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Ankita H Nangare
Final Year Student, Faculty of
Physiotherapy, KIMS, Deemed
To Be University, Karad,
Maharashtra, India

Corresponding Author:
Ankita H Nangare
Final Year Student, Faculty of
Physiotherapy, KIMS, Deemed
To Be University, Karad,
Maharashtra, India

Study of Tendo-Achilles injury in sub-elite hand ball players

Ankita H Nangare

Abstract

Background and Objectives: Handball is a sport that makes heavy demands on the players. The physical work is intermittent, involving high-intensity activity interspersed with short rest pauses. The game involves abrupt jerking movements and staccato footwork. In handball game players need to be able to move in all directions and change directions and change directions quickly, smoothly and efficiently. Sudden starts and stops wear out the body, and demand a lot of strength and motor skills for acceleration, deceleration and then immediate acceleration. Tendo-Achilles injury is common in sports that involve lots of jumping and quick changes in direction. This study was done to find the prevalence of Tendo-Achilles injury in the sub-elite handball players.

Methods: The study group consisted of 90 sub-elite Handball players, 50 Females and 40 Males, both aged between 18-25 years who are playing Handball for 5 or more than 5 years. VISA-A questionnaire was used as the outcome tool to measure the severity of pain and injury in the Achilles region. Each subject was given the questionnaire and according to the score they were further evaluated.

Conclusion: The results show that 56% of players had no pain during sports, 42% of players had mild pain and injury during sports, 2% of players had moderate pain and injury during sports and 0% of players had severe pain and injury during sports. A significant relation was found in between Achilles-tendon injury and sub-elite Handball players with p value of <0.0001.

Keywords: Handball, injury, players, pain, sub-elite, Tendo-Achilles region

Introduction

Tendo-Achilles is large and thickest tendon. About 15cm long. The calf muscles unite into one band of tissue which becomes the Tendo-Achilles at the low end of the calf. It begins near the middle of the leg. It is narrow and thick in the middle and expanded at both end and it is connected to the most posterior surface of calcaneum. The tendon plays an important role in plantar flexion of foot and gives the ability to push off during jumping walking, and running [1].

Blood supply to the Tendo-Achilles is by the branches of the peroneal and posterior tibial arteries [2].

Handball is a sport that makes heavy demands on the players. The physical work is intermittent, involving high-intensity activity interspersed with short rest pauses. The game involves abrupt jerking movements and staccato footwork. Players need to be able to move in all directions and change directions and change directions quickly, smoothly and efficiently. Tendo-Achilles injury is common in sports that involve lots of jumping and quick changes in direction [3].

The mechanism of Tendo-Achilles rupture can occur following: A "Push" off the foot against the ground or hard surface and a simultaneous knee extension. In hand ball, it often happens during the sprints when the weight of the body lies on the forefoot and the sural triceps contracts energetically, putting the tendon in tension, which, consequently, undergoes a passive stretching due to the concomitant knee extension during fast running and during throwing activity. In the game of handball, this type of injury, generated by an indirect trauma, occurs during a forward body falling while the foot is fixed to the ground. A forced foot dorsiflexion, this type of trauma is typical of hand ball in the touchdown after jumping; it may lead to injury. The lesion or injuries are usually located about 3-6 cm from the calcaneal insertion, that is, where the tendon is thin and less vascularised [4].

Risk Factors for this injury: A sudden increase in the intensity, frequency and duration of activity or sport, a decrease in recovery time between activities, wearing inadequate or incorrect footwear, excessive pronation, running on hard or uneven surfaces, poor muscle flexibility, tight calf muscles or weak calf muscles decreased joint range of motion.

Signs and Symptoms: Mild to severe pain and tenderness in the Tendo-Achilles area, Swelling, Stiffness that may diminish as the tendon warms up with use, a feeling of sluggishness in the leg [5].

Tendo-Achilles injury results from repetitive stress to the tendon. This often happens when we push our bodies to do too much but other factors may also be responsible such as sudden increase in the amount or intensity of exercise activity or sport. The primary factors resulting in damage of achilles tendon are training errors such as sudden increase in activity, a sudden increase in training intensity resuming training after a long period of inactivity.

