

Epidemiological Study of Technopaties in Amateur Basketball Players

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Abstract

Introduction

Basketball is a complete sport for a broad audience that can find all the satisfactions associated with physical exercise. His practice is constantly increasing with the development of a game more and more physical, contributing to the increase of the frequency of the traumatisms. The main cause of injury is the contact with the opponent, but overload pathologies are not negligible. Our study aimed to determine the epidemiological aspects of the technopathies frequently encountered in basketball players.

Materials and methods

We collected 20 cases (19 men). The average duration of basketball practice (to date) was 23.35 years with extremes of 10 and 28 years. Those amateur basketball players played 3 times a week during at least 5 years. Professional and casual (who played when they want, can stay months without play) basketball players weren't included. The selection of patients was thorough, a data collection sheet had been duly completed.

Results

There were 25 specific traumatic injuries and 8 overload injuries. The trauma of the lower limbs represented 72%. The muscular contusions had not been taken into account. Ankle sprain and ACL rupture were the most common lesions. Medical imaging was performed in all patients. There were 7 surgical patients. Accidents involving contact with the adversary accounted for 44% of the trauma.

Conclusion

Basket-ball is constantly increasing with the development of a game more and more physical, contributing to the increase of the frequency of the traumatisms. Extremely stressed, the osteoarticular and musculotendinous systems of the upper and lower limbs are permanently exposed to risks of sprains, fractures and various trauma.

Keywords: basketball-technopathies-overloads injuries.

Introduction

Basketball is a complete sport for a broad audience that can find all the satisfactions associated with physical exercise. It is one of the collective sports modifying its regulations with the most regularity.¹

The solicitation of the lower limbs is made of specific strong supports, blocking, changes of direction, acceleration, deceleration and finally jumps. The upper limbs contribute mainly to the movements of the ball and the precision of the shots but they undergo significant constraints of contact with the opponents both in defense and attack. This whole context makes the basketball player a potential target of musculoskeletal trauma.

Technopathy represents all traumatic injuries (acute or wear) specific to the practice of a given sport.

The purpose of our study was to take stock of the epidemiological aspects of lesions of technopathies frequently encountered in amateur basketball players (commonly known as "playgrounders").

Materials and methods

Population

It was a retrospective study conducted at the Olympic Club in Senegal for one month (July 2016) that evaluated a group of basketball players.

Selection criteria: passionate basketball players who are physically at least 18 years old and who have been playing basketball for more than five years (amateur or semi-professional), who are active and who, after the practice of basketball, have suffered an injury of the musculoskeletal system supported in a hospital environment. Those amateur basketball players played at least 3 times a week. The semi-professional trained at least 4 times a week and played competition matches during week end.

The criteria for non-inclusion were: Casual basketball players (basketball players who play accidentally a week, month or year); professional basketball players.

The data was collected from a survey card based on the criteria of our study for a group of amateur basketball players.

There were 20 players (19 men and one woman) whose average age was 37.5 years with extremes of 30 and 45 years. Their average weight was 89.15 kg (72 and 110 kg extreme) for an average height of 1.90 m (extremes of 1m70 and 2m05). The average frequency of weekly basketball sessions for all our players was three (3). Apart from basketball, the other sports practiced were: jogging (n = 18), bodybuilding (n = 15), swimming (n = 10), football (n = 15) and martial arts (n = 2). The players who played in competition were 16 in number.

Methodology

For each player included in the study, a data collection sheet was duly completed by the same investigator.

In addition to the identification of the patient, epidemiological data of the lesional aspects were noted on the individual record of collection.

Results

The mean follow-up was 54.85 months with extremes of 24 and 84 months.

We found 25 acute traumatic injuries that occurred during the practice of basketball for 8 wear injuries.

Lesions of the musculoskeletal system were distributed as follows:

For acute post-traumatic injuries

To the upper limbs (Table I)

Table I Distribution of upper limb lesions

Nature of lesions	Number
Postero lateral elbow discolation	1
Fracture 2 bones of forearm	1
Maillet finger	4
Wrist sprained collateral ligament	1
Total	7

For acute post-traumatic injuries:

To the upper limbs (Table I)

To the lower limbs (Table II)

For chronic or wear injuries (Table III)

Two players in the study presented 2 chronic lesions of the musculoskeletal system (lumbar disc herniation associated with tendinopathy of the patellar ligament for one and rotator cuff for the other).

