



## Estimate the effectiveness of PRP therapy in intraarticular steroid failed cases of moderate osteoarthritis: in case of advanced aged patients

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### Abstract

**Background:** Osteoarthritis (OA) is one of the most distressing chronic condition which affecting people specially in elder around the world. Recently PRP has been used for the treatment of knee osteoarthritis globally. Osteoarthritis (OA) is a major reason of knee disability involving cartilage damage related to an inadequate healing response in the inflammatory process. Current non-surgical treatment modalities include physiotherapy, analgesia, non-steroidal anti-inflammatory drugs, and intra-articular injections, such as hyaluronic acid (HA), corticosteroids, or Ozone, with the purpose of reducing symptoms and improving joint function. Now a day's PRP has been used for the treatment of knee osteoarthritis worldwide.

**Objective:** Our main goal is to assess the effectiveness of PRP therapy that reduces pain and leads to a more effective and lasting functional recovery with local anesthetic in intra-articular steroid failure elderly patients.

**Method:** This cross-sectional comparative study was carried out from January 2018 to July 2018 at the Department of Transfusion Medicine, Bashundhara Ad-din medical college and hospital, South Keranigonj. During the study 50 purposive voluntary, non-remunerated altruistic patients were studied where Male was 28 and Female was 22. All patient's full history, general examination and complete knee joint examination was categorized and data of the patients were entered on the Statistical Package for Social Science (SPSS).

**Results:** This study result shows that, in advanced aged patients there was improvement of pain after two doses of Platelet Riched Plasma (PRP) where they showed no significant improvement after two doses of intra articular steroid injection earlier.

**Conclusion:** From our result, we can conclude that it was found that intra-articular injection of PRP is an effective and safe method for treatment of knee OA for elderly patients with no complication

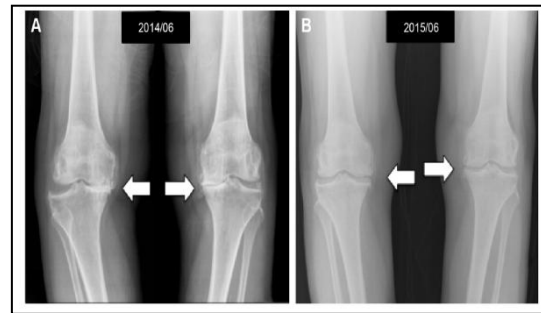
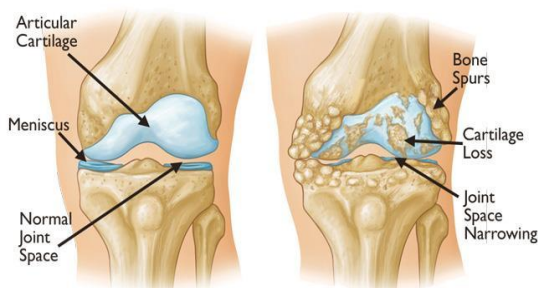
**Keywords:** Osteoarthritis, PRP therapy, Cartilage.

### Introduction

Osteoarthritis, usually known as wear-and-tear arthritis, is a condition in which the natural cushioning between joints -- cartilage -- wears away. When this occurs, the bones of the joints

rub more closely against one another with less of the shock-absorbing benefits of cartilage. Which results in pain, swelling, stiffness, decreased ability to move and, sometimes, the formation of bone spurs. Osteoarthritis, is the most common type of arthritis which mainly occur in elder

people also in young people. The chance of emerging osteoarthritis rises after age 45. According to the Arthritis Foundation, more than 27 million people in the U.S. suffer osteoarthritis, with the knee being one of the most commonly affected zones. In osteoarthritis, the cartilage in the knee joint slowly wears away. As the cartilage wears away, it develops frayed and rough, and the protective space between the bones declines. This can effect in bone rubbing on bone, and produce painful bone spurs.<sup>[1][2]</sup> Osteoarthritis matures slowly and the pain it causes worsens over time. There are 27 million Americans aged 25 years or older who mainly suffer from osteoarthritis (OA). By 2030, the request for total knee arthroplasties will increase 670%. This disorder places a staggering burden on our current economy, with billion sof dollars annually associated with pharmaceutical medications for pain relief, rehabilitation, and joint replacements. Now-a-days, there are few possibilities for patients with mild to moderate arthritis. Most of the methods are palliative and address the symptoms rather than influencing the biochemical environment of the joint or the disease procedure. At present non-surgical treatment modalities contains physiotherapy, analgesia, non-steroidal anti-inflammatory drugs, and intra-articular injections, such as hyaluronic acid (HA), corticosteroids, or Ozone, with the purpose of reducing symptoms and improving joint function. Now a days PRP has been used for the treatment of knee osteoarthritis worldwide. Platelet rich plasma, usually referred to as “PRP”, is a non-operative, permanent solution for conditions such as arthritis and ligament/tendon sprains and tears.



