

## A Comparative Study to Assess the Role of Clinical and Radiological Outcome of Intra- Articular Injection of Platelet Rich Plasma and Corticosteroid in Patients Age Between 45-65 Years with Knee Osteoarthritis at a Tertiary Care Centre

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### Abstract

**Background:** Knee osteoarthritis is prevalent globally among the aged adults with an ageing and increasingly obese population. It is also the second leading cause of disability and a heavy economic and social burden. The aim of this study is to analyse the efficacy of intra articular PRP injections in knee osteoarthritis.

**Materials and Methods:** In this study, participants ke jagah patients with osteoarthritis knee the participants who suffered from knee osteoarthritis (Grades II/III), were randomly divided into two groups: intra articular injection of PRP and CS. Knee injury and osteoarthritis outcome score (KOOS), the 20-Meter-Walk Test (20MW), active and passive ranges of motions (ROM), flexion contracture, and pain intensity based on Visual Analog Scale (VAS) were assessed before, 2-months, and 6-months after interventions.

**Results:** It is evaluated based on active and passive ranges of motions (ROM), flexion contracture, and pain intensity based on Visual Analog Scale (VAS) were assessed before, 1,3 and 6-months after interventions.

**Conclusions:** Our study demonstrated that one shot of PRP injection, decreased joint pain more and longer-term, alleviated the symptoms, and enhanced the activity of daily living and quality of life in short-term duration in comparison with CS.

**Keywords:** Platelet Rich Plasma (PRP), Corticosteroid, Osteoarthritis Knee.

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### Introduction

It is crucial to address knee osteoarthritis (OA), a prevalent condition among aging individuals globally, exacerbated by the rise in obesity. Ranking as the second leading cause of disability, OA imposes significant economic and social burdens. Patients typically encounter symptoms such as pain, swelling, stiffness, and restricted motion. Management strategies encompass conservative measures like patient education, weight loss, exercise, and the use of pain medications, as well as intra-articular interventions like hyaluronan, glucosamine, or chondroitin. In cases where OA progresses to an advanced stage, joint replacement surgery, specifically arthroplasty, becomes a clinically relevant option. However, for this procedure to be considered cost-effective, it is essential to limit its application to patients with a severely compromised functional status. This emphasizes the importance of tailoring treatments

to the specific needs and conditions of individuals affected by knee osteoarthritis. [1,2] Oral NSAIDs prove effective in providing clinically significant improvement in both pain management and enhanced functionality for individuals with knee osteoarthritis. In cases where patients do not respond adequately to oral or topical analgesics, intra-articular corticosteroids are recommended as an alternative. Additionally, the clinical efficacy of intra-articular hyaluronic acid (HA) injections stands out, offering beneficial effects in alleviating pain, improving overall function, and positively influencing global patient assessments in the context of treating osteoarthritis of the knee. [1,3] These treatment modalities contribute to a comprehensive approach in managing knee osteoarthritis, considering both oral and localized interventions based on individual patient responses and needs. The use of platelet-rich plasma (PRP) in

the context of osteoarthritis treatment has garnered attention for its potential to modify the course of the disease. Its simplicity and cost-effectiveness, coupled with the minimally invasive nature of intra-articular injection, make PRP an appealing therapeutic option. The concentrated growth factors present in PRP contribute to tissue regeneration, offering a natural and autologous approach to enhance healing. [4]

In addition to its regenerative properties, PRP stands out for its anti-inflammatory effects. The release of interleukin-1ra, a key anti-inflammatory signal, positions PRP as a promising avenue for addressing the inflammatory component of osteoarthritis. This dual action, promoting both tissue repair and reducing inflammation, underscores the multifaceted potential of PRP in managing knee osteoarthritis. [5] Moreover, the cost-effectiveness of platelet concentrates is a notable advantage. The straightforward process of obtaining PRP through centrifugation, utilizing the patient's own blood, contributes to its economic appeal. This makes PRP an accessible and patient-friendly option for those seeking alternatives to traditional osteoarthritis treatments. [6] As research continues to unfold, the versatility and regenerative capabilities of PRP hold promise for advancing the landscape of knee osteoarthritis management. The combination of being a patient-friendly, cost-effective, and minimally invasive option makes PRP a compelling therapeutic strategy in the quest for effective osteoarthritis interventions. [7]

### Materials and Methods

In this study, participants ke jagah patients with osteoarthritis knee who suffered from knee osteoarthritis (Grades II/III), were randomly divided into two groups: intra articular injection of PRP and CS. Knee injury and osteoarthritis outcome score (KOOS), the 20-Meter-Walk Test (20MW), active and passive ranges of motions (ROM), flexion contracture, and pain intensity based on Visual Analog Scale (VAS) were assessed before, 1,3 and 6-months after interventions The Western Ontario and McMaster University Osteoarthritis Index (WOMAC) and the 10 cm visual analog pain scale were used to assess the response to treatment at various intervals.

The WOMAC was used as a self-administered test consisting of a 24-item questionnaire divided into three subscales which measure pain (5 items, score range 0–20), stiffness (2 items, score range 0–8), and physical function (17 items, score range 0–68). The three normalized subscale values were summed to provide the normalized WOMAC-total score in the range of 0 (best score) to 96 (worst score). With the use of WOMAC, a lower score represented a better outcome. The VAS, which also was administrated by the patient, ranged from 0 to

10 cm, with lower numbers representing less pain and higher numbers representing more pain. All the three measurements were used at the time of enrollment in the study before any injection and then the VAS was measured again at six weeks three and six months follow-up while the WOMAC was also measured at six weeks three and six months.

