Prevalence of Patellar Tendinitis in Dominant Lower Limb in Professional Football Players in Kolhapur City

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***Abstract*— Background: Patellar tendinitis is a common consequence of a patellar fracture. Jumper's Knee, or patellar tendinitis, is an overuse condition brought on by overuse or repetitive motion. Prevalence of PT in soccer players is 13.4%. PT commonly occurs in running and jumping sports such as basketball and volleyball.**

Materials and Methods: Ninety participants (age- 21.2 ±1.66) 78 male and 12 female football players with anterior knee pain were included. They were first assessed for leg dominance with kick test. Later clinical examination of the participants was done using Passive flexion-extension tension sign and standing active quadriceps sign for diagnosis of PT. The VISA-P questionnaire was given out to participants in order to determine the intensity of PT symptoms (54.23 ±4.01).

Results: In the study it was found that the prevalence of patellar tendinitis in football players was 52% (47 participants) and remaining 48% (43 participants) were found negative for patellar tendinitis. Out of 47 participants 61% (29 Participants) were found positive for PT and were having pain in dominant extremity, 21% (10 Participants) were having pain in non-dominant extremity and 17% (8 participants) were having pain bilaterally. When compared to non-dominant extremities, the dominant extremity had a significantly greater prevalence of patellar tendinitis.

Conclusion: There is higher prevalence of patellar tendinitis in dominant extremity than in non-dominant extremity. Lower limb dominance plays a crucial role in football players as it has a greater impact on sports performance of the player and hence it is necessary to focus more on the strengthening of dominant extremity to prevent any condition.

Key Word: Anterior knee pain, Dominant leg, Football players, Patellar Tendinitis

I. INTRODUCTION

Jumper's knee, commonly known as patellar tendinitis, is a degenerative disorder. PT diagnoses are frequently made using the patient's clinical examination results, palpable pain, and symptoms. In a general adult population, PT had an incidence of 1.6 per 1000 person-years and lower extremity tendinopathies a prevalence rate of 10.5 per 1000 person-years.[1] Active people (ages 14 to 40) frequently suffer from this difficult condition, particularly those who participate in high-intensity activities like basketball, volleyball, and running. [1,2] PT is the most common complication of patellar fracture. It is an overuse injury, which is caused mainly due to sudden high intensity activity and prolonged period of exercise which puts repetitive stress on patellar tendon. It also affects the performance of athlete, regular training and competitions of athletes. Intense situations cause acute or chronic inflammatory response of injury of patellar tendon. Tendon strain during movement may also be caused by compression and stress shielding. [2,3] The frequency of patella tendinopathy rises extrinsically as the external environment changes, most typically due to increased training loads in sports involving jumping. All athletes and patients experience the same external stimuli, however not all athletes experience patella tendinopathy. The prognosis is not good if patella tendinopathy is present. [2,4] Within a year of receiving supervised treatments, only 46% of athletes were able to resume their sporting activities after fully recovering. Athletes who play on hard courts and synthetic turf run a higher risk of injury. Additionally, it has been observed that 58% of PT patients had difficulty engaging in physically demanding jobs. Although the etiology and pathophysiology of PT have numerous risk factors, a clear cause-and-effect relationship remains unclear. There were found to be six groups of possible risk factors or variables related to patellar tendinopathy: Muscle length and joint range of motion, athletics and physical activity, functional test results, muscle performance, and job demands [5,6] According to reports, almost one-third of patients who had physical therapy were unable to resume their athletic endeavour within six months of their injuries. Management of PT involves the utilization of multiple therapy modalities. These include includes rest, altering one's lifestyle, anti-inflammatory drugs, injectable therapies, taping, doing intense exercises, applying shock waves outside the body, applying

percutaneous electrolysis, and performing surgery. PT patients have access to a variety of treatment choices, but no one approach has been shown to consistently provide a full recovery in individuals.[7] The two main clinical characteristics of physical therapy (PT) are pain and discomfort that intensifies with knee extension, particularly during activities that involve the patellar tendon's storage and release of energy. The Royal London Hospital test revealed higher specificity and poorer sensitivity than manual palpation in patients with PT symptoms. Tenderness in the focal points is the most common physical examination finding. Patients who appear with the above stated clinical symptoms may undergo diagnostic ultrasonography imaging of the patellar tendon to confirm the diagnosis of PT. The gold standard test for determining the counterparts of a patellar tendon anomaly is ultrasound imaging.[1,8,3] Athletes in good health as well as those with injuries frequently talk about leg dominance. Leg dominance in healthy persons does not appear to affect knee function. Additionally, the onset of knee injuries appears to be influenced by leg dominance. Several previous studies have concluded that leg dominance plays a crucial role in causing lower injuries especially ACL injuries. However, there isn't much research on how leg dominance affects football players who have patellar tendinitis. Football players tend to use their dominant leg for skillful play so there are chances of overuse injury. Despite football being most popular sport in world, no study has been done to rule out the effect of limb dominance on knee conditions. Therefore, more studies exploring the prevalence of patellar tendinitis in dominant lower extremity are needed and hence this study is been done for the same.

