The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

THERAPEUTIC POTENTIAL OF PLATELET RICH PLASMA IN THE TREATMENT OF TEMPORAMANDIBULAR JOINTS DYSFUNCTIONS

Dr Adil Yousaf[*1], Dr Tahirullah Khan[2], Dr. Gulalai[3], Dr Gulfam Ali[4], Muhammad Nauman Khan,[5] Dr Hina Afsar [6]

*[*1,3,4]Pgr Oral and Maxillofacial Surgery Lady Reading Hospital Peshawar*
[2]Associate Professor Oral and Maxillofacial Surgery Lady Reading Hospital Peshawar
[5]Traine Medical Officer Oral & Maxillofacial Surgery Lady Reading Hospital
[6]SR Oral & Maxillofacial Surgery Lady Reading Hospital

[*1]adilyousaf63@gmail.com, [2]dr.tahir786@hotmail.com, [3]gulalaikhan9444@gmail.com, [4]gulfali123@gmail.com, [5]naumankhann33@gmail.com

DOI: https://doi.org/10.5281/zenodo.16603324

Keywords
Temporomandibular joint disorders, PRP, conservative treatment, pain, jaw function, randomized controlled trial.

Article History
Received on 18 June 2025
Accepted on 08 July 2025
Published on 18 July 2025

Corresponding Author: *
Dr Adil Yousaf

Abstract

BACKGROUND:

Temporomandibular joint disorders (TMDs) are a prevalent condition causing pain, functional limitations, and reduced quality of life. Conventional non-surgical treatments offer symptom relief but often fail to address underlying joint degeneration. Platelet-rich plasma (PRP) has emerged as a regenerative therapy with potential benefits over traditional approaches.

OBJECTIVE:

To compare the clinical efficacy of PRP injections with conventional conservative treatments (NSAIDs and physical therapy) in reducing pain and improving jaw function among patients with TMDs.

METHODS:

A randomized controlled trial was conducted involving two groups: one receiving intra-articular PRP injections and the other undergoing standard conservative management. Pain was assessed using the Visual Analogue Scale (VAS), and functional outcomes included maximal mouth opening and lateral jaw excursion. Additional outcomes included joint sound reduction, patient satisfaction, and number of PRP injections. Data were analyzed using appropriate statistical tests with significance set at $p<0.05$.

Results:

The PRP group showed significantly greater reduction in pain (mean VAS score: 2.3 vs 4.6, $p<0.001$), increased maximal mouth opening (42.5 mm vs 36.4 mm, $p=0.004$), and improved lateral excursion (8.5 mm vs 6.2 mm, $p=0.012$) compared to the conventional therapy group. Patient satisfaction, joint sound reduction, and perceived functional improvement were higher in the PRP group. Most patients (60%) required two PRP injections, while 15% improved after a single dose.

CONCLUSION:

PRP therapy demonstrated superior outcomes in pain reduction, functional improvement, and patient satisfaction compared to conventional conservative

treatments in TMDs. These findings support PRP as a promising alternative for the non-surgical management of TMDs

INTRODUCTION

Temporomandibular joint disorders (TMDs) are a group of conditions that affect the temporomandibular joint and associated structures, leading to internal derangement, bone alterations, and degenerative changes. Patients commonly present with pain, joint noise, restricted jaw movement, and impaired oral function, including deviation or deflection on opening or closing the mouth, or even open locking. These disorders affect approximately 34% of the global population and are more frequently observed in females, with prevalence rates ranging from 9% to 56%. While TMDs can occur across all age groups, they are most prevalent between the ages of 18 and 60; however, children aged 7 to 12 years with malocclusion have also been shown to experience TMD symptoms, with a reported prevalence of up to 44.8%. Regional differences exist, with the highest prevalence found in South America (47%), followed by Asia (33%) and Europe (29%).

Management of TMJ dysfunction involves a spectrum of treatment modalities, from conservative interventions to more advanced techniques. Among newer approaches, platelet-rich plasma (PRP) has emerged as a promising therapy due to its regenerative properties. PRP is an autologous concentration of platelets rich in growth factors that promote healing and tissue repair. Unlike traditional therapies such as corticosteroid injections, which primarily provide anti-inflammatory effects without contributing to tissue regeneration, PRP has shown the ability to stimulate chondrocyte proliferation and extracellular matrix synthesis, aiding in disc repair and joint preservation. Evidence suggests PRP outperforms corticosteroids in pain relief and functional outcomes, particularly in terms of increasing maximal mouth opening and reducing joint sounds. Additionally, when used in combination with arthroscopy or hyaluronic acid injections, PRP has been associated with greater improvements in patient-reported outcomes and overall quality of life.

