120 - FIELD HOCKEY ATHLETES INJURIES: A STUDY WITH THE MASCULINE AND FEMININE BRAZILIAN SELECTIONS

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1 INTRODUCTION

Even with the technological advances in design and construction of preventive equipments for elite athletes, the injuries continue being one of the most sporting leaders', technicians, trainers and athletes concerns. Complex injuries cause great damages to the clubs, for the technicians and trainers because of the reduction of the performance of the group, in function of the period that the injuried athletes stay away for the recovery, and the discomforts caused by the injuries that, in some cases, make the athlete abandon the period or competitive career.

Several studies point the occurrence of injuries in sports caused by the repetitiveness movement or by the athletes collisions impacts with the opponent or with the ground (VALIANT and CAVANAGH, 1985; GERBERICH et al., 1987; STACOFF et al., 1988; SANTOS, 2003; GOTTSCHALL and KRAM, 2005). So, the sports that provide impacts and contacts between the athletes, like the field hockey, are those whose the athletes are more vulnerable to injuries.

The field hockey is the second most popular sport of the world, being practiced at 132 countries. It is a contact sport played by two opposing teams of 11 players who use sticks curved at the striking end to hit a small hard ball into their opponent's goal. This sport demands from the athletes physical characteristics like speed, force in the lower limbs and explosion and an excellent aerobic conditioning to support the competition duration of 2 times with 35 minutes each.

Due to the characteristics of field hockey, 15% of the participants are injured during a single season (EGGER, 1990). Alcock et al. (1997) found that the proportion of injured participants for hockey was the fifth highest when compared to other popular sports, even outranking Australian Football League.

Considering a variety of studies that point the great number of field hockey injuries, this study intended to investigate the athletes' of the feminine and masculine Brazilian field hockey team, with relationship to the injuries occurrences. For this, the following problems were defined to investigate:

- How many and in what body region the athletes were injured?
- Do the athletes use protection equipments and do they accomplish some treatment for the injuries?
- Which is the most injury mechanism pointed by the athletes?
- Do existing association among number of injuries with the age and with the time of practice?

Trying to answer these questions, the general purpose of this study was to analyze the injuries and the injuries mechanisms pointed by the Brazilian's athletes of feminine and masculine field hockey team. More specifically it was aimed: to identify the profile in terms of age, corporal mass, stature and previous sporting practices; to verify the number and the place of injuries happened with the athletes in the modality, as well as the mechanism, the use of preventive equipments and the treatment accomplished; to associate the number of injuries with the age and with time of practice in the modality.

2 MATERIALS AND METHODS

Participated in this quantitative descriptive study of the type diagnosis, 16 female and 14 male athletes of the Brazilian selections of field hockey, chosen intentionally.

As measure instrument, a questionnaire was built to investigate the profile and the report of the athletes' injuries, submitted to a validation process for three doctors, which was obtained an index of 93%, and the clarity tested by three athletes obtaining an index of 100%.

Attending to the legal demands of the National Council of the Health Resolutions 196 and 251, of 07/08/97 to the Federal University of Santa Catarina Ethics Committee, the data were collected after the athletes sign an informed consent term, in the Biomechanics Laboratory of the Federal University of Santa Catarina, preceding other evaluation.

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

3 RESULTS AND DISCUSSION

The data were analyzed and discussed according to the specific objectives of the study.

3.1 The participants' profile

The first specific objective of the study was to identify the athletes' profile of age, stature, corporal mass, time of practice and previous sporting practices. The referring data to the age, stature, weight and time of practice are presented in the Table 1.

Table 1 - Age, stature, corporal mass and time of practice of 16 female and 14 male players of Brazilian's field hockey team.

Variables	Female ($\bar{x}$ s CV)		Male ($\bar{x}$ s CV)	
Age (years)	18,8±3,95	21	18,8±1,3	7
Stature (cm)	166,3±5,4	3	174,2±5,5	3
Body mass (Kg)	60,1±6,1	10	68,57±6,2	9
Time of practice (years)	3,69 ± 3,8	104	6,0±4,2	70

According to Table 1, is verified that the female team is heterogeneous in terms of age and time of practice, because, considering Gomes' indexes (1991), the coefficient of variation of the age (21%) is loud and the modality practice time is very loud (CV=104%). On the other hand, the mass and the stature show a homogeneous team. The heterogeneity of the age and of the time of practice of the female team is justified for an existence of one athlete's with 32 years of age and with 16 years of practice in this modality.

The male team was heterogeneous with relationship at the practice time (CV=70%), fact that is also justified for an

athlete's presence with 13 years of practice in the hockey, as well as homogeneous in terms of age, stature and corporal mass.

