

# Healing and Analgesic Potential of Autologous PRP in Rotator cuff lesion

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## ABSTRACT

This is a prospective study, 67 subjects were included in the study conducted with an aim "Healing and Analgesic Potential of Autologous PRP in Rotator cuff lesion". The study included all the patient aged from 18 years to 90 years, who had shoulder pain due to overuse activity and pain on visual analog scale >5 (VAS), who were diagnosed rotator cuff tear on Ultrasonography, failure of conservative treatment. On the contrary patient were excluded who came with other causes of shoulder pain, who were diagnosed with fracture, any systemic disease of rheumatology like arthritis, were diagnosed with cervical radiculopathy, pregnant females, who had systemic disease like diabetes mellitus and blood disorder, who loss to follow up, pervious history of steroid injection.

All 67 patients were subjected to PRP therapy in the OPD in sterile condition and a regular follow were done at 6,12,18,24 weeks, which was also assessed by ASES Shoulder score. In our study we found that the ASES score mean  $\pm$  SD was  $34.7 \pm 7.2$  before injection and  $94.7 \pm 1.87$  after 24 weeks which came out to be statically significant (p value < 0.0001).

At last we can conclude that autologous PRP therapy is good, effective, less invasive, inexpensive, simple technique for the treatment of shoulder tendinopathy. With prolong treatment of PRP and regular follow up, pain and be reduced, functional activity is improved.

**Keywords:** Healing, Analgesic, Autologous, PRP, Rotator cuff lesion.

**Study Design:** Prospective Study.

## 1. INTRODUCTION

The shoulder complex is one of the most mobile joints in the human body allowing a great freedom of motion to the upper limb. However, enhanced mobility comes at the cost of making joint stabilizer's susceptible to injury in extremes of motion. Unfortunately chronic shoulder pain and weakness is a common cause of a visit to physician's office with its prevalence being as high as 15.4% in men and 24.9% in women with a significant rise in pain and severity in population over 50years. Rotator cuff tendinopathies are believed to be the most common cause of shoulder pain syndromes with one cross-sectional study reporting that 86% of all clinical diagnoses of shoulder pain were that of rotator cuff lesions.<sup>2</sup> Sub acromial impingement syndrome (SAIS) is a spectrum of pathologies of the sub acromial space including partial rotator cuff tears (RCT), calcific tendinitis, supraspinatus tendinosis and

bursitis. It is estimated from cross sectional studies that it affects over 50% of population over 60 years of age.(3) Rotator cuff tendinopathy is caused by overuse, among the causes of shoulder pain rotator cuff injuries i.e. partial and full thickness tear is most common cause of shoulder pain counter in day to day life.

Musculoskeletal ultrasound (MSUS) is a diagnostic tool that can be used to detect and confirm partial or full-thickness rotator cuff tear [4]. The best treatment of shoulder tendinopathies is surgical repair but at a cost of shoulder stiffness, infection at surgical site and injuries to the adjoining structures. But now a days autologous blood derived Platelet rich plasma is giving good promising results in shoulder tendinopathies as it not only decrease the pain at the site but also improves and fasten the healing process of tendon tears.

## 2. MATERIAL AND METHODS:

This is a prospective study, 67 subjects were included in the study who came to out-patient department of Orthopedics from January 2020 to December 2020. Informed written consent was obtained from every subject.

The study included all the patient aged from 18 years to 90 years, who had shoulder pain due to overuse activity and pain on visual analog scale >5 (VAS) ,who were diagnosed rotator cuff tear on Ultrasonography, failure of conservative treatment On the contrary patient were excluded who came with other causes of shoulder pain, who were diagnosed with fracture, any systemic disease of rheumatology like arthritis, were diagnosed with cervical radiculopathy, pregnant females, who had systemic disease like diabetes mellitus and blood disorder, who loss to follow up, pervious history of steroid injection.

The study was conducted after obtaining consent, patient were analyzed with Visual Analogue Scale (VAS). Pain and disability of shoulder were also assessed by validated questionnaires on different time frame of 6weeks,12 weeks,18 weeks 24 weeks, questionnaires comprised of components of American Shoulder and Elbow Surgeons (ASES) which had maximum score of 100 made of pain and function components 100 being fully normal shoulder without pain and 0 is for painful and non-functional shoulder. Musculoskeletal ultrasound (MSUS) assessment of shoulder. It was performed using a high-frequency (0–12 MHZ) linear transducer (LOGIQ 500 pro series, GE Medical Systems, USA). The examination started while the patient was setting for proper visualization of the shoulder.The transverse and longitudinal scans were applied to the shoulder for assessment of rotator cuff tendons.(5)