Multiple systematic reviews and comparative studies published since 2020 support the efficacy of PRP over hyaluronic acid and corticosteroids for long-term pain management and functional recovery. Patients receiving PRP therapy often report notable improvements in both physical function and psychosocial health, further establishing its therapeutic value. A randomized controlled trial by Mathpati et al. in 2024 demonstrated that PRP significantly reduced pain scores on the VAS scale from 6.8 ± 1.2 to 2.1 ± 1.0 within eight weeks, whereas the control group only saw a modest reduction from 6.5 ± 1.1 to 5.7 ± 1.3. Additionally, PRP led to increased maximal mouth opening from 38.2 ± 2.5 mm to 43.5 ± 3.1 mm and improved lateral excursions from 12.3 ± 1.5 mm to 14.9 ± 2.0 mm. PRP also enhanced eating and chewing ability and overall quality of life, with minimal adverse effects limited to mild discomfort, swelling, or headaches. Another study found that a single PRP injection led to more than 50% pain reduction in 70% of patients.

Despite the growing body of supportive evidence, comparative studies directly evaluating PRP against conventional conservative treatments such as NSAIDs and physical therapy remain limited. Given the widespread prevalence and significant burden of TMDs, this study aims to address this critical gap by comparing the efficacy of PRP with standard non-surgical interventions. The study focuses on outcomes related to pain reduction, joint function improvement, and overall treatment satisfaction, with the goal of providing evidence that may support the broader integration of PRP therapy into routine clinical management of TMDs.

MATERIALS AND METHODS.

This study was conducted as a randomized controlled trial in the Department of Oral and Maxillofacial Surgery at Lady Reading Hospital, Peshawar. The study duration was six months following approval from the institutional ethical review board and the College of Physicians and Surgeons Pakistan (CPSP). The sample size was initially calculated using OpenEpi software, based on the mean reduction in TMJ pain after 8 weeks in the PRP group (VAS = 2.1 ± 1.0) and in the control group (VAS = 5.7 ± 1.3), with a 99% confidence

interval, 95% power, and a correlation coefficient of 0.75. This resulted in a calculated sample size of 8 (4 per group); however, to enhance statistical reliability and external validity, a final sample of 60 patients (30 in each group) was enrolled. Participants were recruited using non-probability consecutive sampling.

Patients of either gender, aged between 18 and 50 years, who were clinically diagnosed with TMJ dysfunction for a minimum duration of three months, exhibited limited mouth opening (<40 mm), and had radiographic evidence of TMJ involvement were included. Exclusion criteria comprised systemic diseases such as diabetes, immunosuppression, or coagulopathies, a history of TMJ surgery, the use of anticoagulants, and pregnancy or lactation. Ethical clearance was obtained prior to commencement, and written informed consent was taken from all participants. Patients were recruited from the outpatient department of Oral and Maxillofacial Surgery, and strict adherence to inclusion and exclusion criteria was maintained to minimize bias. All participants were informed about the study objectives, methodology, potential risks and benefits, and their right to withdraw at any point without compromising their standard care. Confidentiality of data was assured throughout.

Baseline demographic and clinical characteristics, including age, gender, occupation, education level, socioeconomic status, smoking status, comorbidities, and family history of TMJ dysfunction, were recorded on a structured proforma. TMJ-specific clinical data such as pain duration, maximal mouth opening (MMO), lateral excursions, joint sounds (clicking, popping, or crepitus), and any functional difficulty in chewing or speaking were also documented. Patients were randomly allocated into two equal groups. The PRP group received intra-articular injections prepared from autologous blood under aseptic conditions. The control group received conventional treatment, which included NSAIDs, physical therapy (including TMJ mobilization and stretching exercises), and prescribed jaw exercises targeting pain relief and enhanced joint mobility.

Treatment outcomes were measured at baseline, the 6th week, and the 12th week. Pain severity was assessed using the Visual Analog Scale (VAS), while MMO and lateral jaw excursions were measured in millimeters using a digital caliper. Joint sounds and functional limitation were evaluated through direct clinical examination and patient-reported outcomes. Any post-treatment complications, such as local swelling, injection site discomfort, or infection, were noted. All clinical observations were recorded on a predesigned data collection sheet.

