

# A prospective study of role of platelet rich plasma in tendinopathy

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**Abstract Background:** Tendinopathy is a major medical problem. It can be defined as a syndrome of tendon pain, localized tenderness, and swelling that impairs performance. In chronic tendinopathy there is an increasing degree of degeneration with little or no inflammation present. The application of PRP has been documented in many fields. First promoted by M. Ferrari in 1987 as an autologous transfusion component after an open heart operation to avoid homologous blood product transfusion, there are now over 5200 entries in the NCBI for PRP ranging in fields from orthopaedics, sports medicine, dentistry, otolaryngology, neurosurgery, ophthalmology, urology, wound healing, cosmetic, cardiothoracic and maxillofacial surgery. **Materials and Methods:** This was a prospective interventional study undertaken in the Department of Orthopaedics, Santhiram Medical College and General Hospital, Nandyal. Patients with chronic tendinopathy like supraspinatus tendinopathy, patellar tendinopathy, tendo A chilles tendinopathy, planter fasciitis, medial epicondylar tendinopathy, lateral epicondylar tendinopathy came to Santhiram Medical College and General Hospital, Nandyal included in the study after obtaining their informed consent. Diagnostic criteria being pain and tenderness at respective joints, more on movements, X-rays showing sclerosis at greater tuberosity in shoulder, calcaneal spur. In few cases sonography of local part done which showed changes of tendinosis. This study was undertaken from January 2019 to December 2019. The patients with no improvement with medical treatment for last 3 months with or without physiotherapy included in the study. A detailed history was obtained for evaluating the mode of trauma, visual analogue score, chronicity, physiotherapy etc. Detail clinical examination and investigations including complete blood count were carried out before giving injection. **Results:** The mean age of study group was 38 years for the male. The mean age of study group was 40 years for the female. So it's a low standard deviation which means there was no significant difference between the age of males and females. Fifty percent of males and females belong to 31-40 years, 70% of males and females belong to 31-50 years. The chronic tendinopathy was more common in form of tennis elbow and plantar fasciitis. 66% of patients are having plantar fasciitis and tennis elbow. Golfer's elbow was more common in males than females. In these study, patellar tendinopathy was not seen in females. **Conclusion:** PRP may be used as a new therapeutic option for chronic tendinopathies. Its ease of preparation, relatively low cost and minimal invasiveness are arguments in its favour. This suggests that platelet rich plasma injection takes time to act and this will result in gradual decrease in symptoms. One should consider this treatment before going to surgical treatment for chronic tendinopathies. One of the limitations was that the study was carried out with 6 months of follow up, long term results and follow up would have been ideal.

**Key Words:** Tendinopathy, PRP, otolaryngology, neurosurgery, ophthalmology.

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Tendinopathy is a major medical problem. It can be defined as a syndrome of tendon pain, localized tenderness, and swelling that impairs performance. In chronic tendinopathy there is an increasing degree of degeneration with little or no inflammation present. The application of PRP has been documented in many fields. First promoted by M. Ferrari in 1987 as an autologous transfusion component after an open heart operation to avoid homologous blood product transfusion, there are now over 5200 entries in the NCBI for PRP ranging in fields from orthopaedics, sports medicine, dentistry,

otolaryngology, neurosurgery, ophthalmology, urology, wound healing, cosmetic, cardiothoracic and maxillofacial surgery. The initial popularity of PRP grew from its promise as a safe and natural alternative to surgery. PRP advocates promoted the procedure as an organically based therapy that enabled healing through the use of one's own natural growth factors. In recent years, scientific research and technology has provided a new perspective on platelets. Studies suggest that platelets contain an abundance of growth factors and cytokines that can affect inflammation, postoperative blood loss, infection, osteogenesis, wound, muscle tear and soft tissue healing. Research now shows that platelets also release many bioactive proteins responsible for attracting macrophages, mesenchymal stem cells and osteoblasts that not only promote removal of degenerated and necrotic tissue, but also enhance tissue regeneration and healing. Jumper's knee also known as patellar tendonitis characterized by inflammation of patellar tendon. It is seen in athletes participating in sports like high jump, basketball, ice hockey, volleyball, rad cycling, soccer, wrestling. It is seen more in males compare to females and symptoms are often serious resulting in long standing impairment of athletic performance. Different sports specific loading characteristics of the knee extensor apparatus, a younger age and higher body weight seem to be risk factors.