II. PROCEDURE

The study was conducted at D.Y Patil Medical college, hospital and research institute, Kolhapur for period of 6 months. It was a cross-sectional study. 90 patients were fulfilling the inclusion and exclusion criteria were included in the study.

Inclusion Criteria: Participants belonging to 18-25 years age group having Anterior knee pain for 3-6 months (Subacute), who were football players for more than 5 years and playing for more than 3 hours.

Exclusion Criteria: Participants having history of Patellar Fracture, knee ligament injury, recent knee and lower limb surgeries.

Methodology: The study was started after getting approval from the Institutional ethical committee and Protocol committee of D Y Patil Educational Society. Written consent was taken from the participants. Participants were assessed for dominant lower limb by kick test. Kick test was performed by using a football. The subject was asked to kick the football at a target four meters away. The extremity used for kicking the ball was the dominant extremity of the subject. Participants were then assessed for tenderness using two special tests.

Passive flexion-extension tension sign

Participants were positioned in supine with one leg extended and one knee flexed. Palpation of the anterior aspect and inferior pole of patella is done to find out the point of maximal tenderness when knee is fully extended and knee in 90^0 of flexion. Interpretation- marked reduction in the tenderness with change in position of the knee.

Standing active quadriceps sign

In this test participants were positioned in standing with on leg extended and other leg flexed at 30^0. The patellar tendon is palpated and the point of maximal tenderness is identified in weight bearing full extension and then the patient is asked to flex the knee to 30^0 and tendon is re-palpated. Interpretation- marked reduction in the tenderness with change in position of the knee.

Data collection sheets were recorded including personal details such as age, gender, address, occupation and sports history such as no. of playing years, no. of playing hours, recent knee surgery.

NPRS was used to assess the severity of pain of Patellar Tendinitis. The participants were explained about the scale rating and was asked to mark between 0-10 based on the level of pain participant is experiencing. According to the scale 0 -no pain, 1-3 mild, 4-6 moderate and 7-10 severe.

VISA-P Victorian Institute of Sport Assessment-Patella score questionnaire is used to assess the severity of symptoms in patellar tendinitis. It contains 8 questions and the maximum score for this is 100 and minimum is 0 for asymptomatic person. The participants are expected to fill the complete questionnaire to rule out the severity of Patellar Tendinitis. The interpretation of the study will be done based on Victorian Institute of Sport Assessment- Patella score questionnaire, Passive flexion-extension tension sign, Standing active quadriceps sign and kick test. Statistical analysis was done and results were obtained.

III. STATSITICAL ANALYSIS

In our study we have calculated prevalence of patellar tendinitis in dominant lower limb in professional football players through MS Excel 16 Software.
The variables age, no. of playing hours and no. of playing years are represented in the form of table of mean and SD. Prevalence of PT in professional football players is represented in the form of table and pie chart. Prevalence of PT in dominant and non-dominant extremity in professional football players is represented in the form of table and pie chart. Mean and SD of Outcome measures: NPRS and VISA-P are represented in the form of table.

IV. RESULT

A total 90 participants, 78 male and 12 female football players complaining of anterior knee pain were selected for study from various football clubs in and around Kolhapur. Age of the participants was between 18 to 25 years with mean age 21.32 (±1.71) years as shown in Table no.1. Participants with history of patellar fracture, knee ligament injury, recent lower limb surgery and any lower limb fracture were excluded.

Participants having anterior knee pain for 3-6 months, playing for more than 5 years and for more than 3 hours were included. Mean for no. of playing hours was recorded 7.05 ± 2.99 and for no. of playing years was recorded 7.95 ± 2.57 as shown in Table no.1.

In our study we found that the prevalence of patellar tendinitis in football players was 52% (47 participants) and remaining 48% (43 participants) were found negative for patellar tendinitis as shown in Tab no. 2 and pie chart no.1.

