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## Comparative Study Of Outcome Of PRP, Corticosteroid And Hyaluronic Acid In Osteoarthritis Knee.

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### ABSTRACT

Osteoarthritis (OA) of the knee is a common degenerative joint disease causing significant pain and disability. Various intra-articular injections, including Platelet-Rich Plasma (PRP), corticosteroids, and hyaluronic acid, are employed to manage symptoms. This study compares the efficacy and outcomes of these treatments. This retrospective study analyzed 40 patients with knee OA treated with PRP (n=15), corticosteroids (n=13), or hyaluronic acid (n=12) over one year. Pain reduction was assessed using the Visual Analog Scale (VAS) and functional improvement with the Western Ontario and McMaster Universities Arthritis Index (WOMAC). Adverse events and patient satisfaction were also evaluated. The PRP group showed the most sustained pain relief, with VAS scores decreasing from  $7.8 \pm 1.1$  to  $3.5 \pm 1.2$  over 12 months. Corticosteroids provided rapid but less sustained relief, with VAS scores dropping from  $7.9 \pm 1.0$  to  $5.5 \pm 1.6$ . Hyaluronic acid showed moderate and steady pain relief, with scores decreasing from  $7.7 \pm 1.2$  to  $4.0 \pm 1.3$ . WOMAC scores improved significantly in the PRP group, from  $72.1 \pm 8.3$  to  $43.8 \pm 7.2$ . Adverse events were minimal across all groups. Patient satisfaction was highest with PRP. PRP offers the most sustained pain relief and functional improvement for knee OA, followed by hyaluronic acid. Corticosteroids are effective for short-term relief. These findings can inform treatment selection for knee OA management.

**Keywords:** Osteoarthritis, Platelet-Rich Plasma, Hyaluronic Acid, Corticosteroids

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## INTRODUCTION

Osteoarthritis (OA) is a prevalent degenerative joint disease characterized by the progressive breakdown of cartilage, leading to pain, stiffness, and impaired function. Affecting millions worldwide, OA is a significant cause of disability, particularly in the aging population. The knee is one of the most commonly affected joints, where the wear-and-tear process results in inflammation and decreased mobility. Managing knee OA involves various treatment strategies aimed at alleviating symptoms and improving joint function [1, 2].

Among the numerous therapeutic options, intra-articular injections of Platelet-Rich Plasma (PRP), corticosteroids, and hyaluronic acid have gained considerable attention. PRP, derived from autologous blood, contains a high concentration of growth factors that promote tissue repair and regeneration. Corticosteroids, on the other hand, are potent anti-inflammatory agents that provide rapid relief from pain and swelling. Hyaluronic acid, a key component of synovial fluid, enhances lubrication and cushioning within the joint [3, 4].

This comparative study aims to evaluate the efficacy and outcomes of PRP, corticosteroid, and hyaluronic acid injections in patients with knee OA. By analyzing clinical and functional outcomes, this study seeks to identify the most effective treatment modality for managing knee OA, ultimately improving patient quality of life.

## METHODOLOGY

This retrospective study was conducted over a one-year period, involving a sample size of 40 patients diagnosed with knee osteoarthritis. The patients were selected based on predefined inclusion criteria, including clinical symptoms, radiographic evidence of OA, and previous treatment history. Medical records were reviewed to extract relevant data, ensuring that all patients had received either PRP, corticosteroid, or hyaluronic acid injections as part of their treatment regimen.

The patients were divided into three groups based on the type of intra-articular injection they received: PRP, corticosteroid, or hyaluronic acid. Group allocation was determined by reviewing the treatment records. Each patient's clinical and functional outcomes were assessed through a combination of patient-reported outcome measures and objective clinical evaluations. The primary outcome measures included pain reduction, measured using the Visual Analog Scale (VAS), and improvement in joint function, assessed by the Western Ontario and McMaster Universities Arthritis Index (WOMAC).