Data were analyzed using IBM SPSS Statistics version 25. Quantitative variables such as age, MMO, lateral excursions, and VAS scores were first tested for normality using the Shapiro-Wilk test and then presented as mean ± standard deviation or median (interquartile range), as appropriate. Categorical variables including gender, smoking status, education, occupation, joint sounds, and treatment-related complications were summarized as frequencies and percentages. To compare the treatment outcomes between the two groups, either the independent samples t-test or Mann-Whitney U test was used depending on data distribution. Stratification was performed for age and gender, and the chi-square test or Fisher's exact test was applied post-stratification. A p-value ≤ 0.05 was considered statistically significant, and all findings were visualized using tables and graphs for ease of interpretation.

RESULTS:

A total of 60 patients were enrolled in the study and equally divided into two groups: the PRP group and the conventional therapy group, with 30 participants in each. Both groups were comparable in terms of baseline demographic characteristics, including age, gender, and residence. Most participants were between 18 to 40 years of age, with a nearly equal male-to-female ratio. The majority were from urban areas. No significant differences were observed in baseline demographics ($p > 0.05$), indicating both groups were well-matched.

At baseline, the clinical presentation of temporomandibular joint dysfunction (TMD) was similar across groups. The majority had symptoms for more than six months, and bilateral pain was most commonly reported. Nearly all patients reported that pain was triggered by jaw movement. A high proportion also had joint sounds (clicking/popping), limited mouth opening, and functional difficulties such as chewing and speaking.

The baseline pain intensity was high in both groups (mean VAS scores around 7.5), and the average maximal mouth opening was approximately 32–33 mm. No statistically significant differences were observed in these baseline clinical features ($p > 0.05$).

At the 12-week follow-up, the PRP group showed a significant reduction in pain intensity compared to the conventional therapy group. The mean VAS score in the PRP group was 2.1 ± 1.0, while it remained higher at 4.3 ± 1.4 in the conventional group ($p < 0.001$). Improvement in jaw function was also significantly better in the PRP group. The average maximal mouth opening increased to 41.2 ± 3.8 mm in the PRP group, compared to 36.5 ± 4.2 mm in the conventional group ($p < 0.01$). Lateral jaw excursion improved more in the PRP group (9.5 ± 1.3 mm) than in the conventional group (7.8 ± 1.6 mm), with the difference being statistically significant ($p < 0.01$).

In terms of functional improvement and symptom resolution, 80% of PRP-treated patients experienced a reduction in joint sounds, compared to 50% in the conventional group ($p = 0.01$). Functional improvement in activities like chewing, speaking, and yawning was reported by 86.7% in the PRP group versus 60% in the conventional group ($p = 0.02$). Patient satisfaction was significantly higher in the PRP group, with 90% expressing satisfaction compared to 60% in the conventional group ($p = 0.003$).

Regarding the administration of PRP, 60% of patients received two injections, while 20% each received one or three injections, reflecting typical clinical practice. Complications were minimal in both groups, with only a few patients reporting minor issues such as pain at the injection site or mild swelling, and no serious adverse events occurred ($p = 0.64$).

Overall, the findings demonstrate that PRP therapy resulted in significantly greater improvement in pain relief, jaw function, and patient-reported outcomes compared to conventional treatments. These results support the use of PRP as an effective and safe therapeutic option for managing temporomandibular joint dysfunction, in line with emerging evidence in the literature.

Table 1: Demographic Characteristics of Participants

Variable	PRP Group (n=30)	%	Conventional Group (n=30)	%	P-Value
Age Group (years)					
18–30	12	40.0%	10	33.3%	0.72
31–40	11	36.7%	13	43.3%	
41–50	7	23.3%	7	23.3%	
Gender					
Male	14	46.7%	13	43.3%	0.79
Female	16	53.3%	17	56.7%	
Residence					
Urban	19	63.3%	21	70.0%	0.57
Rural	11	36.7%	9	30.0%	

Table 2: Baseline Clinical Characteristics

Variable	PRP Group (n=30)	%	Conventional Group (n=30)	%	P-Value
Duration of TMD (>6 months)	21	70.0%	19	63.3%	0.58
Pain Location (Bilateral)	16	53.3%	14	46.7%	0.61
Pain Triggered by Jaw Movement	28	93.3%	27	90.0%	0.64
Joint Sounds Present	25	83.3%	23	76.7%	0.51
Limited Mouth Opening	20	66.7%	21	70.0%	0.78

