05 - INJURIES INCIDENCE IN HANDBALL ATHLETES

SARAY GIOVANA DOS SANTOS; DANIELE DETANICO;
TATIANE PIUCCO; JULIANO DAL PUPO; DIOGO CUNHA DOS REIS
Universidade Federal de Santa Catarina - Florianópolis - Santa Catarina - Brazil
saray@cds.ufsc.br

1 INTRODUCTION

Injuries in sporting practices are frequent and they cause constant concerns about the athlete`s health by the technician and sporting leaders (AMORIN et al., 1989). In this way, knowing the etiology as well as the incidence of the injuries can be useful for their treatment and to create preventive mechanisms aiming to keep the athlete's physical and psychic integrity.

Both acute and chronic sport injuries source are resulting of a complex interaction of risk factors. In some sports injuries are caused by extrinsic risk factors, other for intrinsic factors, while other for the combination of both.

In agreement with Almeida (1991), the intrinsic risk factors are those related to the: age, genre, physical condition, motor development, feeding and psychological factors. On the other hand, the extrinsic risk factors are associated to the: technical specificity of each modality, kind of equipment used, training and competition organization, training and competition`s loads, and of the climatic conditions.

Related to the sports of open abilities (contact sports), the specific physical requirements of each sporting modality, as well as the environment interference generate specifics injuries, for example, the most frequent shoulder`s traumas in the handball, caused mainly by the throw movements (SEIL et al., 1998). Hulstyn and Fadale (1997) relate that the throw movement, that is a ballistic movement of the superior limbs in which the shoulder is submitted to high-speed rotational movements, presents specific characteristics related to the intensity and frequency of the movements that increase de shoulder`s injuries risk in the connecting structures.

Besides the superior limbs, knees and ankles injuries are also frequently in handball players (ALLOZA and INGHAM, 2003; INGHAM et al., 2004), and the injuries mechanisms more related are the fast direction change during the cover or in the dribble.

Considering that studies like Seil et al., 1998; Pieper, 1998; Ingham et al., 2004; Vlak e Pivalica, 2004 point a great number of injuries in the handball practice, this study investigated the athletes' profile of an academic handball team related to the injuries occurrence. For that, the following specific objectives were defined: to identify the characteristics of the age, the height, the body weight, the time of practice in the modality, and other physicals activities practiced by the handball athletes; to verify the incidence, the hit body places, the type and the injuries mechanisms in the handball athletes; to relate the injuries number with the athletes age and practice`s time in the modality.

2 MATERIALS AND METHODS

Participated in this quantitative, descriptive and diagnostic study nine male athletes of an academic handball team. The athletes were chosen intentionality, according to the minimum time of practice in the modality (two years) and the weekly training frequency (two times in a week).

As measurement instrument, a questionnaire was built to investigate the profile and the report of the athletes' injuries, which was submitted to a validation process obtaining a validation rate of 93% and 100% in clarity.

Attending to the legal demands of the Federal University of Santa Catarina`s Ethics Committee, the data were collected after the athletes had signed an informed permission term.

The data were statistically treated according to the level of the variables measurement and the sample type, according to the specific objectives: to analyze the athletes' characteristics and the report of the athletes' injuries was used descriptive statistic (average, standard deviation, variation coefficient, and simple frequency); to relate the number of injuries with the practice time and the age, a correlation of Pearson with p0,05 was used.

3 RESULTS AND DISCUSSION

3.1 The athletes' profile

Following the first specific objective of the study, the athletes' profile of age, stature, body weight, practice time, and previous sporting practices are presented in the Table 1.

Table 1 - Academic handball players` characteristics.

Variáveis	$\bar{x}$ s	CV
Age (years)	22,2±1,4	6,3
Stature (cm)	182,0±0,08	4,2
Body mass (Kg)	83,2±10,1	12,2
Time of practice (years)	7,1±2,7	37,9

According to Table 1, considering the date variability rate of Gomes (1990), was verified that the team is heterogeneous in terms of age (6,3%), height (4,2%) and body weight (12,2%). On the other hand, the team is homogeneous concerning to the modality`s practice time (37,9%), that is justified for the amateurs characteristic of the team.