Out of 47 participants who were found positive for patellar tendinitis 61% (29 Participants) were having pain in dominant extremity, 21% (10 Participants) were having pain in non-dominant extremity and 17% (8 participants) were having pain bilaterally as shown in Table no.3 and fig no.2. The prevalence of patellar tendinitis was much higher in dominant extremity than in non- dominant extremity.

The mean and SD of outcome measure: NPRS and VISA-P score for professional football players with patellar tendinitis was recorded 2.82 (±0.7) and 54.23 (±4.01) as shown in table no.4.

IV. DISCUSSION

Patellar tendinitis is a common complication of patellar fracture. Jumper's Knee i.e. patellar tendinitis is a condition caused by overuse of the knee in running or jumping sports [2]. Several studies suggested the cause of patellar tendinitis to be vascular, mechanical, pathological but most common was the chronic repetitive tendon overload. Patellar tendinitis is characterised by anterior knee pain or pain at the inferior pole of patella. The pain is insidious in onset and is often related to increases patellar tendon loading activity [9]. According to Gerrit Bode and Thorsten Hammer the prevalence of patellar tendinitis was 13.4% in soccer players.[8]

For different sports the prevalence of PT varies between 14.4% and 2.5% in non-elite athletes. Whereas prevalence of PT in adult elite soccer players differ from 7 to 23% [8]. Almost one-third of the players diagnosed with patellar tendinitis are unable to return to sports for more than 6 months [10]. 53% of the athletes with PT led to retirement [11].

In a previous study it was concluded that prevalence of PT was relatively high in young elite players and the risk was twice in the 15 to 17 age group compared to other age groups [8] . In our study there was no correlation with age and the mean age of the football players was 21.2 ±1.66.

Players with PT displayed symptoms such as localized pain, pain at stretching and neovascularization [8]. There is a poor blood supply to tendons compared to muscles. The proximal and distal attachments of patellar tendons are commonly associated with degeneration due to areas of reduces vascularity. There is a tensile failure of collagen fibres within patellar tendon due to overloading of quadriceps muscle [9].

There is a high number of stretch-shortening cycles in the patellar tendon in jumping sports because of repetitive movement. An acute or chronic increase in load on patellar tendon beyond tolerance leads to the onset of symptoms. Hence, PT is a tendon degenerative pathological condition that is caused due to overuse of underlying structures [10].

In above study football players of different age, gender, level of sport and limb dominance are investigated for patellar tendinitis and are analyzed and quantified. Our study diagnosed patellar tendinitis with a variable combination for parameters such as questionnaire, special tests and pain rating scale.

Similar to the hand dominance, leg dominance also plays a crucial role in doing skillful activities. Several studies show that lower limb dominance can be causative factor in sports. In a study by Nicky van Melick, Bart M. Meddele four tasks were performed bilaterally and unilaterally to rule out leg dominance. Out of all the four task, kick test was having 100% agreement which is also used in our study to find the leg dominance in football players [12]. In our study all the participants were asked to perform the same test to assess the lower limb dominance which also showed 100% result. Our study concluded that 8 participants were positive for bilateral patellar tendinitis. The remaining 39 participants with patellar tendinitis were reported with unilateral knee pain.

Previous studies also suggest several methods to examine and diagnose patellar tendinitis. Victorian Institute of Sport Assessment Patella (VISA-P) Questionnaire for Patellar Tendinopathy is used to measure the severity of symptoms in patellar tendinitis. This questionnaire is used in several previous studies to assess the symptom severity of patellar tendinitis along with different diagnostic criteria. This is a self-administered questionnaire which assesses the severity of symptoms and functional limitations of patients. There are 8 items present in VISA-P out of which 6 uses Visual Analogue Scale of 0-10. The 7th question has four different scorings i.e. 0,4,7,10 and the last question involves 3 different sub questions based on pain and ability of training out of which only one question is supposed to be answered. The maximum scoring is 100 and minimum is 0[11]. According to a previous study this tool has a reliability of r=0.87[3]. In above study we used VISA-P to note the severity of patellar tendinitis. In this study out of total 90 participants the score for 55% (50 participants) was recorded below 60 and for 45% (40 participants) was recorded above 60. The VISA-P score was 4.01± 54.23 for football players with patellar tendinitis.