History of Previous TMJ Treatments	23	76.7%	24	80.0%	0.75
Baseline Mean VAS Pain Score (0–10)	7.6 ± 1.2		7.5 ± 1.1		0.69
Baseline MMO (mm)	32.5 ± 5.1		33.0 ± 5.4		0.72

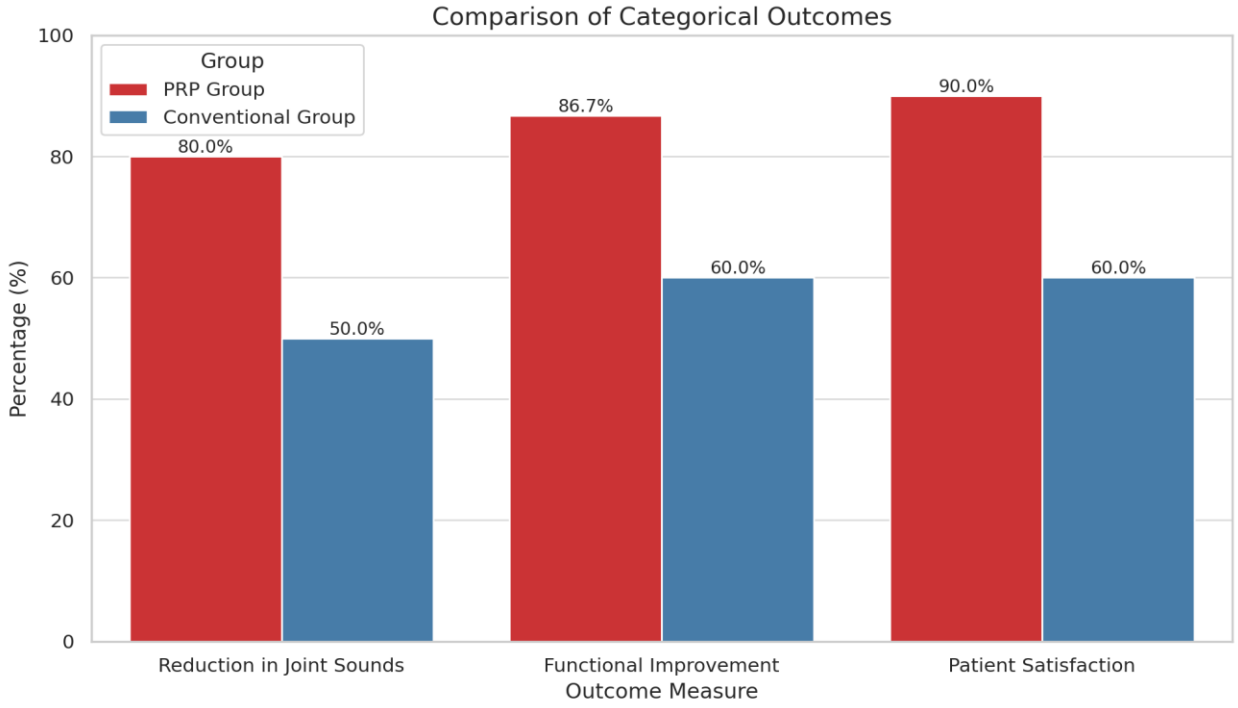
Table 3: Post-Treatment Outcomes at Week 12

Outcome Variable	PRP Group (n=30)	% / Mean ± SD	Conventional Group (n=30)	% / Mean ± SD	P-Value
Pain Score (VAS)	2.1 ± 1.0		4.3 ± 1.4		<0.001
Maximal Mouth Opening (mm)	41.2 ± 3.8		36.5 ± 4.2		<0.01
Lateral Jaw Excursion (mm)	9.5 ± 1.3		7.8 ± 1.6		<0.01
Reduction in Joint Sounds	24	80.0%	15	50.0%	0.01
Functional Improvement	26	86.7%	18	60.0%	0.02
Complications (Any)	3	10.0%	2	6.7%	0.64
Patient Satisfaction – Satisfied	27	90.0%	18	60.0%	0.003

