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Pranali Kakade
Intern, Krishna College of
Physiotherapy, Krishna Institute
of Medical Sciences "Deemed To
Be University" Karad,
Maharashtra, India

Corresponding Author:
Pranali Kakade
Intern, Krishna college of
Physiotherapy, Krishna Institute
of Medical Sciences "Deemed To
Be University" Karad,
Maharashtra, India

The study of flat foot and inferior heel pain in sub elite basketball players

Pranali Kakade

Abstract

Background: The aim of this study was to find the relation between flatfoot and inferior heel pain in sub elite basketball players. The arches of foot supports the body weight and absorbs ground reaction force during physical activities or sports. Many studies have been done on BMI and flat foot, ankle injuries, knee injuries and etc in basketball players but there is lack of research on relation between flatfoot and inferior heel pain which can also occur in basketball players.

Methods: This was an observational study. Total 80 players were taken, 40 players with flatfoot and 40 players with normal foot arches with age group of 18-25. This candidates were assessed for flatfoot and VISA-A questionnaire was asked, answers were recorded and data was analysed.

Result: The 80% of basketball players with flatfoot has inferior heel pain while the 37.5% of basketball players with normal foot arch has inferior heel.

Conclusion: On the basis of result it can be concluded that basketball players having flatfoot and less experience in playing are more prone to get inferior heel pain.

Keywords: Flatfoot, inferior heel pain, plantar fasciitis, basketball players

Introduction

Inferior heel pain is mostly caused by plantar fasciitis. It is due to factors such as foot pronation, sudden gain in body weight, increase running distance or intensity, sudden changes in directions, change in walking or running surface and tightness of Achilles tendon ^[1].

Plantar fasciitis is characterised by localized pain that is increased by continues weight bearing and also due to chronic micro trauma. Mechanical overloading and excessive strain within the fascia are fundamentals of development of plantar fascia ^[2] The plantar fascia origins from medial calcaneal tuberosity and it fans out to be inserted into plantar surface of metatarsophalangeal joints and it has an important function in maintaining the medial longitudinal arch of foot ^[1].

Flatfoot is characterised by flattening of arches of foot. Bones forming medial longitudinal arch are: talus, calcaneum, navicular, three cuneiforms and 1st, 2nd, 3rd metatarsals. The main bone is talus. Bones forming lateral longitudinal arch are: calcaneum, cuboid and 4th, 5th metatarsal. The main bone is cuboid. Arches are supported by intrinsic and extrinsic muscles of the sole with the plantar ligaments, aponeurosis and shape of the bones. The ligaments which mainly takes part are spring ligament, interosseous ligament, long plantar ligament and short plantar ligament. In pes planus, the spring ligament and muscle tendons are stretched out so that the individual losses the function of medial longitudinal arch of foot during weight bearing, due to the displacement of the head of talus bone medially and distally from the navicular bone ^[3]. In obese the cause for flat foot may be the presence of plantar fatty pad under the medial longitudinal arch and also the excessive and continuous loading of foot by body weight ^[4]

In basketball players the inferior heel pain is seen mostly due to their jumping mechanism, ground reaction forces, muscle tightness and structure of foot. The degree of risk depends on the skill level, activity at the time of injury, playing surface and the use of protective equipment ^[5].

Material and Methodology

This was an observational study of flatfoot and inferior heel pain in sub elite basketball players. The study was done in duration of 6 month. Individual were approach and those fulfilling the inclusive criteria were selected. The purpose was explained and written inform consent was taken prepared in accordance with the Helsinki Declaration from those who are willingly to participate. Total 80 players were taken. 40 players with flatfoot and 40 players with normal foot arches. The inclusive criteria was both male and female players with age between 18-25 years, playing basketball since 1-4 years, sub elite players. Exclusive criteria was any other injury or fracture to lower limb, more than 5 years of experience in basketball. Individuals were assessed for flatfoot and VISA-A Questionnaire were asked. The answers were recorded and interpretation was done.

Statistical Analysis

Statistical analysis of the recorded data was done by using the software SPSS version 20

Result

The 80% of basketball players with flatfoot has inferior heel pain while the 37.5% of basketball players with normal foot arch has inferior heel pain. The inferior heel pain is more commonly seen in players who are playing basketball for 1- 2 years than those who are playing for more than 4 years as they

know the proper techniques and stretches to be followed.

Table 1: Players with Flatfoot Having Inferior Heel Pain

Total number of players	Yes	No
40	32 (80%)	8 (20%)

Interpretation: Among the 40 basketball players with flatfoot, 32 players has inferior heel pain while 8 players don't have any inferior heel pain.

