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Sports injuries among young basketball players: A retrospective study

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Abstract
Objective: To analyse the sports injuries in young basketball players and the characteristics associated with that injuries.
Study Design: Non experimental design.
Subjects: A retrospective survey, applying inclusion and exclusion criteria, 150 young basketball players who have got injured are conveniently selected. Among them 109 players got injured. Basketball players were interviewed using the Reported Condition Inquiry Questionnaire**.**
Results: A total of 167 of the interviewees reported injuries. Statistical analysis was done by calculating percentage.
Conclusion: The female gender was at greater risk of injury than the male gender. Ankle (38.5%) and knee (34.9%) were the most affected anatomic sites. The injury mechanisms were predominantly direct contact (72.5%) and non-contact (50%) in both sexes and the injury occurred during training (77.1) and the physiotherapy treatment taken by the players are very less.

Keywords: basket ball, reported condition inquiry questionnaire, injuries, retrospective

Introduction

Basketball is one of the most popular sports in the United States and throughout the world. It is a sport played by two teams of five players on a rectangular court. The objective is to shoot a ball through a hoop 18 inches (46 cm) in diameter and 10 feet (3.048 m) high mounted to a backboard at each end. It was first introduced to the world in 1891 by Dr. James Naismith, using a soccer ball and two peach baskets. Today's high-speed, physical sport scarcely resembles the original game with modern basketball's fast pace game having many opportunities for injuries. It is estimated that more than 1.6 million injuries are associated with basketball each year. Its participation in childhood and adolescence offers a number of benefits, such as increased physical fitness and motor coordination, self-discipline, control of body composition and enhanced muscle strength [1].

Basketball injuries are generally defined as either acute/traumatic or overuse injuries. Acute or traumatic injuries occur due to a sudden force, or impact, such as a fall or a stumble. Overuse injuries occur over time due to stress on the muscles, joints and soft tissues without proper time for healing. They begin as a small, nagging ache or pain, and can grow into a nasty debilitating injury if they aren't treated early. Both types of injuries may result from overuse, lack of proper rest, lack of proper warm ups or poor conditioning. However, the regular participation among young players, added to the specific risks of the sport factors can increase the chances of suffering an injury mainly due to the immaturity of the musculoskeletal system during the period of structural and motor development [2].

Types of injuries most common in basketball are

Ankle Sprains
Jammed Fingers
Knee Injuries
Deep Thigh Bruising
Facial Cuts
Foot Fractures [3]

Overuseinjuries

Injuries caused by stressing an area over and over until it is damaged and begins to hurt are described as overuse injuries. One such injury is patellar tendinitis, or "JUMPER'S KNEE," which is characterized by pain in the tendon just below the kneecap [4].

Achilles Tendinitis is another common overuse injury in basketball players. This injury of the tendon connecting the muscles in the back of the calf to the heel bone causes pain in the back of the leg just above the heel. Occasionally, the Achilles tendon can tear. Some basketball players overuse the tendons in their shoulders.

Rotator Cuff Injury: The rotator cuff of the shoulder is composed of four muscles. The tendons that attach these muscles to the shoulder bones can become inflamed and painful, particularly when doing repetitive overhead activities, such as shooting the basketball.

Traumatic Injury

Traumatic injuries are those caused by a sudden forceful injury. Some of the more common traumatic injuries in basketball are Jammed Fingers. The severity of a jammed finger can range from a minor injury of the ligaments, which connect bones, to a broken finger. Another type of traumatic injury is a muscle pull or tear. In basketball players, these injuries occur primarily in the large muscles of the legs.

Ankle Sprain

The most common basketball injury is the Ankle Sprain. This

injury often occurs when a player lands on another player's foot or the ankle rolls too far outward. When this happens, the ligaments connecting bones and supporting the ankle are stretched and torn. The ligaments can tear partially or completely [4].

Knee Injuries

Knee injuries are some of the most serious basketball injuries. One type of knee injury is a sprain. A knee sprain is a small tear in the ligaments or joint capsule that is not severe enough to cause the knee to give way [5].

If the knee is twisted, meniscus will tear (Meniscal Tear). Meniscus is a tissue that acts as a cushion between the femur and the tibia.