### Inclusion Criteria:

1. Patients diagnosed with primary knee OA for at least one year and presence of level 2 or level 3 OA according to Kellgren-Lawrence staging on radiographs taken in the last six months, and is not satisfied with conservative management using physical therapy, NSAIDS, HA etc. and not willing for TKA
2. Patients age between 45-65years of age.

### Exclusion Criteria:

1. Patients having a history of knee operation.
2. Patients with tumor or metastatic disease, an active local or systemic infection.
3. Patients with a history of uncontrolled diabetes mellitus, peripheral vascular disease, inflammatory arthritis, traumatic arthritis, metabolic arthritis (gout) etc.
4. Patients taking any anti-platelet drugs

### Results

Among the 82 patients enrolled in our study, 27 (32%) were male and 55 (68%) were female with a mean age of 64.7. Out of 82 patients, there were 26 unilateral knee cases and 56 bilateral knee cases. A patient with bilateral knee pain was considered as one patient. 11 (13%) patients had OA on the right knee and 15 (18%) on the left knee, and the remaining 56 (68%) had bilateral knee involvement. The mean age of the patients in the corticosteroid group were  $64.7 \pm 9.1$  years and in platelet-rich plasma group were  $63.8 \pm 9.4$  years. Males constituted 37.5% in corticosteroid group and 28.5% in platelet-rich plasma group Pain (VAS)The VAS score before intervention in corticosteroid group was  $7 \pm 2$  and in platelet-rich plasma group was  $7 \pm 2.5$ . In corticosteroid group, pain at end of six weeks significantly decreased to  $4.5 \pm 1.5$ . At the end of three months, pain increased to  $5 \pm 2$  and at the end of six months, pain score increased to  $6 \pm 2$ . In platelet-rich plasma group, at end of six months, pain significantly decreased to  $6 \pm 2$ , pain continued its decreasing trend to  $5.5 \pm 1.5$  at end of third month. At the end of six month, pain score decreased to  $4 \pm 2$  and it was also significantly lower than primary pain score. WOMAC score Pain and stiffness in the two study groups decreased 3 months after intervention. Also physical function significantly improved in the two groups. The improvement was more significant in PRP group as compared to

corticosteroid and platelet-rich plasma groups at the end of 3 months.

**Table 1: Sex wise distribution of patients in the study groups**

	Corticosteroid		Platelet-rich plasma	
	Number	Percentage	Number	Percentage
Male	15	37.5	12	28.5
Female	25	62.5	30	71.5

**Table 2: Comparison of VAS scores between the study groups at pre-intervention and 1, 2 and 3 months post-intervention**

VAS score	Pre- intervention	At 6 weeks	At 3 month	At 6 month
Corticosteroid	7 ± 2	4.5 ± 1.5	5 ± 2	6 ± 2
Platelet-rich plasma	7 ± 2.5	6 ± 2	5.5 ± 1.5	4 ± 2

**Table 3: Shows PRP group as compared to corticosteroid and platelet-rich plasma groups at the end of 3 months**

WOMAC score	Corticosteroid		Platelet-rich plasma	
	Mean	SD	Mean	SD
Before injection	78.5	10.5	78.5	10.5
At 6 weeks	72.5	8.5	74.5	8.5
At 12 weeks	68.5	8.5	66.5	10.5
At 24 weeks	55.5	10.5	52.5	10.5



**Figure 1: Pre-Operative**



**Figure 2:**



**Figure 3: Post-Operative**

### Discussion

Primary treatment goals in knee OA include pain reduction and improvement of joint mobility and function. The secondary goal is to decrease the progression of disease. Platelet rich plasma is a non-operative intervention, which is frequently administered with the hope of achievement of both primary and secondary therapeutic goals over longer duration as compared to corticosteroid. These two categories of intra-articular injections need to be clinically evaluated comparatively to assign their indications, contra-indications and to determine which treatment method was more effective for alleviation of pain and durability. This study showed that in the two study groups, the functions of the knee improved, but intra-articular PRP injection were found superior to corticosteroid in improving pain, stiffness, and functional status over a longer term. VAS scale showed that two modalities were effective in pain reduction at six weeks, third and six month after intervention. The effectiveness of pain reduction was more durable in PRP group as compared to CS. The pain score gradually increased at the six month endpoints after decreasing drastically at the six month and three month endpoint but still remained better than pre-intervention levels in CS group. WOMAC Scores showed improvement in all the parameters post-intervention after 3 months.

The improvement was more significant in PRP group as compared to corticosteroid group at the end of 3 months providing a good clue to compare the clinical efficacy of each intervention over 3 months. Since the degree of pain relief was comparable across the study groups; consequently, it is argued that the most important difference between the two intervention modalities is the duration of effectiveness. Compared to CS group, PRP is suggested to be superior in the duration of pain relief. We can propose that intra-articular PRP injections provide significant pain relief even after

3 months post-intervention and the need for re-administration is less likely as compared to CS after every 3 months for knee joint OA. None of the patients were lost during follow-up. We found that conducting studies with more extensive follow-ups and significantly larger sample size was demanding. In a prospective, randomized study, by Jones et al. patients withdrew during follow-up most commonly because of worsening of the symptoms over a longer term of conservative treatment thus challenging the utility of conservative methods of treatment of OA knee over a longer duration articular injection can be used, as short term measure. It is safe and effective. Though it is not a permanent solution for knee OA but it relieves pain. Improve function and quality of life. In acute exacerbation of pain. Intra articular steroid can be given, it relieves pain rapidly and its effect lasts for 8-10 weeks. Intra articular PRP comparatively gives longer duration of pain relief. PRP is more effective in relatively younger age patients and lower degree of cartilage degeneration [8-14].

### Conclusions

Our study demonstrated that one shot of PRP injection, decreased joint pain more and longer-term, alleviated the symptoms, and enhanced the activity of daily living and quality of life in short-term duration in comparison with CS.

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