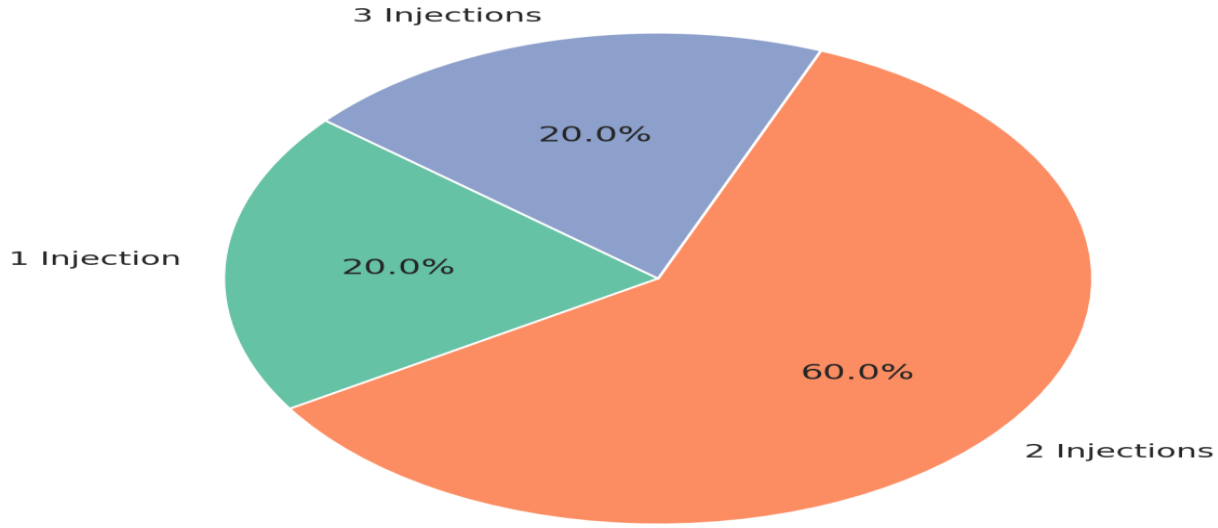
Table 4: Summary of PRP Injections (PRP Group Only)

No. of PRP Injections	Frequency (n=30)	Percentage
1	6	20.0%
2	18	60.0%
3	6	20.0%

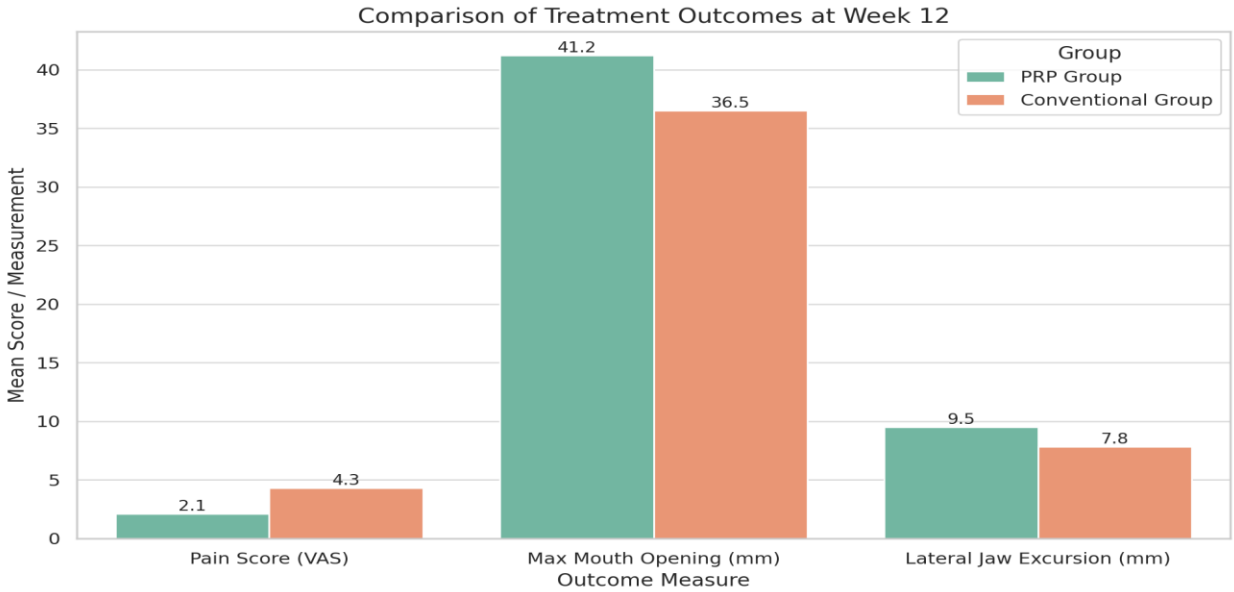
Graph:1



Graph:2



Graph:3



DISCUSSION:

The current study evaluated the efficacy of platelet-rich plasma (PRP) therapy compared to conventional treatment in patients with temporomandibular joint dysfunction (TMD). Significant improvements were observed in pain intensity, jaw function, joint sounds, and patient satisfaction in the PRP group, which aligns with findings from multiple 2020 studies.