A more severe injury is a complete tear of one or more of the ligaments that support the knee. The Anterior Cruciate Ligament (ACL) is one of the more commonly torn ligaments in the knee. This ligament connects the femur and tibia and helps hold the knee in place [6]. If the ACL is damaged, the knee will probably hurt and give way persistently.

From a sports medicine perspective, the prevention of sports injuries is important, as an injury occurring at a young age can have short and long-term effects on both physical and mental health [7]. Thus, an early sports injury can hamper physical activity for the rest of one's life and might also influence attitudes towards sports and physical activity. As a result, it is necessary to conduct prevention research to protect children and adolescents against the potential negative consequences of sports. The need for the study is to find out the prevalence of the sports injury among young basketball players in chennai and to create awareness about the physiotherapy treatment for young basketball players.

The aim of the study is to analyse about the characteristics associated with sports injuries among young basketball players of both gender.

Methodology

Non-experimental, Retrospective type of study, Male and Female players aged 13-18 years who have been injured in previous 12 months, who have been participating basketball for past two years were included in this study. Institution ethical clearance certificate was obtained.150 players those who met the inclusion criteria were conveniently selected from SRM University, Kattankulathur. Raghavendra club, T-Nagar, Schools in Chennai- 1.GRT Matriculation Higher secondary school, Ashok nagar.2.Govt Girls Higher secondary school, Ashok nagar.3.AVM, Virugambakkam.4.St.Peters, Rayapuram.5.Lady sivaswamy, Mylapore.

For this study, written consent were obtained from 150 young Basketball players were selected and detailed explanation about the study was given and the Reported Condition Inquiry Questionnaire was administered to the participants. Among these 150 Basketball players those who had been injured in previous 12 months were identified.

For this, each subject was provided with a Reported Condition Inquiry Questionnaire by which the data about the injury and physiotherapy treatment for the soft tissue injury, if taken by them was collected.

Anatomic site was defined as the location of the pain or musculoskeletal discomfort was marked by the players on the human body chart.

From this, the commonest anatomic site of injury,the mechanism of the injury, the moment of the injury, the physiotherapy treatment taken and outcome was obtained

Table 1: Anatomical site of injury and its percentage

S. No	Anatomic site	Frequency	Percentage %
1	Shoulder	5	4.6
2	Arm	3	2.8
3	Elbow	13	11.9
4	Forearm	3	2.8
5	Wrist	15	13.8
6	Hand	14	12.8
7	Anterior Thigh	3	2.8
8	Posterior Thigh	1	0.9
9	Knee	38	34.9
10	Leg	14	12.8
11	Calf	7	6.4
12	Ankle	42	38.5
13	Foot	12	11.0
14	Thorax	1	0.9
15	Abdomen	0	0
16	Head	0	0
17	Cervical Spine	2	1.8
18	Lumbar Spine	2	1.8
19	Pelvic Girdle	0	0
20	Others	9	0.3

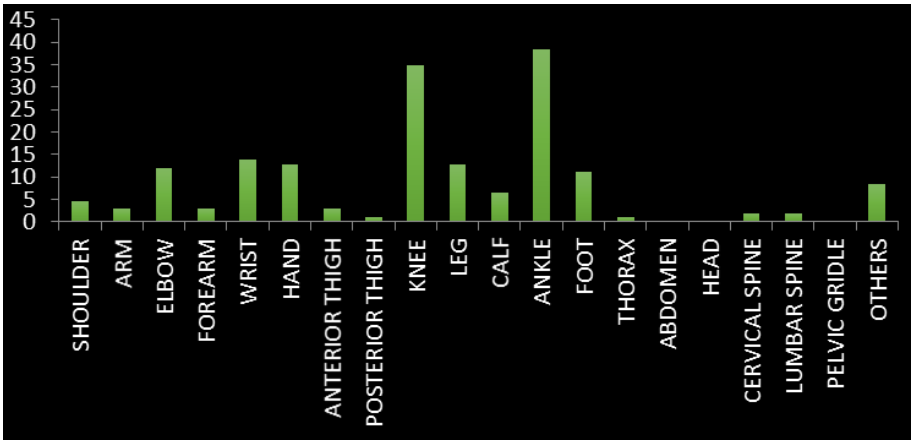

Fig 1: Anatomical site of injury and its percentage

Table 2: Injury mechanism and its percentage.