Table 2 Distribution of lesions in the lower limb

Nature of the lesions	Number
ACL knee rupture	05
Patellar ligament rupture	01
Meniscal lesion	03
LCL knee benign sprain	01
Leg fracture (tibia)	01
Ankle sprain	05
Internal malleolar isolated fracture	01
Achilles tendon rupture	01
Total	18

Table 3 Distribution of chronic lesions

Nature of lesions	Number
Lumbar disc herniation (LDH)	3
Tendinopathy of rotators cuff	1
Chronic patellar ligamentous tendinopathy	2
Haglund disease	1
Plantar fasciitis	1
Total	8

Discussion

Acute lesions

Traumatic injuries to the upper limbs accounted for 28% of all specific traumatic injuries.

The upper limbs contribute mainly to the movements of the ball and the precision of the shots but they also undergo significant constraints against the opponents both in attack and in defense.

The finger-mallet fingers accounted for 16% of the specific traumatic injuries in the series. According to several studies,²⁻⁴ traumatic injuries of the fingers are recurrent during the practice of Basketball. For Ito et al,⁵ traumatic finger lesions among basketball players accounted for 7.4% (lower than our series).

Wrist sprain accounted for 14.28% of trauma. According to authors Deitch JR⁴ and Dick R,⁶ sprains are the most common wrist pathologies with 1.3% in National Basketball Association (NBA), 1% in Women's National Basketball Association (WNBA) and 1, 6% in the National Collegiate Athletic Association (NCAA) male.

Fracture of both forearm bones and posterolateral elbow dislocation accounted for the remainder of the specific lesions. No literature data on his specific basketball injuries were found.

Lower limb trauma accounted for 72% (n = 18) of all specific traumatic injuries.

According to two studies^{2,6} involving 16 years of observation (1988-2004) in the NCAA, ankle injuries remain the most common lesions (25.3% of the most serious injuries occurring during contact with another player). The lower part of the body is the most frequently reached area, both during matches (26.2% of men and 24.6% of women), as during training (26.8% of basketball players and 23.6% basketball players). Knee problems (7.4% of basketball players and 15.3% of basketball players) are recurrent in NCAA.

Repetitive jumps interspersed with racing and change of direction are responsible for a higher number of injuries to the lower limbs (62.4%) compared to the upper limbs (37.6%).⁷

Ankle sprains and knee injuries were the most common in our study. They accounted for 27.7% and 55.5% respectively. Indeed, ankle injuries are often benign and allow the basketball player to continue his practice despite a physical limitation. Ankle injury is the leading cause of injury according to the International Amateur Basketball Federation (FIBA) with 92.8% of lesions affecting the lateral collateral ligament (most vulnerable area).⁸ In the NBA and Pro A (first division men's championship) in France, we find respectively the same lesion in the ankle with 17.3% and 25%.^{4,9} The reception during a jump is the main mechanism of injury, but to this, are added the abrupt changes of direction. It should be noted that 66% of athletes who suffered ankle injuries had a history of sprain and that the follow-up of these long-term injuries showed a recurrence rate of 40 to 50%.⁵

Ito et al.⁵ note that in Japan, ankle sprain is more common among female basketball players (64.4%) than men (58%).

Historically, ankle sprains and basketball are closely linked. All studies identified ankle sprains as one of the major injuries found in this sport^{2,7,10,11} and at any level of play.¹² Our study confirms this trend. The occurrence of an ankle sprain leads to an increase in ligament laxity which may be a predictor of later instability.¹³

However, severe injuries to the knee often require the immediate end of the practice minutes after the trauma. Breaks in the ACL account for 27.7% of traumatic injuries to the lower limb. Our results are

significantly superior to those of Hickey et al.¹⁴ which was 1.8%. For Parkkari et al.¹⁵ the relative risk of ACL rupture was twice as high for girls with sports activities greater than four times a week compared to boys. There was no difference for a sports activity less than three times a week. The rupture of the ACL was found in the only girl of our series. For Prodromos et al.,¹⁶ basketball is one of the most risky sports for girls. For meniscal lesions, there were two internal meniscal lesions associated with ACL rupture and one external meniscal lesion on stable knee. In the literature, these lesions concern more the medial meniscus than lateral and are rarely isolated at the sportsman.¹⁷ Before 30 years of age, they are often associated with central pivot involvement, and are then of poorer prognosis,¹⁸ and after 40 years they most often mask degenerative bone lesions.

The rupture of Achilles tendon when to it, can occur at the high level and occasional athlete.¹⁹ The essential factor of rupture is mechanical. A case was found in our series. However, O. Jarde in his study found 02 cases of traumatic Achilles tendon rupture in basketball.¹⁹

Fractures accounted for 11.11% of traumatic lower limb injuries. No data were found in the literature on the specificity of fractures in the basketball player.