## MATERIALS AND METHODS

This was a prospective interventional study undertaken in the Department of Orthopaedics, Santhiram Medical College and General Hospital, Nandyal. Patients with chronic tendinopathy like supraspinatus tendinopathy, patellar tendinopathy, tendo A chilles tendinopathy, planter fasciitis, medial epicondylar tendinopathy, lateral epicondylar tendinopathy came to Santhiram Medical College and General Hospital, Nandyal included in the study after obtaining their informed consent. Diagnostic criteria being pain and tenderness at respective joints, more on movements, X-rays showing sclerosis at greater tuberosity in shoulder, calcaneal spur. In few cases sonography of local part done which showed changes of tendinosis. This study was undertaken from January 2019 to December 2019. The patients with no improvement with medical treatment for last 3 months with or without physiotherapy included in the study. A detailed history was obtained for evaluating the mode of trauma, visual analogue score, chronicity, physiotherapy etc. Detail clinical examination and investigations including complete blood count were carried out before giving injection. Platelet count of blood was checked with that of PRP before giving the injection. Patients who were fitting into the inclusion criteria and gave consent were enrolled and it came to fifty during the time period of this study from

January 2019 to December 2019. Sample size though not very big but thought to be reasonable hence total 50 patients were included. The inclusion and exclusion criteria were as follows. Depending on the table shown above, the result is prepared. If Visual Analogue Scale is less than 20 then the result is excellent; if VAS is between 20 to 49 then the result is good; if VAS is between 50 -69 then the result is fair and if VAS is greater than 70 then the result is poor.

### Inclusion Criteria

Patient with symptoms typical to lateral epicondylar tendinopathy, medial epicondylar tendinopathy, supraspinatus tendinopathy, tendo Achilles tendinopathy, plantar fasciitis and patellar tendinopathy, treated with diclofenac 100 mg twice a day or Ibuprofen 400 mg thrice a day or tramadol 100 mg twice a day and physiotherapy for more than 3 months but not improved.

### Exclusion Criteria

1. Any skin pathology at local site.
2. Symptoms of < 3 months duration.
3. Patients who have taken chronic anti-platelet therapy for conditions like stroke, myocardial infarction etc.
4. Patients having muscular dystrophy.
5. Patients having more than one chronic tendinopathy.

After getting informed consent platelet rich plasma was prepared from patient's own blood. For which blood drawn and it processed by centrifugation. All procedure done under strict aseptic conditions. PRP hence prepared was injected within 30 minutes of preparation. After giving injection patient was advised to take rest for 3 weeks. Patients were instructed to apply ice for pain and to avoid using NSAID. Physiotherapy was started after 3 weeks of injection as this was causing pain for first 3 weeks. Patients are advised to join their duty after 3 weeks of injection. All the patients were followed up in OPD at 3 weeks, 6 weeks, 3 months and 6 months. At every follow up, range of motion, visual analogue scale and functional activity score recorded. When the patient has started his / her duty, was recorded. Check for development of any complications.

## RESULTS

The mean age of study group was 38 years for the male. The mean age of study group was 40 years for the female. So it's a low standard deviation which means there was no significant difference between the age of males and females. Fifty percent of males and females belong to 31-40 years, 70% of males and females belong to 31-50 years. The chronic tendinopathy was more common in form of tennis elbow and plantar fasciitis. 66% of patients are having plantar fasciitis and tennis elbow. Golfer's elbow was more common in males than females. In these study,

patellar tendinopathy was not seen in females. The follow up shows that most of the patients do not get relief within 3 weeks after injection. The mean of males who got relief within 3 weeks is 0.2 with standard deviation of 0.4. The mean of females who got relief within 3 weeks is 0 with standard deviation of 0. Only 1 patient of planter fasciitis got relief from pain at 3 weeks. Pain relief was considered when visual analogue scale of the patient decreased to at least 50% from pre injection visual analogue scale.