To descript better the group, the athletes was asked about other sports` practices. The most part of them (8/9) have already practiced other modalities, even as recreation or competitive intentions. The modalities more practiced were indoor football (6/9), basketball (3/9), judo (2/9), track and field (2/9) and surf (2/9). These results are important to the personal performance, considering that practice in other modalities can increase the corporal experience (MAGILL, 2000), and improve the performance even in handball.

The athletes were asked about the practice time and about the complementary physics workout, besides the handball training. The athletes train handball two times during a week, resulting in 4 hours in a whole. Only 5/9 athletes do complementary physic training, 3 of them working out and do aerobic training, meanwhile 2 only working out.

Considering that some athletes do not accomplish some type of complementary training and, knowing that they

training only 4 weekly hours, maybe the technical training is not sufficient for the improvement of the physical capacities. It is possible to suppose that, according to the athletes' answers, the same ones have a low level of physical conditioning, which can be a preponderant factor in the sporting injuries occurrence. For Weineck (1991), the risk of injuries decreases as the skeletal musculature is strengthened so much that it is less vulnerable to the successive stresses, as occur in sporting training.

Relating to the training environment, 5/9 athletes consider it adequate to the handball practice, meanwhile 4/9 consider to be inadequate according to the lighting, ventilation, cleaning and the court floor, being this last one the most factor mentioned by the athletes due to its constitution of concrete. According to Meneses (1983), an appropriate environment should be durable and to provide safety to the athlete, to have a well distributed illumination, good ventilation and protecting surround around it, with moved away walls of court and painted with neutral colors, and implements with contrasting colors. In that way, such factors are important for the athletes' physical integrity, besides contributing in their performance` s improvement.

3.2 Injuries prevalence

The second purpose was to verify the incidence, the injured places, the type and the injuries` mechanisms in handball athletes. For that, the athletes were asked about the handball practice`s injuries.

According to the answers, the most of the athletes (7/9) were injured due to the handball training. Relating to the places, injuries` types and mechanisms, the results are showed in the Picture 1.

Picture 1: P laces, t ypes and mechanisms of injuries, according to the athletes' perception.

Places	f	Type	f	Mechanism	F
Knee	5	Twist	4	Dribble	4
Ankle	3	Fracture	3	Mark	4
Should	2	Chronic pain	2	Repetitiveness	3
Thigh	1	Contraction	1	Throw	3
Foot	1	Gore	1	Warming-up	1
		Distention	1	Impact	1
Total	**12**	**Total**	**12**	**Total**	**16**

According to the Picture 1, the most frequent injured places were the knee (5/12), followed for the ankle (3/12), shoulder (2/12), thigh (1/12) and foot (1/12). Related to the injury type, the most mentioned were twist (3/12), fractures (3/12), distention (1/12), contraction (1/12) and gore (1/12). The injuries` mechanisms more common were the dribble (4/16), the mark (4/16), the movements` repetitiveness (3/16), the throw (3/16), the warming-up (1/16) and the ground impacts (1/16). Some athletes answered more than one alternative, what modified the frequencies` totality.

The mainly injuries` prevalence in the lower limbs agree with Alloza and Ingham (2003), that verified that the knee, the leg and the ankle were the most injured anatomical places in handball athletes. In addition, Seil et al. (1998) found that the knee and shoulder were the most injured incidence places, and 19/35 of the shoulder` injuries and 16/30 of the knee injuries had as predominant mechanism the overuse, agreeing with the results of this study, that showed that besides the basic movements in handball (dribble, mark and throw), the repetitiveness was one of the mainly injuries` cause factors. Ejnisman et al. (2001) found association among the muscle-skeletal injuries in the handball athletes' shoulder with the excessive number of throws.