### PRP technique (6)

PRP was prepared using a platelet concentration system (centerion 2006 England). Initially, the patient's blood was collected under aseptic precautions. Vein puncture was done for collection of 45 ml, then mixed with 6 ml citrate in a special-designed disposable tubes (falcon tubes) for double centrifugation; first, for 15 min at 1600 rpm to separate RBCs from the plasma, and second, the plasma was separated and centrifuged for 10 min at 3200 rpm to separate platelet-rich plasma from platelet-poor plasma, and 6 ml of PRP was obtained. One milliliter of PRP was collected for blood counting to establish the platelet concentration (at least double the serum concentration), and the remaining 5 ml without any buffering or activating agent was injected under complete aseptic condition and under US guidance into the partial tear of the tendon or around it. After injection, patients were instructed to rest fromoverhead activity and rotatory movements of the shoulder for 2 days after the injection.(6)

### 3. RESULTS:

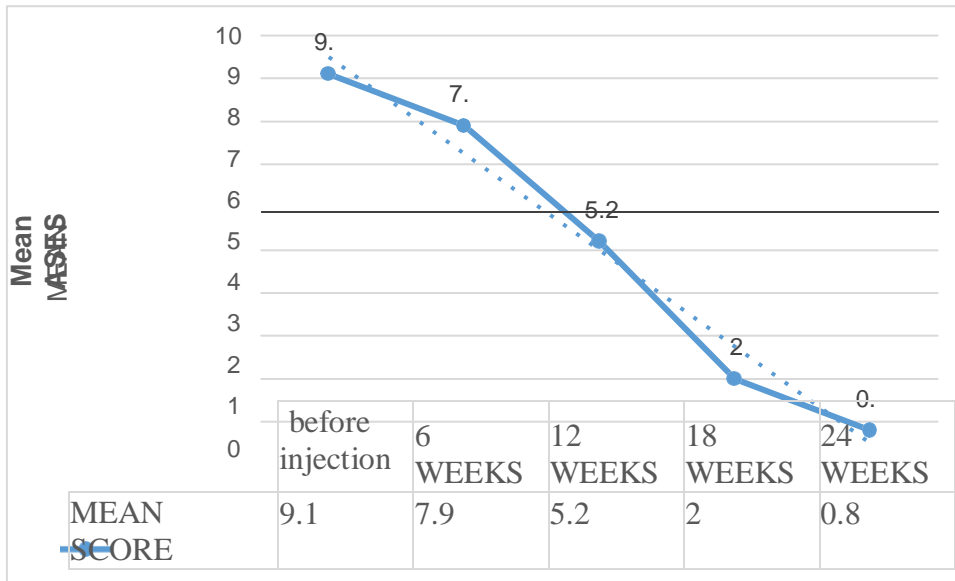
In our study we included total of 67 subjects who were in our inclusion criteria and was diagnosed as shoulder tendinopathy clinically (sign and symptoms) and radiological. Our study subject ranges from 18 years to 88 years with a total of 58.2% (39) males and 41.7% (28) females, with maximum subjects are coming in the age group of 28-37 years i.e. 23.8% (16) followed by 38-47 years i.e.22.3% (15) and least in the age group of 78-88 years i.e. 1.49% (01) Below is the data shown in tabulated and graphic form:

Age	Female	Male	TOTAL
18-27	2	7	9
28-37	8	8	16
38-47	5	10	15
48-57	5	9	14
58-67	4	3	7
68-77	3	2	5
78-88	1	0	1
TOTAL	28	39	67

All 67 subjects were subjected to PRP therapy in the OPD in sterile condition and a regular follow were done at 6,12,18,24 weeks, analysis was done primary by Visual Analogue Scale. In our study we found that the VAS pain score mean  $\pm$  SD was  $9.1 \pm 0.7$  before injection and  $0.8 \pm 0.7$  after 24 weeks which came out to be statically significant (p value < 0.0001).

Below is the table and graphic representation showing descending trend of pain after the initiation of pain therapy.