Table 2: Players with Normal Foot Arch Having Inferior Heel Pain

Total number of players	Yes	No
40	15 (37.5%)	25 (62.5)

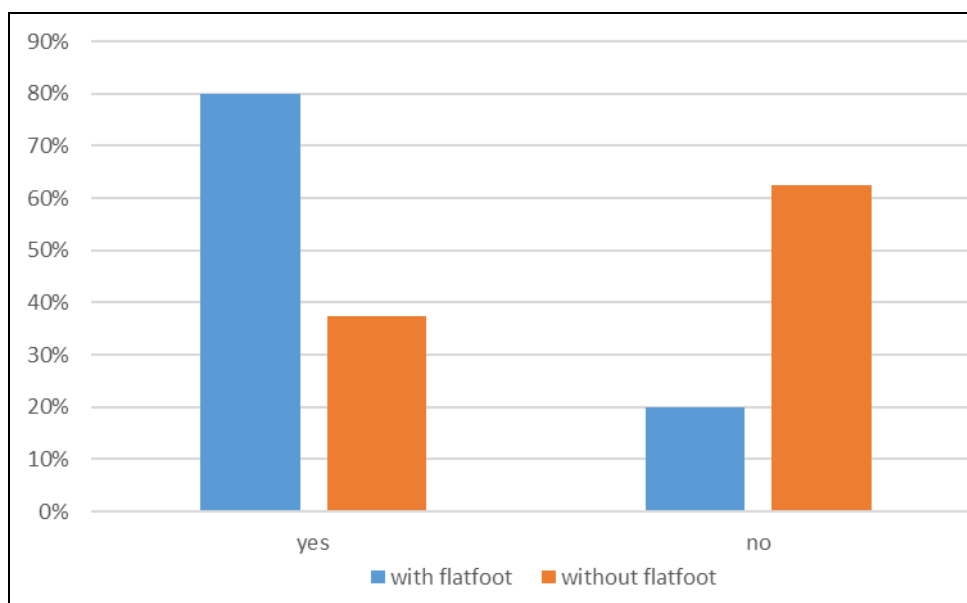
Interpretation: Among the 40 basketball players with normal foot arch, 15 players has inferior heel pain while 25 players don't have inferior heel pain.

Table 3: Age Wise Distribution

Age Group	Total Number of Players
18-20 years	46 players (57.5%)
21-25 years	34 players (42.5%)

Interpretation

The Table shows 57.5% of the population are aged between 18-20 years and 42.5% of population are age 21-25 year.



Graph 1: Inferior Heel Pain in Players With and Without Flatfoot

Interpretation: This graph shows the comparison of inferior heel pain in players with and without flatfoot. The players with flatfoot has more prevalence of inferior heel pain then without flatfoot players.

Discussion

The purpose of this study was to find the relationship between flat foot and inferior heel pain in sub elite basketball players. Many studies have been done on BMI and flat foot, ankle injuries, knee injuries and etc in basketball players but there is lack of research on relation between flatfoot and inferior heel pain which can also occur in basketball players. The arches of foot supports the body weight and absorbs ground reaction force during physical activities or sports [6]. In

case of flatfoot, the subtalar joint remains pronated and mid trasal joint is not locked, when abnormal weight bearing condition persists, the foot cannot support the rapid propulsion. As foot remains pronated causes prolong tibial rotation which causes tightness of plantar fascia [1, 7]. In flatfoot deformity the stress on the origin of plantar fascia increases, as the windlass mechanism will be under increased strain in maintaining a stable arch during the propulsive phase. There may be an excessive strain on the heel area because the foot lacks the ability to evert to absorb the shock and adapt itself to the ground [9].

In jumping mechanism as the players land on their toes the foot dorsiflexes and the plantar fascia stretches causes micro trauma and inflammation of plantar fascia. As plantar fascia

extends distal to the metatarsal head, tension increases in the fascia causing micro tear that lead to plantar fasciitis ^[1]. In basketball players there is a lot of torque being put on the foot, more than average person which makes it more difficult to maintain arch of foot and indeed increases pressure in plantar fascia. Also the stopping and starting burst aspect of basketball players influences plantar fasciitis ^[5] The rest, stretches, NSAIDS and proper shoes with mid foot soles can be use to treat plantar fasciitis.

This study had 57.5% players (age 18-20 years) and 42.5% players (age 21- 25 years). When association between age and injury was observed by unpaired-t test, the outcome was not statistically significant. (p= 0.122). Our study had 18 (45%) players with flatfoot and 15 (37.5%) players without flatfoot playing since 1-2 years and 22 (55%) players with flatfoot and 24 (60%) players without flatfoot playing since 3-5 years. We found that the players having more experience has less pain then new players having less experience this may be due to lack of warm-up, stretches or jumping techniques in new players or may be due to adaptation of tendon to injury in experienced players.

In study done by Ana Maria Gaca also showed that the plantar fasciitis is seen in young athelets involved in jumping, hill running or speed work ^[5]

In study done by Yu-Chi Huang, *et al.* showed a significant relationship between flexible flatfoot individuals and plantar fasciitis. They took 23 candidates with flatfoot and 23 candidates with normal foot and used a statheli plantar arch index for diagnosis of flatfoot and ultrasonography for plantar fasciitis to diagnose. Our study supports this article ^[1].

Indeed, the study done by Werner Nachbauer and Benno M. Nigg showed that the impact of forces did not differ for different arch height. They took 34 candidates and were divided in three arch height and three arch flattening groups, and single factor analyses of variance were conducted and compared. Our study do not support this article. For this further research is required ^[9].

Conclusion

On the basis of result it can be concluded that basketball players having flatfoot and less experience in playing are more prone to get inferior heel pain due to their foot structure, jumping mechanism, torque and sudden start and stop actions while playing.

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