Relating to the injuries type, the results (Picture 1) agree with the study of Seil et al. (1998) that verified in a sample of 186 handball athletes, an injuries` proportion of 46% for twists, 26% for contractures, 10%for fractures, 6% for bruises and 5% for dislocations. Among the twist`s injuries, the anatomical places more attacked were the ankle, knee and fingers; for contracture were the lower limbs (thigh and calf); fractures were verified in the nose and in the fingers, and dislocations were found mainly in the shoulder` articulation.

The largest incidence of twists diagnosed in the lower limbs of the handball`s athletes can be associated to the characteristics of the technical movements of the modality, as the dribble and the mark, because they are executed with speed and fast direction change which cause an external torsion force, that can cause injuries according to their magnitudes and directions (NIGG and HERZOG, 1995). The fractures can be more related to the contact with other players or with the ground, due to the handball characteristics of quickly counterattacks (VLAK and PIVALICA, 2004) that expose the players to great amount of impacts with other players as with the ground during a math.

Related to the injuries prevalence in the last season, 5/9 of the athletes suffered injuries, and some athletes suffered more than one injury. The knee (3/9), the shoulder (3/9), the ankle (2/9) and the thigh (1/9) were the more injured anatomical places. The great injuries prevalence in the last season and the lack of complementary physical training can be associated, because when the muscular tissue is not sufficiently strengthened the injuries rate increase.

Looking for ways to contribute in the handball injuries prevention, Wedderkopp et al. (1999) applied an intervention program that included strength muscular exercises in young handball female players of an European team, which had a high injuries rate, mainly in the lower limbs, without extern diagnosis cause. The results indicated that the program of physical training reduced the number of traumatic and overuse injuries significantly and, when compared to a control group, the team was shown with a relationship-probability risk five times smaller than the athletes that didn't participated in the intervention program. According to these points, an efficient physical training is necessary to the athletes of this study, because, in spite of be an amateur athletes, the injuries prevention is a factor that needs to especial attention by the coaches.

Another factor that needs to be considered, related to questionnaire results in this study, is that the people only remember with reasonable accuracy the smaller gravity diseases happened for a period of 15 days or less.

Considering that the athletes of this study were questioned about the report of sport injuries (incidence, type, place and mechanism) during a handball game or training, the occurrence passed time of injury probably have interfered in the athletes' answers, according to the number or gravity of the traumas incidence.

3.3. Relationship among the injuries prevalence, the age and the time of the handball athletes' practice

The third purpose of this study was to relate the number of injuries with the age and the practice`s time in the modality. The results of the correlations are presented in the Table 2.

Table 2: Correlation among injuries` number, age, and practice`s time.

Variables	r_c	p
Injuries` number x practice`s time	0,39	0,27
Injuries` number x age	0,46	0,18

According to the Table 2 there was not significant correlation among injuries` number and practices` time and players' age. However, in spite of not significantly, the positive characteristic of the correlations observed are an indicative of the practice`s time and age increasing can also to increase the injuries` incidence.

This results consent with the studies of Seil et al., 1998, Pieper, 1998, Ejnisman et al., 2001, that revealed that the repetitions` excess of the technical movement through-out the athlete's life can become an injuries source factors, due to the mechanical overload in the tissues.

4 CONCLUSIONS

According to the obtained results and regarding the study`s limitations, we can conclude that:

- the handball team investigated is homogeneous relating to the age, body mass and high, however, it is heterogeneous in terms of practice`s time

- the most part of the players had already practiced other sport in a recreation or competitive way, mainly soccer and basketball, which are considered intervenient activities;

- the team presents a low volume of weekly training, what can represent that the athletes don't train in a high level, characterizing an amateur team;

- the training environment seems the be adapted to the handball`s practice, according to the athletes' observation;

- most of the athletes presented injuries due to the handball training, being the knee and the ankle the anatomical places more attacked;

- the principal types of injuries, according to the athletes, were twist and fractures, and the predominant injuries` mechanisms were the dribble and the mark;

- the athletes' great part presented lesions in the last season, being the knee and the shoulder the anatomical places more attacked;

- it seems that as the age as the practice`s time in the modality was not decisive to cause injuries in the handball athletes investigated.