Chronic lesions or wear injuries

Daily sports practice exposes to undetected microtrauma that can be revealed over time.

In the upper limb, only one case of tendinopathy of the rotator cuff was found in our study. Joint and tendon hypersollicitation, poor gestures and age can be considered as risk factors for microtrauma. The average age in our study was 37.5 years old. Basketball is a rather demanding sport in which several movements of the musculoskeletal system are solicited; the intensity of the matches both in competition (high level) and amateur level requires a certain physical condition. Some of these qualities diminish over time.

Three cases of lumbar disc herniations have been found in our series. All sports activities can cause lumbar disc herniation. In French Pro A, low back pain is the fourth leading cause of stopping sports after ankle sprain, muscle injuries and all technopathies. In the NBA, this is the third pathology in terms of frequency with 5.8%. In WNBA this incidence is 3.6%.⁴ The repetition of "dunk" is incriminated.⁹

A study of French professional players shows that the main back injury is paralumbar muscle contracture (14.3%).³

All sports that cause significant axial overload (weightlifting, downhill skiing, etc.) associated with rotation or lateral inclination (basketball, handball, volleyball, etc.) can be the cause of disc pathology by repeated microtrauma on the intervertebral disc.

The general biomechanics of sport explains these microtrauma, but for each sport it is necessary to distinguish the various disciplines, or even each position within a team.²⁰ It will be necessary to take into account extrasportive, professional or parallel sports activities.

Tendinopathy of the patellar ligament or "jumper knee" is a very common pathology in this sport that requires repeated jumps. In our study it accounted for 50% of overuse injuries in the lower limbs. Its prevalence varies according to the level practiced. According to Van der Worp,²¹ in basketball it is respectively 32% (high level basketball players) and 12% (amateurs). A study conducted in Norway²² on a population of high-level athletes, in 9 different sports disciplines, found a general prevalence (signs present in imaging) of 14.2% patellar ligament tendinopathy. For athletes who developed the symptoms, it was higher among volleyball players (44.6%) and

basketball players (31.9%). No difference between men and women was found. Male athletes have a prevalence twice as high as female athletes.²² However, this pathology also affects children as in the case of basketball where a prevalence of 7% could be reported in a population according to Rudovsky.²³

The etiologies appear to be multiple:²⁴ overweight, length discrepancy of the lower limbs, hollow feet, stiffness of the hamstrings, quadriceps muscle strength and vertical impulse. Extrinsic factors were also mentioned: the volume and the training load, the type of terrain or the unsuitable material.²⁵ The patient in the study who presented this pathology was 38 years old for a height of 2m10 and having played professionally for 15 years. He had a flat foot. For Guincestre et al. tendinopathies of the extensor apparatus would be less frequent on synthetic soil which more or less dampens the fall or the reception of jumps.

In addition, the occurrence of a first episode of injury increases the risk of new outbreaks.²⁶ Due to its often chronic installation, patellar technopathy is sometimes very long to treat, having a direct impact on the sports performance of the athlete.²⁷ At the end of their careers, 53% of athletes who have suffered from PT who admit to having ended their career early because of the latter.²⁸

Plantar fasciitis accounted for 25% of the lower limb overload lesions in the study. The prevalence among athletes varies between 10 and 20%.²⁹ This pathology is observed both in athletes and non-athletes. It occurs most of the time around the age of 40 even if all age groups are interested. No difference in frequency has been demonstrated for sex.³⁰ If the exact etiology remains unknown, it remains close to that of tendinopathies. In athletes, inappropriate footwear or hard ground are contributing factors.³¹ On the other hand, the anatomical morphology of the foot can also have an influence such as the flat valgus foot with a calcaneal horizontalisation, an eversion of the subtalar articulation too marked, the hollow foot exerting a tension on the plantar fascia or still hyperpronation of the foot in dynamics.³² Concerning the calcaneal spine, confusion exists as to whether it is the cause or the consequence. Some argue that the calcaneal spine is an adaptation to vertical compression at the level of calcaneal anthesis.³³

For the patient with Haglund's disease, the clinical examination had found a foot with a normal architecture. It is a pathology generally associated with intense physical activities such as running or jumping. It is most often found among athletes practicing medium and long distance races (prevalence of 7 to 9% for high level), orienteering, athletics, tennis, basketball and^{34,35} This patient reported regular mid-distance racing sessions.

Conclusion

Basket-ball is constantly increasing with the development of a game more and more physical, contributing to the increase of the frequency of the traumatism. Extremely stressed, the osteoarticular and musculotendinous systems of the upper and lower limbs are permanently exposed to risks of sprains, fractures and various trauma.

Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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