Follow up shows that 16 patients got relief within 6 weeks after injection. Patients with planter fasciitis, tennis elbow, golfer’s elbow and patellar tendinopathy seem to get pain relief earlier as compared to patients with supraspinatus and tendo A chille stendinopathy. At 12 weeks 37 patients out of 50 get pain relief is considered when visual analogue scale of the patient decreased to at least 50 % from pre injection visual analogue score. Result shows that 46 patients out of 50 get relief within 6 months after injection.

**Table 1: Result as per Visual Analogue Scale**

S.No	Range of Visual Analogue Scale	Result
1	<20	Excellent
2	20-49	Good
3	50-69	Fair
4	>70	Poor

**Table 2: Distribution of Patients as per VAS**

VAS	Pre Injection	At 3 weeks	At 6 weeks	At 12 weeks	At 6 months
≥ 70	46	40	10	4	2
50-69	3	7	26	9	3
20-49	1	3	14	28	7
<20	0	0	0	9	38
<b>Total</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>

**Table 3: Distribution of patients as per FAS**

FAS	Pre injection	At 3 weeks	At 6 weeks	At 12 weeks	At 6 months
2	46	43	18	6	2
1	4	7	31	38	16
0	0	0	1	6	32
<b>Total</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>

**Table 4: Quality of PRP Compared with Results**

Quality of PRP [Increase in Concentration Compared to the Baseline Platelet Count]	No of patients	Result
<3.5	15	Excellent-4 Good-06 Fair-03 Poor-02
3.5 – 5.5	30	Excellent-28 Good-02 Fair-00 Poor-00
>5.5	05	Excellent-05 Good-00 Fair-00 Poor-00

**DISCUSSION**

The primary aim of the current study was to determine whether PRP injection would improve clinical parameters i.e., pain and function. Secondary aim included identifying prognostic factors. This study suggests that 82% of female were having significant pain relief as compared to males which is 94%. This study also suggests that if the platelet

count in platelet rich plasma injection is more than 3.5 times to baseline than chance of good result increased. By releasing different platelet growth factors, PRP may be used as a new therapeutic option for chronic tendinopathies. Its ease of preparation, relatively low cost, and minimal invasiveness are arguments in its favour. Furthermore, PRP is not associated with any side effects.

The findings of this study show that platelet rich plasma injection at the tendon is effective mode of treatment for patients with chronic tendinopathies. In this study, mean age of patients having chronic tendinopathy is 38 years in male and 40 years in female. This study shows that 32% of patients were having improvement in pain and function at 6 weeks of injection and 74% patients having improvement in pain and function at 12 weeks of injection. 92% of patients were having significant pain relief at 6 months. This suggest that platelet rich plasma injection takes time to act and this will result in gradual decrease in symptoms. This study also suggest that plantar fasciitis and tennis elbow are more common than other tendinopathies. In this study 32% patients were having plantar fasciitis and 34% patients having tennis elbow. This study suggests that 74% of patients having excellent result in terms of pain and function and 16% patients having good result in terms of pain and function. Only 4% of patients having poor result. Platelet rich plasma is very effective in treatment of chronic tendinopathies.

## CONCLUSION

PRP may be used as a new therapeutic option for chronic tendinopathies. Its ease of preparation, relatively low cost and minimal invasiveness are arguments in its favour. This suggests that platelet rich plasma injection takes time to act and this will result in gradual decrease in symptoms. One should consider this treatment before going to surgical treatment for chronic tendinopathies. One of the limitations was that the study was carried out with 6 months of follow up, long term results and follow up would have been ideal. PRP with good platelet concentration is associated with enhancement of healing due to its bioactive factors. These are transforming growth factor-beta, platelet derived growth factor. Insulin like growth factor 1 and 2, fibroblast growth factor, vascular growth factor, and endothelial cell growth factor.<sup>3</sup>The findings of this study show that platelet rich plasma injection under ultrasound

guidance at the tendon is effective mode of treating patients with chronic tendinopathies. This suggests that PRP injection takes time to act and this will result in gradual decrease in symptoms. PRP is very effective in treatment of chronic tendinopathies. So, one should consider this treatment before going to surgical treatment for chronic tendinopathies.

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