The occurrence of Tendo-Achilles injuries in players increases with age. Not all the Tendo-Achilles injuries in handball players are total or partial ruptures. There are other injuries most often associated with pain. Thus, the problem of painful conditions in the Tendo-Achilles region in handball players seems relatively widespread, but little is known about the type and severity of such injuries. The purpose of this investigation was to describe the prevalence of Tendo-Achilles injury in sub-elite handball players.

Materials and Methodology

An observational study was conducted for the duration of 6 months in karad. Total 90 sub-elite handball players were selected by convenient sampling method and as per inclusion and exclusion criteria for the study. Inclusion criteria was both male and female players in between Age group of 18-25 years, players playing from 5 or more than 5 years and exclusion criteria was Any recent ankle joint fracture in past 3 month, Any recent trauma to lower limb in past 3 month, Any previous injury to Tendo-Achilles, Playing any other sport, except handball. Written informed consent was taken and whole study was explained to them. Subjects were assessed using VISA-A Questionnaire. The interpretation of the study was done by comparing the individual scores.

Discussion

The purpose of this study was to find the prevalence of Tendo-Achilles injury in sub-elite handball players. Many studies have been conducted on ankle sprain, knee joint ligament injuries in handball players but very few studies are conducted on Tendo-Achilles region injuries which might also occur in these players.

A study was carried out to see Painful conditions in the Tendo-Achilles region in elite handball players by Martin Fahlström, the purpose of this study was to investigate the prevalence and characteristic of painful conditions in the Tendo-Achilles region in elite handball players.

Our study included 90 subjects (50 Females and 40 Males), 56% Females and 44% Males. However, the training intensities and hours were equal for both.

Our study did not focus on laxity but more on pain and injury which could a probable cause of difference.

This study had 51% players (age 18-20 years) and 49% players (age 21- 25 years). When association between age and injury was observed by unpaired-t test, the outcome was not statistically significant ($p=0.1583$). A study by K. Høy MD,

used Abbreviated Injury Scale (AIS), according to which all the severe injuries (56%) were found in the oldest age group (>25 years), $p=0.0001$. Probable reason for the difference could be that our study only focused on younger age group (18-25 years)

Our study showed 42% players with mild injury and pain and 2% players with moderate injury and pain and the results observed were statistically significant ($p<0.0001$).

Our study has seen 5 players (1.05%) playing since 5 years had injury, 16 players (51.61%) playing since 6 years had injury, 14 players (46.67%) playing since 7 years had injury, 5 players (62.5%) playing since 8 years had injury. The observed results were not statistically significant ($p=0.198$). Probable reason could be, with increasing years of advance training the tendon get adapted and so chances of injury decreases. In our study the players played on different court surfaces with many different kinds of shoes and so probably after playing for many years they have suffered injury.

Limitations of this study: Small sample size and the age group were very specific and so the results cannot be extrapolated to other age groups.