The clinical diagnosis of patellar tendinitis is based on palpation for tenderness at the anterior knee or inferior pole of patella in different positions. According to Ehud Rath, Ran Schwarzkopf and John C Richmond two clinical signs are used to assess patellar tendinitis. The passive flexion-extension tension signs and standing active quadriceps sign are the clinical signs for diagnosis of patellar tendinitis. To confirm the diagnosis of patellar tendinitis there should be marked reduction of tenderness on palpation when the knee is flexed and extended. In this study there was significant reduction in pain on VAS with flexion and contraction of quadriceps (P<0.0001) [13]. Diagnosis of patellar tendinitis in our study was done based on these two tests and the result was similar to the previous study. Our study used the same test and showed significant reduction in tenderness with flexion and quadriceps contraction on NPRS.

The aim of the study was to determine the prevalence of patellar tendinitis in dominant extremity among football players. The dominance of lower limb was assessed by kick test as given by Nicky van Melick and Bart M. Meddeler.[12] and patellar tendinitis was diagnosed by Passive Flexion- Extension tension sign, Standing active Quadriceps Sign. Victorian Institute of Sport Assessment- Patella Sign was used to assess the severity of symptoms as given by Ken Erbvin Sosa and Paul Daniel Ravarra [11]. The intensity of pain was recorded with the help of Numeric pain rating scale. The average NPRS score recorded for participants was 0.70± 2.82.

Thus, the prevalence of patellar tendinitis in football players was 52%. Among which 18% were bilateral and 82% were unilateral. The prevalence of patellar tendinitis was higher in dominant extremity than in non-dominant extremity. There was no correlation recorded between age, number of playing years and number of playing hours.

A. Figures and Tables

	Mean	SD
Age	21.2	±1.66
No. of playing hours	7.05	±2.99
No. of playing years	7.95	±2.57

SD: standard deviation

Table. 1 Mean and SD of Age, No. of playing hours and No. of playing hours of participants with patellar tendinitis.

Patellar Tendinitis	No. of Participants	Percentage
Positive	47 Participants	52.23%
Negative	43 Participants	47.77%
Total	90 Participants	100%

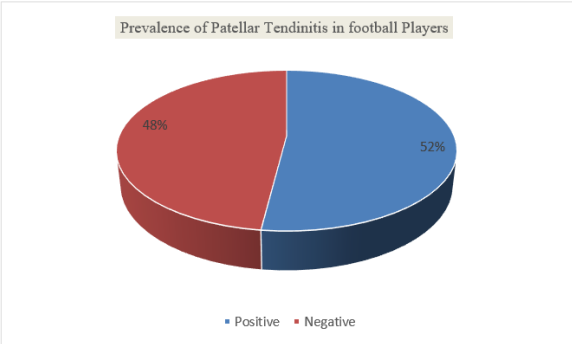
Table. 2 Prevalence of Patellar Tendinitis in professional football players.

Pain in	No. of participants	Percentage
Dominant Extremity	29	61%
Non-Dominant Extremity	10	21%
Bilaterally	8	17%

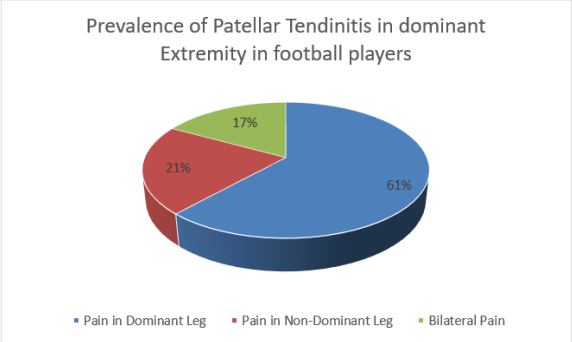
Table. 3 Prevalence of Patellar Tendinitis in dominant and non-dominant extremity in professional football players.

Outcome Measure	Mean	Standard Deviation
NPRS	2.82	±0.7
VISA-P	54.23	±4.01

Table. 4 Mean and standard deviation of outcome measure: NPRS and VISA-P for participants with PT.



PIE CHART 1. Prevalence of Patellar Tendinitis in professional football players.



PIE CHART 2. Prevalence of Patellar Tendinitis in dominant and non-dominant extremity football players.

B. Abbreviations and Acronyms

Fig.	Figure
PT	Patellar Tendinitis
NPRS	Numeric Pain Rating Scale
VISA-P	Victorian Institute of Sport Assessment - Patella score flow
SD	Standard Deviation
No.	Number

VII. CONCLUSION

This study conducted among football players of age between 18 to 25 years in and around Kolhapur region reveals, that there is higher prevalence of patellar tendinitis in dominant extremity than in non-dominant extremity. Lower limb dominance plays a crucial role in football players as it has a greater impact on sports performance of the player and hence it is necessary to focus more on the strengthening of dominant extremity to prevent any condition.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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