S. No	Injury mechanism	Frequency	%
1	Direct Contact	79	72.5
2	Contactless	55	50
3	Overuse	19	17.4

This table 2 shows the percentage of commonest mechanism of injury. Direct contact (72.5%), contactless (50%) and overuse (17.4%)

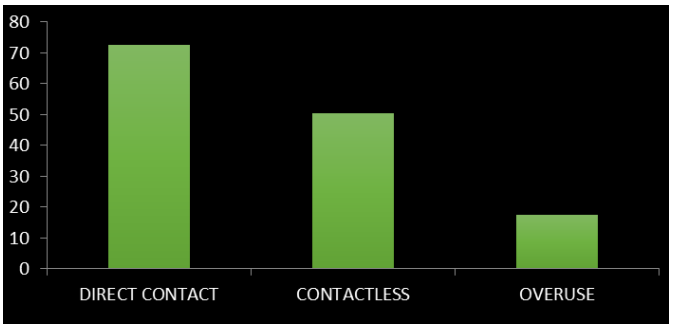

Fig 2: Injury Mechanism and Its Percentage.

Table 3: Period of Injury and Its Percentage

S. No	Period of Injury	Frequency	%
1	Training	84	77.1
2	Competition	53	48.6

This table shows the percentage of period or moment of injury.

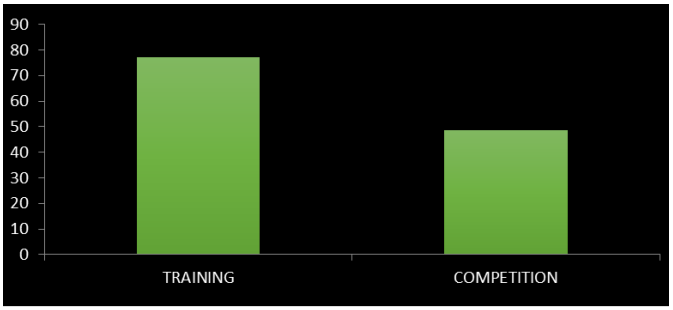

Fig 3: Period of Injury and Its Percentage

Table 4: physiotherapy treatment taken by the players and the outcome of the treatment.

S. No	Treatment	Frequency	%
1	Taken	15	13.8
2	Better Outcome	15	13.8
3	No Improvement	1	.9

This graph shows the percentage of Physiotherapy treatment taken by the players and its outcome. The treatment taken by the players are 13.8%, very low.

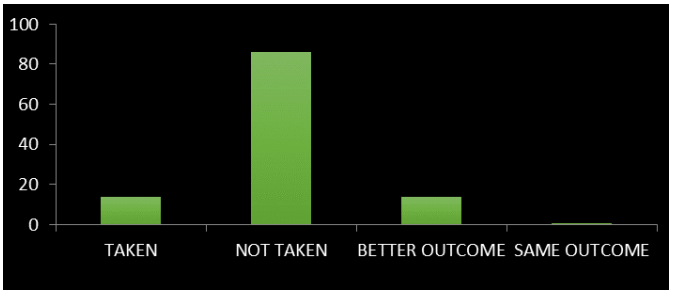

Fig 4: Physiotherapy treatment taken by the players and the outcome of the treatment

Table 5: Total percentage of injured and noninjured male and female players

Variables	Gender		Total %
	Male(73)	Female(77)	
Injured	(43)39.4%	(66)60.6%	72.70%
Not injured	(30)73.2%	(11)26.8%	27.30%

Discussion

In the present study, the risk of injury was greater among Females than males. Ankle and knee injuries and the direct contact and non-contact mechanisms were the most frequently reported characteristics in both sexes.

According to Messina *et al*. in a study involving basketball players between 14 and 18 years of age, in which 543 injuries were reported among 973 male players (injury rate: 0.56) and 436 injuries were reported among 890 female players (injury rate: 0.46) said that greater risk of males suffering musculoskeletal injury [8, 9].