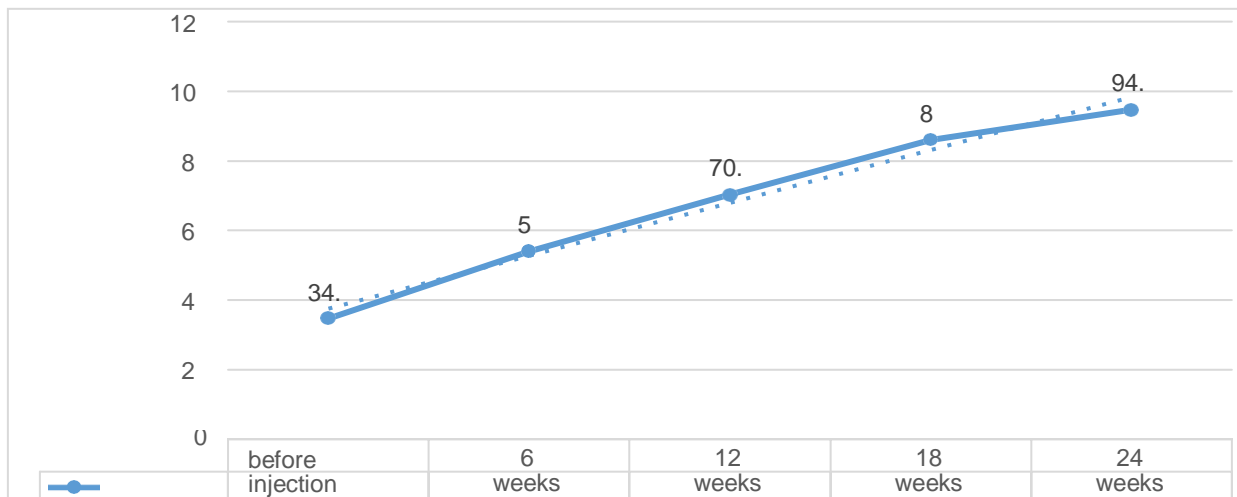
VAS FOLLOW UP WEEKS					
Follow up	before injection	6 WEEKS	12 WEEKS	18 WEEKS	24 WEEKS
MEAN SCORE	9.1	7.9	5.2	2	0.8



All 67 patients were subjected to PRP therapy in the OPD in sterile condition and a regular follow were done at 6,12,18,24 weeks, which was also assessed by ASES Shoulder score. In our study we found that the ASES score mean  $\pm$  SD was  $34.7 \pm 7.2$  before injection and  $94.7 \pm 1.87$  after 24 weeks which came out to be statically significant (p value < 0.0001).

Below is the table and graphic representation showing increasing trend of reliving of symptoms after the therapy.

ASES Follow up weeks					
Follow up	before injection	6 weeks	12 weeks	18 weeks	24 weeks
Mean Score	34.7	54	70.3	86	94.7



**4. DISCUSSION:**

Commonest cause of shoulder pain is due to shoulder tendonopathy which is similar to Mitchell C et.al 2005.(7), Factor D et.al 2014(8). Our study also states that partial and full thickness tear is the most common cause of shoulder pain which is similar to Sher JS et.al(1995),Miniaci A et.al (2002), Milgrom C et al(1995)(9,10,11). The study included all

the patient aged from 18 years to 90 years, which is accordance to Cai et. al., 2019(12) who took study population from 18 years to 55 years, Kim SJ et.al 2019(13) where study population aged more than 18 years. This study included VAS score which is similar to Prodromos CC 2021(14), Nermin Hassan El et.al 2020(6) and ASES score similar to Kim SJ et.al 2019(13). The PRP injection was first described by a research group in Spain for maxillofacial and plastic surgery in 1999 [15]. Recent studies have assessed the biologic enhancement of the healing process and PRP is able to produce growth factors, collagen, and probably an increase in the number of stem cells, which consequently enhance healing by delivering high concentrations of alpha-granules containing biologically active moieties such as transforming growth factor- $\beta$  and vascular endothelial growth factor to the areas of soft tissue damage [16–18]. PRP has been shown to be effective and safe. It can be applied either as a non-operative method of treatment or intra-operative [19]. Our study focused on the efficacy of PRP injection in reduction of pain and improvement of functionality of the patient so, we found that VAS pain score decreased from  $9.1 \pm 0.7$  to  $0.8 \pm 0.7$  which was highly statistically significant and was similar to Nermin Hassan El et.al 2020(6). This study also focused on ASES score, the analysis of ASES score before-injection and after injection were highly significant as the mean  $\pm$  SD increased from  $34.7 \pm 7.2$  to  $94.7 \pm 1.8$  similar to Lee et.al 2019(20).

Comparison between VAS score and ASES score before injection and after injection				
	Mean $\pm$ SD		Difference(Mean)	p value
	before Injection	After Injection		
VAS Score	$9.1 \pm 0.7$	$0.8 \pm 0.7$	8.3	< 0.0001

ASES Score	$34.7 \pm 7.2$	$94.7 \pm 1.8$	60	< 0.0001
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## 5. CONCLUSION

At last we can conclude that autologous PRP therapy is good, effective, less invasive, inexpensive, simple technique for the treatment of shoulder tendinopathy. With prolong treatment of PRP and regular follow up, pain and be reduced, functional activity is improved.

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