of bioactive compounds. These granules influence the inflammatory cascade, promote tenocyte growth, and modify the extracellular matrix. PRP increases type I collagen deposition and promotes vascularity, which helps move the healing process towards regeneration in tendinopathies, where degenerative rather than inflammatory alterations predominate. Additionally, PRP's ability to counteract the pathogenic milieu linked to chronic tendinosis is partially explained by its control of cellular activity in the tenocyte microenvironment, including suppression of catabolic cytokines like TNF-α and IL-1β.The temporal aspect of treatment efficacy is crucial when comparing PRP and CS injections. Our study observed progressive improvement over six months, suggesting the long-term benefits of PRP. This is consistent with findings from a meta-analysis from 2023, which reported that CS provided better short-term (>2 months) functional improvement and pain relief, while PRP offered superior long-term (≥6 month) outcomes as well the meta-analysis discussed earlier [7,15]. Further, a study from 2013 reported that CS injections resulted in lower rates of complete recovery or much improvement at one year compared to placebo, with higher recurrence rates. This suggests that while CS may offer rapid symptom relief, it may not provide sustained benefits and could be associated with higher recurrence rates [16].

Therefore, a combination of steroid injections and PRP therapy may need to be explored to provide immediate pain relief as well as sustained symptom remission. The inconsistent results across studies regarding PRP efficacy may be due to several factors: such as PRP preparation and composition, patient selection, injection techniques, and variability in outcome measures.

Differences in PRP preparation methods, including platelet concentration and leukocyte content, can influence therapeutic outcomes. A meta-analysis by from 2021 indicated that leukocyte-rich PRP may provide better pain relief and functional outcomes compared to leukocyte-poor PRP [17]. Variations in centrifugation speed, duration, and the use of additives can lead to differences in the biological composition of PRP. These differences can impact the release of growth factors essential for tendon healing. A randomized controlled trial comparing PRP and autologous blood injections emphasized the need to standardize PRP preparation protocols to ensure consistency of therapeutic outcomes [18,19].

Conclusion

In conclusion, present study findings align with existing evidence suggesting that PRP may offer significant and sustained improvements in both pain and function in patients with elbow epicondylitis. However, the observed discrepancies across the literature underscore the critical need for standardized protocols and further investigation. Future research should aim to optimize PRP preparation and delivery while identifying patient subgroups most likely to benefit from this biologic therapy. These results highlight PRP‘s potential role as a reliable, long-term treatment alternative to corticosteroid injections, especially in chronic or refractory cases.

References

1. Shiri R, Viikari-Juntura E, Varonen H, Heliovaara M. Prevalence and determinants of lateral and medial epicondylitis: a population study. Am J Epidemiol. 2006;164(11):1065–

1074. http://dx.doi.org/10.1093/aje/kwj325.
2. Harrington JM, Carter JT, Birrell L, Gompertz D. Surveillance case definitions for work related upper limb pain syndromes. Occup Environ Med. 1998;55(4):264–271.
3. Ikpe S, Lesniak B. Biologics and Cell-Based Treatments for Upper Extremity Injuries. Oper Tech Orthop. 2016;26(3):177–181. http://dx.doi.org/10.1053/j.oto.2016.06.007.
4. Reece CL, Li D, SUSMARSKI ADAMJ. Medial Epicondylitis. [Updated 2024 May 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557869/
5. Kiel J, Kaiser K. Golfers Elbow. [Updated 2023 Jun 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK519000/
6. Buchanan BK, Varacallo M. Lateral Epicondylitis (Tennis Elbow) [Updated 2023 Aug 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK431092/
7. Li A, Wang H, Yu Z, Zhang G, Feng S, Liu L, et al. Platelet-rich plasma vs corticosteroids for elbow epicondylitis: A systematic review and meta-analysis. Medicine. 2019; 98(51):e18358.
8. Kemp JA, Olson MA, Tao MA, Burcal CJ. Platelet-Rich Plasma versus Corticosteroid Injection for the Treatment of Lateral Epicondylitis: A Systematic Review of Systematic Reviews. International journal of sports physical therapy. 2021;16(3):597-605.
9. Arirachakaran A, Sukthuayat A, Sisayanarane T, Laoratanavoraphong S, Kanchanatawan W, Kongtharvonskul J. Platelet-rich plasma versus autologous blood versus steroid injection in lateral epicondylitis: systematic review and network meta-analysis. Journal of orthopaedics and traumatology: official journal of the Italian Society of Orthopaedics and Traumatology. 2016;17(2):101-12.
10. Gosens T, Peerbooms JC, van Laar W, den Oudsten BL. Ongoing positive effect of platelet-rich plasma versus corticosteroid injection in lateral epicondylitis: a double-blind randomized controlled trial with 2-year follow-up. The American journal of sports medicine. 2011;39(6):1200-8.
11. Mishra A.K., Skrepnik N.V., Edwards S.G., Jones G.L., Sampson S., Vermillion D.A., et al. Efficacy of Platelet-Rich Plasma for Chronic Tennis Elbow: A Double-Blind, Prospective, Multicenter, Randomized Controlled Trial of 230 Patients. Am J Sports Med. 2013; 42:463–47.
12. J.C. Peerbooms, J. Sluimer, D.J. Bruijn, T. Gosens Positive effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial: platelet-rich plasma versus corticosteroid injection with a 1-year follow-up Am. J. Sports Med.2010;, 38 (2):255-262.
13. Krogh TP, Fredberg U, Stengaard-Pedersen K, Christensen R, Jensen P, Ellingsen T. Treatment of lateral epicondylitis with platelet-rich plasma, glucocorticoid, or saline: a randomized, double-blind, placebo-controlled trial. The American journal of sports medicine. 2013;41(3):625-35.
14. Kale P, Patel H, Jaiswal AM. Mechanisms, Efficacy, and Clinical Applications of Platelet-Rich Plasma in Tendinopathy: A Comprehensive Review. Cureus. 2024;16(7): e65636.
15. Xu Y, Li T, Wang L, Yao L, Li J, Tang X. Platelet-Rich Plasma Has Better Results for Long-term Functional Improvement and Pain Relief for Lateral Epicondylitis: A Systematic Review and Meta-analysis of Randomized Controlled Trials. The American journal of sports medicine. 2024;52(10):2646-56.
16. Coombes BK, Bisset L, Brooks P, Khan A, Vicenzino B. Effect of corticosteroid injection, physiotherapy, or both on clinical outcomes in patients with unilateral lateral epicondylalgia: a randomized controlled trial. Jama. 2013;309(5):461-9.
17. Shim JW, Lee JS, Park YB, Cho HC, Jung HS. The effect of leucocyte concentration of platelet-rich plasma on outcomes in patients with lateral epicondylitis: a systematic review and meta-analysis. Journal of shoulder and elbow surgery. 2022;31(3):634-45.
18. Thanasas C, Papadimitriou G, Charalambidis C, Paraskevopoulos I, Papanikolaou A. Platelet-rich plasma versus autologous whole blood for the treatment of chronic lateral elbow epicondylitis: a randomized controlled clinical trial. The American journal of sports medicine. 2011;39(10):2130-4.
19. Linnanmäki L, Kanto K, Karjalainen T, Leppänen OV, Lehtinen J. Platelet-rich Plasma or Autologous Blood Do Not Reduce Pain or Improve Function in Patients with Lateral Epicondylitis: A Randomized Controlled Trial. Clinical orthopaedics and related research. 2020;478(8):1892-900.