Data analysis was performed using statistical software to compare the efficacy of the three treatment modalities. The results were analyzed to determine the mean differences in pain relief and functional improvement across the three groups. Additionally, the study evaluated any adverse events or complications associated with each treatment. The findings were then interpreted to draw conclusions about the relative effectiveness of PRP, corticosteroid, and hyaluronic acid injections in managing knee osteoarthritis.

## RESULTS

**Table 1: Baseline Characteristics of Patients**

Characteristic	PRP Group (n=15)	Corticosteroid Group (n=13)	Hyaluronic Acid Group (n=12)
Age (years)	58.2 ± 6.4	60.1 ± 5.8	59.3 ± 6.1
Gender (Male/Female)	7/8	6/7	5/7
Body Mass Index (BMI) (kg/m <sup>2</sup> )	27.4 ± 3.5	28.1 ± 3.2	27.9 ± 3.6
Duration of Symptoms (years)	3.5 ± 1.2	3.8 ± 1.4	3.6 ± 1.3

**Table 2: Pain Reduction (VAS Score)**

Time Point	PRP Group (Mean ± SD)	Corticosteroid Group (Mean ± SD)	Hyaluronic Acid Group (Mean ± SD)
Baseline	7.8 ± 1.1	7.9 ± 1.0	7.7 ± 1.2
1 Month	4.5 ± 1.2	3.9 ± 1.3	5.0 ± 1.4
3 Months	4.0 ± 1.1	4.8 ± 1.4	4.5 ± 1.3
6 Months	3.8 ± 1.0	5.2 ± 1.5	4.2 ± 1.2
12 Months	3.5 ± 1.2	5.5 ± 1.6	4.0 ± 1.3

**Table 3: Functional Improvement (WOMAC Score)**

Time Point	PRP Group (Mean ± SD)	Corticosteroid Group (Mean ± SD)	Hyaluronic Acid Group (Mean ± SD)
Baseline	72.1 ± 8.3	73.4 ± 7.9	71.8 ± 8.5
1 Month	50.2 ± 7.5	52.8 ± 7.8	51.5 ± 8.0
3 Months	47.5 ± 6.9	54.0 ± 8.1	49.3 ± 7.7
6 Months	45.3 ± 7.0	56.2 ± 8.4	48.0 ± 7.5
12 Months	43.8 ± 7.2	57.5 ± 8.5	46.7 ± 7.6

**Table 4: Adverse Events**

Adverse Event	PRP Group (n=15)	Corticosteroid Group (n=13)	Hyaluronic Acid Group (n=12)
Local Pain at Injection Site	2	3	2
Swelling	1	2	2
Infection	0	1	0
Allergic Reaction	0	0	1

**Table 5: Overall Satisfaction**

Satisfaction Level	PRP Group (n=15)	Corticosteroid Group (n=13)	Hyaluronic Acid Group (n=12)
Highly Satisfied	10	6	8
Satisfied	3	4	3
Neutral	2	2	1
Dissatisfied	0	1	0
Highly Dissatisfied	0	0	0

**DISCUSSION**

The present study aimed to evaluate and compare the efficacy of Platelet-Rich Plasma (PRP), corticosteroid, and hyaluronic acid injections in the management of knee osteoarthritis (OA). This retrospective analysis included a sample of 40 patients, divided into three groups based on the treatment they received. The primary outcomes assessed were pain reduction using the Visual Analog Scale (VAS) and functional improvement using the Western Ontario and McMaster Universities Arthritis Index (WOMAC). Additionally, the study examined adverse events and overall patient satisfaction with each treatment modality [4, 5].

**Pain Reduction**

The results of the study indicated that all three treatments—PRP, corticosteroids, and hyaluronic acid—resulted in significant pain reduction from baseline to 12 months. However, the degree and sustainability of pain relief varied among the groups. The PRP group showed a substantial and consistent reduction in VAS scores over the 12-month period, with the mean score decreasing from 7.8 ± 1.1 at

baseline to  $3.5 \pm 1.2$  at 12 months. This suggests that PRP may offer a more sustained pain relief compared to the other treatments.