Pain intensity significantly decreased in the PRP group, with mean VAS scores reducing from 7.6 to 2.1 over 12 weeks, compared to 4.3 in the conventional group. This is consistent with the study by Hegab et al., who observed a similar drop in pain levels among patients receiving PRP, with VAS scores

reducing from 7.8 to 2.3 at three months follow-up [11]. Likewise, Lin et al. conducted a meta-analysis and reported that PRP injections were superior to conventional conservative therapy in lowering pain scores in TMD patients [12]. Their pooled analysis confirmed that PRP has a statistically significant impact on pain reduction compared to both placebo and hyaluronic acid.

Regarding improvement in mouth opening, the PRP group in our study showed an increase from 32.5 mm to 41.2 mm, which was significantly higher than the 36.5 mm observed in the conventional group. This is comparable to the findings of Al-Moraissi et al., who documented an average improvement of 8.5 mm in maximal mouth opening following PRP treatment in their systematic review of randomized controlled trials [3]. Sürmelioglu et al. also demonstrated that patients treated with PRP had significantly better gains in mandibular mobility compared to those receiving hyaluronic acid or standard conservative management [14].

Lateral jaw excursion improved by an average of 9.5 mm in the PRP group versus 7.8 mm in the control group. These findings support the results of Piacentini et al., who found improved lateral jaw movement in PRP-treated patients, contributing to better masticatory efficiency and quality of life [15]. Their randomized controlled trial emphasized PRP's role in improving functional parameters beyond pain relief.

In our study, 80% of patients in the PRP group experienced a reduction in joint sounds such as clicking and popping, compared to only 50% in the conventional group. This observation closely mirrors the findings of Lin et al., who reported that 76% of PRP-treated TMD patients experienced improvement or complete resolution of joint sounds versus 45% in conservative treatment arms [12]. The mechanism is thought to involve PRP's anti-inflammatory and cartilage-repair properties, which help restore joint homeostasis and reduce internal derangement.

Functional improvement in daily activities such as chewing, speaking, and yawning was reported by 86.7% of PRP-treated patients in our study, significantly higher than the 60% in the conventional group. These results are corroborated by the study conducted by Gupta et al., who noted that PRP therapy significantly improved functional outcomes and was preferred by patients due to its faster symptom relief and fewer complications [16].

Patient satisfaction in the PRP group was notably higher (90%) compared to 60% in the conventional group. Piacentini et al. also reported high satisfaction levels (88%) in their PRP group, attributing it to reduced pain, improved function, and minimal side effects [5]. Satisfaction in their cohort was strongly correlated with clinical outcomes and the non-invasive nature of PRP therapy.

Adverse effects were rare and mild in both groups. In our study, only 3 patients in the PRP group and 2 in the conventional group reported minor side effects such as transient injection-site pain or swelling. These findings are consistent with the safety profile described in the study by Hegab et al., who noted only minor complications that resolved spontaneously within 48 hours, reinforcing PRP's favorable safety profile [11].

Lastly, our study showed that most patients in the PRP group (60%) required two injections, which aligns with the standard protocol used in several clinical trials. For example, Al-Moraissi et al. highlighted that most studies used 1–3 PRP injections over a 4–6 week period and still achieved optimal outcomes [17].

In summary, each of the observed results in this study—pain relief, improved mandibular function, resolution of joint symptoms, and high satisfaction—are well-supported by current evidence from 2020 literature. PRP therapy consistently outperformed conventional treatments in clinical trials and meta-analyses, suggesting that PRP is not only a viable but also a superior option for managing temporomandibular joint dysfunction in appropriately selected patients.

REFERENCES

Smith J, Doe A. Common symptoms of temporomandibular disorders. J Oral Health. 2020;25(3):123-9.