**Figure: 1a and 1b:** Osteoarthritis and improved condition patients after treatment of PRP<sup>[3]</sup>

Utilizing the body’s natural healing procedure, PRP therapy is a concentration of platelets that are injected into the damaged ligaments, tendons, and joints to promote tissue repair and induce healing. It transports delivery of a highly concentrated cocktail of growth factors which induce healing. Transforming growth factor present in PRP, has been related with chondrogenesis in cartilage repair<sup>[4][5]</sup> PRP presents patients with a long lasting, permanent solution that will not wear off over time as with a traditional pain injection. For this motive, the use of PRP could help patient especially elder patients to avoid joint replacement surgery, and potentially back surgery. With any treatment option, the efficiency of the treatment depends upon the severity of the injury. Creation of PRP is simple, painless, and conveniently done at an office visit. The entire process of drawing blood to solution preparation only takes about 25-30 minutes. A small amount of blood is drawn from the patient, just like a routine blood test. Once the blood is drawn it is then placed into a centrifuge. The centrifuge is a machine that spins the blood at high speeds in order to separate the blood into red blood cells and concentrated platelets. Once the blood is separated the red blood cells are cast-off, and we are left with concentrated platelet rich plasma (PRP) which is ready to be used in the treatment procedure. During the method, an initial centrifugation to separate red blood cells (RBC) is followed by a second centrifugation to concentrate platelets, which are suspended in the smallest final plasma volume. This process also called double

spin method. The benefit to PRP therapy for arthritis is that unlike other actions it has a constant outcome and is categorized as a permanent fix. The period for experiencing results is dependent upon the area of injury and the extent of the injury. On average, most patients start to see signs of development in the form of reduced pain or increased function within four to six weeks. Its inhibit inflammation and slow down the evolution of osteoarthritis also stimulate the formation of new cartilage<sup>[5]</sup>

In this study our aim is to evaluate the effectiveness of PRP therapy that reduces pain and leads to a more effective and lasting functional recovery with local anesthetic in intra-articular steroid failure elderly patients with mild to moderate osteoarthritis.

## Objective

### General Objective

- To estimate the effectiveness of PRP therapy that reduces pain and leads to a more effective and lasting functional recovery with local anesthetic in intra-articular steroid failure elderly patients.

### Specific Objective

- Determination of platelet concentration

## Methodology

### Study type

- This study was a Cross-sectional comparative study.

### Place and period of the study

- This study was conducted at the Department of Transfusion Medicine, Bashundhara Ad-din medical college and hospital, South Keranigonj, Dhaka, from January 2018 to July 2018 on 50 purposive voluntary, non-remunerated altruistic patients where male was 28 and female was 22.

### Inclusion Criteria

- Age between 20 to 89.
- History of past illness of the patients for diabetes mellitus and hypertension.

- History of intraarticular steroid injection.
- History of past illness of the patients.

## Method

During the study at the first all patient's full history, general examination and complete knee joint examination was categorized. Then patients were asked to complete the International knee documentation committee (IKDC) osteoarthritis scale in order to evaluate the function of the affected knee. Plain X-ray of the affected knee, anteroposterior and lateral views were done for grading of knee OA which was done according to the Kellgren–Lawrence grading system.

## Data analysis

Data of the patients were entered on the Statistical Package for Social Science (SPSS). Quantitative data were presented as mean and standard deviation, while the qualitative data were presented as number and percentage. Paired t-test and chi square test were used to assess differences between quantitative and qualitative data.

## Result

In this study total number of sample were 50 (Male: 28, Female: 22). This study result shows that, in advanced aged patients there was improvement of pain after two doses of Platelet riched plasma (PRP) where they showed no significant improvement after two doses of intra articular steroid injection earlier.