In contrast, the corticosteroid group experienced a more rapid initial reduction in pain, with the VAS score dropping from  $7.9 \pm 1.0$  at baseline to  $3.9 \pm 1.3$  at 1 month. However, this effect appeared to diminish over time, with the VAS score rising to  $5.5 \pm 1.6$  at 12 months. This aligns with existing literature that indicates corticosteroids provide effective short-term pain relief but may not be as effective in the long term due to their temporary anti-inflammatory effects.

The hyaluronic acid group exhibited moderate pain relief, with VAS scores decreasing from  $7.7 \pm 1.2$  at baseline to  $4.0 \pm 1.3$  at 12 months. Although the pain reduction was not as rapid as in the corticosteroid group, it was more sustained, similar to the PRP group. Hyaluronic acid's mechanism of action involves enhancing the lubrication and shock absorption of the joint, which may explain its steady efficacy over time [6-8].

### Functional Improvement

Functional improvement, as measured by WOMAC scores, followed a similar pattern to pain reduction. The PRP group showed significant improvements, with WOMAC scores decreasing from  $72.1 \pm 8.3$  at baseline to  $43.8 \pm 7.2$  at 12 months. This indicates that PRP not only alleviated pain but also contributed to enhanced joint function and overall quality of life for patients with knee OA.

The corticosteroid group also demonstrated initial improvements in WOMAC scores, which decreased from  $73.4 \pm 7.9$  at baseline to  $52.8 \pm 7.8$  at 1 month. However, similar to the pain reduction results, the functional improvements were less pronounced over time, with WOMAC scores increasing to  $57.5 \pm 8.5$  at 12 months. This suggests that while corticosteroids can provide quick relief, their benefits on joint function may not be as long-lasting.

Hyaluronic acid injections resulted in steady functional improvements, with WOMAC scores decreasing from  $71.8 \pm 8.5$  at baseline to  $46.7 \pm 7.6$  at 12 months. The gradual and sustained improvement in both pain and function with hyaluronic acid may be attributed to its role in restoring the viscoelastic properties of the synovial fluid, thereby improving joint mechanics and reducing symptoms.

### Adverse Events

The incidence of adverse events was relatively low across all groups. The most common adverse events were local pain at the injection site and swelling, which were transient and resolved without significant intervention. One case of infection was reported in the corticosteroid group, and one allergic reaction was noted in the hyaluronic acid group. No serious adverse events were associated with PRP injections. The overall safety profile of these treatments is consistent with previous studies, indicating that they are well-tolerated with minimal risk of complications [9].

### Overall Satisfaction

Patient satisfaction is a crucial aspect of treatment efficacy, and the results showed varying levels of satisfaction among the groups. The PRP group had the highest proportion of highly satisfied patients (10 out of 15), followed by the hyaluronic acid group (8 out of 12). The corticosteroid group had fewer highly satisfied patients (6 out of 13), which may be due to the less sustained pain relief and functional improvements observed in this group. Overall, these findings suggest that patients receiving PRP and hyaluronic acid injections are more likely to experience prolonged benefits and greater satisfaction with their treatment.

### Comparative Analysis

Comparing the three treatment modalities, PRP appears to offer the most sustained pain relief and functional improvement over a 12-month period, making it a potentially superior option for long-term management of knee OA. Hyaluronic acid also demonstrated steady efficacy, making it a viable alternative, particularly for patients who may not be suitable candidates for PRP. Corticosteroids, while effective for rapid symptom relief, may be more appropriate for short-term management or for patients

who require immediate pain relief but should be used cautiously due to their diminishing long-term benefits [8-10].

### CONCLUSION

This study provides valuable insights into the comparative efficacy of PRP, corticosteroid, and hyaluronic acid injections in managing knee OA. The findings suggest that PRP and hyaluronic acid are more effective for sustained symptom relief and functional improvement, whereas corticosteroids are better suited for short-term relief. These results can guide clinicians in selecting the most appropriate treatment based on individual patient needs and treatment goals. Further prospective studies with larger sample sizes are warranted to confirm these findings and optimize treatment protocols for knee OA.

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