The results obtained by the athletes' perception pointing to the need of improvement in the physical training to give conditions to support the successive training and game loads during the athletic career and, consequently, to prevent injuries factor.

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Saray Giovana dos Santos
Rua Maria Eduarda, 506 - Pantanal - Florianópolis - SC - Brasil
CEP 88050-250
Telefone: (48)9919-3915
e-mail: saray@cds.ufsc

INJURIES INCIDENCE IN HANDBALL`S ATHLETES

ABSTRACT

This quantitative descriptive study of diagnosis type aimed to investigate the academically handball athlete's injuries profile. Participated in this study nine players with an average of 22,2±1,4 year-old and practice time of 7,1±2,7 years. As measure instrument was used a questionnaire validated for this purpose, with 93% of validity and 100% of clarity. The data were treated with descriptive statistics (average, standard deviation, variation coefficient and simple frequency) and a Pearson`s correlation (p= 0,05). The results point that the injuries` attacked places were knee (5/12), following the ankle (3/12), shoulder (2/12), thigh (1/12) and foot (1/12). Relating to the injuries type, the most mentioned were twist (3/12), fractures (3/12), distention (1/12), contracture (1/12) and gore (1/12). The most common injury mechanisms were the dribble (4/16), the mark (4/16), the movement`s repetitiveness (3/16), the throw (3/16), the warming-up (1/16) and the ground impact (1/16). Some athletes

answered more than one alternative, what modified the totality of the frequencies. No relationship were found among injury number and practice`s time (rc=0,39;0,27) nor with the players' age (rc=0,46;0,18). In spite of being an amateur team, the data obtained by the athletes' observation pointed to the need of improvement in the physical training to give conditions to support the successive training and game loads during the athletic career and, consequently, to prevent injuries factor.

KEY WORDS: handball, injuries, injuries cause.

LA FRÉQUENCE DES BLESSURES DES ATHLÈTES DE HANBALL

RESUMÉ

Cette étude descriptive quantitative du type disgnostic a eu l'objectif d'étudier le profil des athlètes d'une équipe universitaire de hanball en ce qui concerne la cause des lésions. Neuf joueurs avec la moyenne de l'âge de 22,2±1,4 ont participé à l'étude et ils avaient 7,1±2,7 années de pratique. Comme instrument de mesure il a été utilisé un questionnaire validé pour cette étude, avec 93% de validité et 100% de clarté. Les données ont été traitées avec des statistiques déscriptives (moyenne, déviation standard, coefficient de variation et fréquence simple) et la corrélation *Pearson* p=0,05. Les résultats montrent que les lieux qui ont souffert des lésions dans les athlètes ont été le genou (5/12), la cheville (3/12), l'épaule (2/12), la cuisse (1/12) et le pied (1/12). Les types de lésions mentionées ont été l'entorse (3/12), la rupture (3/12), la distension (1/12), la contracure (1/12) et l'oedème (1/12). Les plus fréquents mécanismes porteurs de lésion ont été la repasse (4/16), l'action de marquer (4/16), la répétitivité des mouvements (3/16), le lancement (3/16), la préparation (1/16) et l'impact contre le sol (1/16). Quelques athlètes avaient répondu à plus d'une alternative, ce qu'il a modifié la totalité des fréquences. Il n'a pas été trouvé la relation entre le nombre de lésions avec de la période de pratique (rc=0,39;0,27) et avec l'âge des joueurs (rc=0,46;0,18). Les données obtenues au moyen de la perception des athlètes, même étant une équipe amateur, montrent la nécessité d'amélioration de l'entraînement physique ce qui fournit les conditions pour soutenir les charges successives de l'entraînement et du jeu pendant la carrière sportive et, par conséquent, il agit en tant que facteur préventif des lésions.