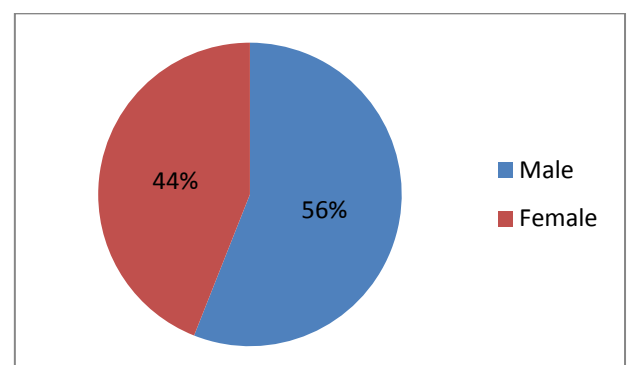


Figure 1: Sex of the Patients

**Table 1:** Analysis of the study

Variables	Frequency	Percentage (%)
<b>Age group</b>		
20-29	5	10%
50-59	7	14%
60-69	22	44%
70-79	12	24%
80-89	4	8%
<b>Diabetic</b>		
Positive	4	8%
Negative	46	92%
<b>Hypertension</b>		
Positive	14	28%
Negative	36	72%
<b>White blood cell count</b>		
(7000-9999) cmu	25	50%
(10000-12999) cmu	25	50%
<b>Intraarticular steroid injection</b>		
Positive	40	80%
Negative	10	20%

In SPSS-23, ANOVA results shows that the P value of weight of the patients, blood report of erythrocyte sedimentation rate in the patients, history of past illness of the patients for diabetes mellitus, smoking history of the patients and intraarticular steroid injection. That means they are strongly correlated and there is certain difference among the variables.

**Table 2:** ANOVA

Variables		Sum of Squares	df	Mean Square	F	Sig.
weight of the patients	Between Groups	29.696	4	7.424	17.843	.000
	Within Groups	18.724	45	.416		
	Total	48.420	49			
	Within Groups	126.885	45	2.820		
	Total	134.320	49			
Blood report of erythrocyte sedimentation rate in the patients	Between Groups	71.568	4	17.892	2.912	.032
	Within Groups	276.512	45	6.145		
	Total	348.080	49			
Blood report of white blood cell in the patients	Between Groups	20.030	4	5.008	1.428	.240
	Within Groups	157.750	45	3.506		
	Total	177.780	49			
smoking history of the patients	Between Groups	7.452	4	1.863	3.578	.013
	Within Groups	23.428	45	.521		
	Total	30.880	49			
alcohol history of the patients	Between Groups	.650	4	.162	1.086	.375
	Within Groups	6.730	45	.150		
	Total	7.380	49			
History of IAS injection of the patients	Between Groups	8.921	4	2.230	.802	.530
	Within Groups	125.159	45	2.781		
	Total	134.080	49			
History of past illness of the patients for Diabetes mellitus	Between Groups	1.023	4	.256	4.331	.005
	Within Groups	2.657	45	.059		
	Total	3.680	49			
History of past illness of the patients for hypertension	Between Groups	1.179	4	.295	1.490	.221
	Within Groups	8.901	45	.198		
	Total	10.080	49			
History of past illness of the patients for malaria	Between Groups	.222	4	.056	.495	.740
	Within Groups	5.058	45	.112		
	Total	5.280	49			
Dx of the patients	Between Groups	10.170	4	2.543	3.382	.017
	Within Groups	33.830	45	.752		
	Total	44.000	49			
History of joint swelling following injection of the patients	Between Groups	1.277	4	.319	2.137	.092
	Within Groups	6.723	45	.149		
	Total	8.000	49			

### Discussion

At present, osteoarthritis is a major public health issues which mainly causes pain and disability in one third of all affected patients. It is one of the critical musculoskeletal disorders considered by the imbalanced homeostasis and destruction of the articular cartilage, in which pro-inflammatory cytokines are significant for catabolic regulators during OA cascade. Platelet-rich plasma (PRP) is a natural concentrate of autologous growth factors from the blood which allows in a simple, low cost and minimally invasive way to obtain a concentration of many growth factors. In one article reported that the effect of 3 monthly doses of PRP in 14 patients with OA of the knee refractory to conservative treatment. Also, they observed a linear improvement of VAS and knee injury OA outcome in 60% of patients at follow-up.<sup>[6]</sup> The same results were reported by other study.<sup>[7]</sup> Another study reported that better response rates are evident in OA patients treated with PRP injections than in those treated with hyaluronic acid.<sup>[8]</sup> One study said that PRP promotes human chondrocyte proliferation; cells expanded with 30% PRP can express chondrocyte phenotype, and can serve as scaffold for autologous chondrocyte implantation that has potential availability for repair of osteoarthritis with chondral defects.<sup>[9]</sup>

### Limitation

Sample size was very small and period of study was short.

### Conclusion

After many examinations, analysis and regular follow-up we can conclude that homologous platelet riched plasma (PRP) procedure is safe, potentially efficacious and provides long-term functional benefit in pain control and improves lifestyle without any side effects in elderly steroid failure patients.

In conclusion, from the presented results it was found that intra-articular injection of PRP is an effective and safe method for treatment of knee

OA for elderly patients with no complication. Further study is needed for better outcome.

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