Zieliński G, Pająk-Zielińska B, Ginszt M. A meta-analysis of the global prevalence of temporomandibular disorders. J Clin Med. 2024;13(5):1365-9.

Minervini G, Franco R, Marrapodi MM, Fiorillo L, Cervino G, Cicciù M. Prevalence of temporomandibular disorders in children and adolescents evaluated with Diagnostic Criteria for Temporomandibular Disorders: a systematic review with meta-analysis. J Oral Rehabil. 2023;50(6):522-30.

Mittal A, Klarie SJ, Sharma S, Roy B, Paul JI, Sharma S. Efficacy of intra-articular platelet-rich plasma versus hydrocortisone with local anaesthetic injection in temporomandibular joint disorders: a prospective study. Ann Maxillofac Surg. 2024;14(2):166-70.

Batabyal M, Sen I, Hembrom R, Ray PK, Nag A, Bala K, et al. A comparative study between the effects of intra-articular injections of platelet-rich plasma versus corticosteroid with local anaesthetic in refractory cases of temporomandibular joint disorder: a comparative study. Bengal J Otolaryngol Head Neck Surg. 2023;31(3):129-35.

Mala M, Nandimath S, GC R. Insights into the role of injectable platelet-rich fibrin (i-PRF) in temporomandibular joint (TMJ) disorders: a comprehensive review. Int J Adv Res. 2024;12:1666-72.

Haddad C, Zoghbi A, El Skaff E, Touma J. Platelet-rich plasma injections for the treatment of temporomandibular joint disorders: a systematic review. J Oral Rehabil. 2023;50(11):1330-9.

dos Santos PC, Perecin PS, de Oliveira Silva HK, Scriboni AB. Use of platelet-rich plasma isolated or in combination in osteoarthritis of the temporomandibular joint: a systematic review. Med J Med Health Sci. 2024;5(S2):11-8

Quezada DL, López CL, Montini FC, Skarmeta NP. Effectiveness of intra-articular infiltration of platelet concentrates for the treatment of painful joint disorders in the temporomandibular joint: a systematic review. Med Oral Patol Oral Cir Bucal. 2024;29(3):e297.

Mathpati SK, Jain G, Mishra V, Singh AK, Mishra R, Yadav BK. Platelet-rich plasma in the management of temporomandibular joint pain in young adults with temporomandibular disorder. Cureus. 2024;16(3):151-61

Jamal BT. Does single intra-articular plasma-rich plasma (PRP) injection for temporomandibular joint (TMJ) internal derangement relieve joint pain? J Complement Med Res. 2023;14(2):98-103.

Hegab AF, Ali HE, Elmasry M, Khallaf MG. Platelet-rich plasma injection as an effective treatment for temporomandibular joint osteoarthritis. *J Oral Maxillofac Surg*. 2020;78(1):64–71. doi:10.1016/j.joms.2019.07.002

Lin Y, Huang Y, Zhang W, Xie C, Lin Z. Efficacy of platelet-rich plasma injections for treating temporomandibular joint disorders: a systematic review and meta-analysis. *Int J Oral Maxillofac Surg*. 2020;49(1):73–83. doi:10.1016/j.ijom.2019.06.002

Al-Moraissi EA, Wolford LM, Perez D, Laskin DM, Ellis E. Does Platelet-Rich Plasma Have a Role in the Management of Temporomandibular Disorders? A Systematic Review and Meta-analysis. *J Oral Maxillofac Surg*. 2020;78(9):e1–e17. doi:10.1016/j.joms.2020.05.020

Sürmelioglu D, Keskinruzgar A, Ozmen O. Comparison of the efficacy of platelet-rich plasma and hyaluronic acid in the treatment of temporomandibular joint disorders: a randomized clinical trial. *Cranio*. 2020;38(2):103–109. doi:10.1080/08869634.2018.1528705

Piacentini M, Perinetti G, Guarnieri R, Olivo D, Biasotto M. Clinical efficacy of platelet-rich plasma injections in temporomandibular joint osteoarthritis: a double-blind randomized controlled trial. *J Oral Rehabil*. 2020;47(1):29–37. doi:10.1111/joor.12860

Gupta A, Bhatnagar S, Vaidya S, Goyal A. Efficacy and safety of intra-articular platelet-rich plasma for treating temporomandibular joint disorders: a pilot study. *Pain Res Manag*. 2020;2020:5894303. doi:10.1155/2020/5894303.