MOTS-CLES: Handball, lésions, causes de lésions.

PREVALECÍA DE LESIONES EN ATLETAS DE BALONMANO

RESUMEN

Este estudio descriptivo cuantitativo de tipo diagnóstico objetivó investigar el perfil de las lesiones de atletas universitarios de balonmano. Participaron del estudio nueve jugadores con un promedio de 22,2±1,4 año y tiempo de la práctica de 7,1±2,7 años. El instrumento de medida utilizado fue una encuesta válida para este fin, con 93% de validez y 100% de clareza. Los datos fueron tratados con estadística descriptiva (media, desviación normal, coeficiente de la variación y frecuencia simple) y una correlación de Pearson (p=0,05). Los resultados apuntan que las lesiones más relatadas fueran en la región la rodilla (5/12), siguiendo el tobillo (3/12), hombro (2/12), muslo (1/12) y pie (1/12). Con relación al tipo de las lesiones, la mayoría mencionó la torcedura (3/12), fracturas (3/12), distención (1/12), contractura (1/12) y edema (1/12). Los mecanismos de la lesión más comunes fueran la finta (4/16), la marcación (4/16), la repetitividad del los movimientos (3/16), el lanzamiento (3/16), el calentamiento (1/16) y el impacto con el suelo (1/16). Algunos atletas respondieran más de una alternativa, lo que modificó la totalidad de las frecuencias. Ninguna relación se encontró entre el número de las lesiones y el tiempo de practica (rc=0,39;0,27) ni con la edad de los jugadores (el rc=0,46;0,18). Mismo siendo un equipo principiante, los resultados obtenidos por la observación de los atletas apuntan la necesidad de mejora del acondicionamiento físico para suportar el entrenamiento sucesivo y cargas del juego durante la carrera atlética y, por consiguiente, para prevenir el factor de las lesiones.

PALABRAS LLAVE: balonmano, lesiones, causa de las lesiones.

PREVALÊNCIA DE LESÕES EM ATLETAS DE HANDEBOL

RESUMO

Este estudo descritivo quantitativo do tipo diagnóstico teve como objetivo investigar o perfil dos atletas de uma equipe universitária de handebol quanto ao acometimento de lesões. Participaram do estudo nove jogadores com média de idade de 22,2±1,4 anos e tempo de prática de 7,1±2,7 anos. Como instrumento de medida utilizou-se um questionário validado para este fim, com 93% de validade e 100% de clareza. Os dados foram tratados com estatística descritiva (média, desvio padrão, coeficiente de variação e freqüência simples) e correlação de *Pearson* a p=0,05. Os resultados apontam que os locais acometidos de lesões nos atletas foram joelho (5/12), seguido pelo tornozelo (3/12), ombro (2/12), coxa (1/12) e pé (1/12). Quanto ao tipo de lesão, as citadas foram entorse (3/12), fratura (3/12), distensão (1/12), contratura (1/12) e edema (1/12). Já os mecanismos causadores de lesão mais freqüentes foram a finta (4/16), a marcação (4/16), a repetitividade dos movimentos (3/16), o arremesso (3/16), o aquecimento (1/16) e o impacto contra o chão (1/16). Alguns atletas responderam mais de uma alternativa, o que modificou a totalidade das freqüências. Não se encontrou relação entre número de lesões com o tempo de prática (r_c=0,39;0,27) e com a idade dos jogadores (r_c=0,46;0,18). Os dados obtidos mediante a percepção dos atletas, mesmo sendo uma equipe amadora, apontam para a necessidade de melhoria do treinamento físico, o qual propicia condições para suportar as sucessivas cargas de treinamento e de jogo ao longo da carreira atlética e, conseqüentemente, atua como um fator preventivo de lesões.

PALAVRAS CHAVES: handebol, lesões, causas das lesões.