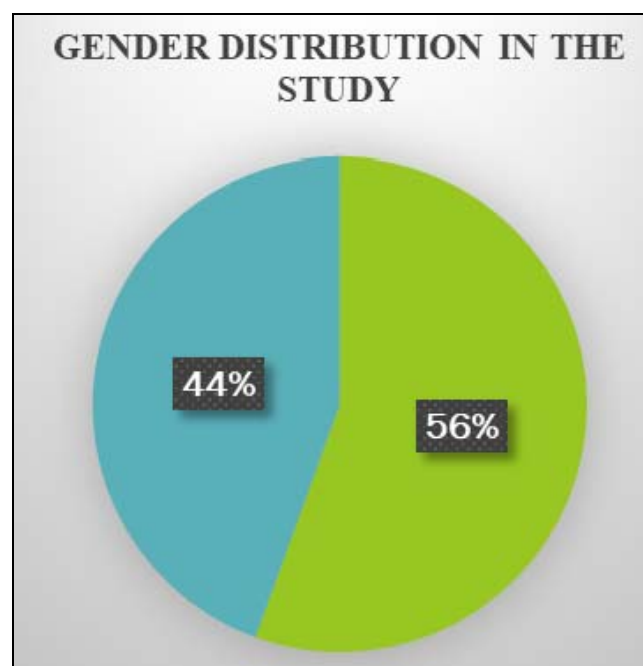
Result

In this study 90 participants (40 males and 50 females) were taken. In this age group of 18 – 25 years were included in this study. Less than or equal to 20 there were $N = 44$, (mean 96.82) (S.D. = 3.6), ($P= 0.1583$) ($T= 1.423$) and more than 20 there were $N= 46$, (mean 97.98) (S.D. =3.2) ($P= 0.1583$) ($T=1.423$). This group consisted of players who played for 5 or more than 5 years. There were no players with severe injury and pain during sports, 2 players with moderate injury and pain, 38 players with mild injury and pain and 50 players were asymptomatic. There was a significant relation between tendo-achilles injury and handball players, p value < 0.0001.

Gender Distribution

Table 1: Gender wise distribution

Gender	Total
Female	50 players (56%)
Male	40 players (44%)



Graph 1: Gender wise distribution

Interpretation

The graph shows 56% of females and 44% of Males participated in the study.

Table 2: Association between Gender and Injury

Gender N = 90 (100%)	Injury		Unpaired T-Test	P - Value
	Mean	Standard Deviation		
50 Females (56%)	96.82	3.5	1.626	0.1075
40 Males (44%)	97.98	3.2	1.626	0.1075

Interpretation

The above table revealed that there was no significant

association between gender and injury.

Age Distribution**Table 3:** Age wise distribution

Age Group	Total Number Of Players
18-20 years	46 players (51%)
21-25 years	44 players (49%)

Interpretation

The Table shows 51% of the population are aged between 18-20 years and 49% of population are age 21-25 year.

Table 4: Association between Age and Injury

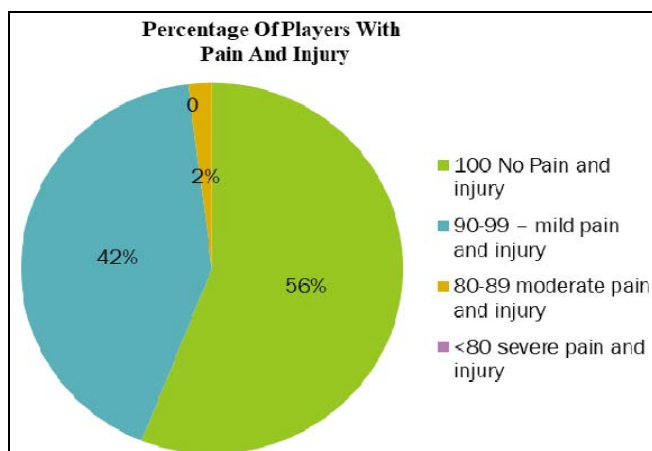
Age Group	Injury		Unpaired T-Test	P -Value
	Mean	Standard Deviation		
18-20 Years (51%)	96.82	3.6	1.423	0.1583
21-25 Years (49%)	97.98	3.2	1.423	0.1583

Interpretation

The above table revealed that there was no significant association between age and injury amongst the players

Percentage of Tendo-Achilles Pain and Injury**Table 3:** Percentage of players with Tendo-Achilles injury

Score	Pain and Injury In Tendo-Achilles	Number of Players	Percentage of Players with Tendo-Achilles Pain and Injury
100	No Pain and injury Asymptomatic	50	56%
90-99	– mild pain and injury during sports	38	42%
80-89	moderate pain and injury during sports	2	2%
< 80	severe pain and injury during sports	0	0%

**Graph 3:** Distribution of pain and injury.

Interpretation: The above graph shows that 56% of players had no pain during sports, 42% of players had mild pain and injury during the sports, 2% of players had moderate pain and injury during sports and 0% of players had severe pain and injury during sports.

Table 4: Prevalence of Tendo-Achilles Injury in Sub-Elite Handball Players.

Total Number of Players	Injury		One Sample T-Test	P -Value
	Mean	Standard Deviation		
90 Players	97.33	3.37	273.29	<0.0001

Interpretation

The above table revealed that there was a significant relation between players and Tendo-Achilles injury.

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