Regarding anthropometric characteristics, studies involving male and female children and adolescents report that spurts in weight and height represent a risk for injury due to the production of forces of greater magnitude that are potentially absorbed by soft tissues and joints. During adolescence, body composition undergoes changes, especially with regard to the percentage of body fat. In boys, there is a relative loss of fat mass, whereas the opposite occurs in girls, with a relative gain in the concentration of body fat. This greater proportion of body fat generates greater impacts of the dynamic movements of basketball, such as landing on the ground, with a greater absorption of shock in body structures and consequent greater risk of injury. The increase in exposure to injury may be related to the increase in repetitive and cumulative micro-traumas stemming from prolonged training to ensure improvement in skills.

According to this present study, Ankle was the anatomic site with the greatest frequency of injury (38.5%).

According to Gomez *et al*. 31% of injuries to the ankle complex affect basketball players between 14 and 18 years of age. According to Timothy *et al*. nearly 72% of grade I ankle sprains affect both the female and male gender in a population made up of elementary and high school students. The occurrence of this type of injury may be explained by the impact with the floor of the basketball court, especially during jumping and landing on the side of the foot or on someone else's foot [10].

The knee was the second most affected anatomic site (34.9%), During the maximal ground reaction force, the structures of the knee are fully tensed by the impact load, which favors the occurrence of injury. There is evidence that flexion of the knee during the landing phase can reduce the odds of injury due to lower ground reaction forces and lesser absorption of impact. Thus, the high correlation between the flexion angle

of the knee and ground reaction force may be an important factor to reduce the impact of landing after a jump and a consequent lesser possibility of injury. Another explanation for knee injuries may be related to muscle fatigue, which impairs performance and alters proprioceptive function. Thus, fatigue may reduce the pre-activation of stabilizing muscles of the knee, causing a loss of balance and leading to excessive strain on the structures of the joint, particularly the ligaments, thereby favoring the occurrence of injury.

Regarding injury mechanism of present study, the injuries caused by direct contact (72.5%) were the most frequent in both sexes.

Kofotolis and Kellis described the data of direct contact mechanism, who report direct contact to be the main mechanism of injury stemming mainly from the constant movements of the sport, such as collisions with the floor, backboard supports, teammates and opponents [11].

According to Agel *et al*., the high degree of physical contact between opponents, together with the lack of technique for practicing the sport on the part of young players, predispose individuals to musculoskeletal injuries [12].

Non-contact injuries were also frequent in the present study (50%). Basketball is a sport that emphasizes explosive force and is practiced within a small physical space with movements that require abrupt changes in speed and direction as well as sudden rotations and numerous jumps. Thus, the dynamic conditions of the game favor the occurrence of non-contact injuries. In the male gender, there was a predominance of injuries during practice rather than during competition considering the weight and height. This may be interpreted as an attempt to achieve the position of team captain, requiring the player to be ready for both the internal dispute within the team and the load to be developed, exposing the individual to more practice time.

In contrast, Messina *et al*. and Agel *et al*. report that competition is the time in which more injuries occur. Moreover, physical exhaustion, especially at the end of practice, can lead to muscle fatigue and consequently compromise motor performance, thereby contributing to injury. Previous studies report that the risk of injury is greater with the longer exposure of the player to practice and games. In our study also training period is the time in whish more injuries occur (77.1%) and the physiotherapy treatment taken by the players are very less (13.8%) and the treatment taken by the players got good improvement.

Purpose of the study is to analyse the commonest injuries occure in basketball and to avoid injuries by creating awareness about physiotherapy treatment in young basketball players. Future studies can be done using a large sample with different questionnaire.

Thus, the information gathered can contribute to the establishment of preventive measures aimed at reducing the occurrence of injuries during the participation of basketball.

Conclusion

The findings of the present study revealed that the female gender (60.6%) was at greater risk of injury than the male gender (39.4%).

The ankle (38.5%) and knee (34.9%) were the most affected anatomic sites.

For most of the individual and training characteristics, the injury mechanisms were predominantly direct contact (72.5%) and non-contact (50%)in both sexes and the injury occurred during training(77.1%) are more common in both gender.

The physiotherapy treatment taken by the players are (13.8%). Most of the Players have not taken physiotherapy treatment and the treatment taken by the less players who undergone physiotherapy treatment for soft tissue injuries got better outcome.

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