With relationship to the practice of other modalities before beginning the hockey practice, one of the athletes didn't just practice previously another modality, four practiced more than one modality and 12 athletes practiced at least one; the modalities more practiced they were the indoor football (6), the swimming (3) and the soccer (2). With relationship to the masculine team, 10 already practiced other sports, four of them practice more than one modality, and only four of the athletes only have as sporting experience the field hockey.

In spite of being a young team, the corporal experience of some athletes in other modalities, mainly the indoor football and soccer experiences, can be transferred for the field hockey because some movements, such as dribbles, resemble to the hockey, as well as the characteristics of the field and objectives of the game. In this case, Magill (2000) can be mentioned when he affirms the question of positive transfers of sporting modalities that use similar foundations.

The athletes were questioned with relationship at the time of practice just in the Brazilian team. The female athletes training on average 1,9+1 year, with a daily time of training of 3 hours, including in this time 1 hour of muscular activity, 30 minutes of physical conditioning, 15 minutes for muscle stretch. The men training on average 1,5±0,8 years in the Brazilian team and the specificities of the trainings and the intensity are same of the female team.

3.2 Injuries happened with the athletes

The second purpose of the study was to verify the number and the place of injuries happened with the athletes, as well as the generating mechanism of the lesion, according to the perception of the same ones, whose data are contained in the Square 1.

Square 1 show that 16 athletes of the female team suffered more injuries than the male, and the places with more injury incidence were in the lumbar area (8/39), followed by the fist and hand (7/39) and thigh (6/39). The 14 athletes of the masculine team presented more injuries in the knee (7/26), followed by the shoulder (5/26), fist and hand (4/26).

Square 1- Number and place of injuries happened with the male and female field hockey Brazilian players.

Injuries places	Nº of injuries (female)	Nº of injuries (male)
Face	2	1
Shoulder	5	5
Elbow	1	0
Fist and Hand	7	4
Lumbar	8	2
Thigh	6	2
Knee	4	7
Leg	3	3
Ankle	3	2
TOTAL	**39**	**26**

The data obtained in this study are similar to other studies like Frek and Daleish (1994) that investigated lesions in 40 elite players being the ankle, the lumbar and the knees the most affected regions, and of Lindgren and Maguire (1985) that detected in 16 men and 12 women Australian elite athletes that most of the injuries happened in the knee, ankle, leg and lumbar.

The places of more frequent lesions in hockey players can be justified for the technical demands of the modality, because to obtain a greater throw precision to the goal and in situation of ball disputes with abrupt changes of direction, the athlete needs good sustentation base reached by the opening of the inferior members with consequent lower of the body gravity center, and a trunk anterior-flexion. This systematical position adopted during the trainings and games demands too much overload of the articulations of ankle knee, as well as of the lumbar column.

The injuries places found in this study corroborate with other studies as the one of Fenety and Kumar (1992), that points that the ankle, the lumbar column and the knee are the places more injured in field hockey athletes. Five girls and four boys answer feel constant pains in lumbar region after the trainings and games. The factors that predispose athletes to injuries or pains in the lumbar, according to Lillegard et al. (2002), can include rigidity of the muscles isquiotibialis and posterior backlumbars fascias and weakness in the abdominal musculature.

Attending to the second specific objective, it was questioned the athletes the injuries mechanisms.

The female group mentions the training excess as the main injury mechanism, followed by the trunk flexion posture adopted for the game, the falls, sticks contacts, dispute of ball and ball strike. The male players mentioning all the mechanisms that the females increasing the defensive and offensive actions, that together with the training excess, are pointed as the main causes of injuries.

The hockey is a violent sport due to speed of the game and for being a contact sport. In spite of the rules be rigorous aiming to preventing injuries, the same ones still happening.

In spite of the few time of practice, when compared with international elite players, the injuries level was high. Of the 17 girls, 15 had a total of 39 injuries being training in the team a 1,9±1 year, and they were out of the training an average of 34±60 days. 10 athletes realized physiotherapy and 8 returns to training with pain symptoms. The male group, all the 14 athletes had 26 injuries, being training on average in the team 1,53±0,8 year, and they were out of the trainings an average 28±43 days. 7 realized physiotherapy, four just used medicines and 7 went back to the trainings with pains symptoms.

In what it concerns to the chronic injuries, three athletes of the feminine team and three of the masculine team have chronic injuries. The girls have told one chronic injury in the shoulder, one in the calf and the other in the lumbar. Two boys told to have chronic injury in the tibia and one in the groin.

According to Willian and Benjamin (1999), the chronic injuries happen mainly because of continuous movements repetition, causing stress in the structure and resulting in a decrease of it capacity, in addition, the injuries with deficient recovery tend to become chronicle.

Still with relationship to the second specific objective, it was questioned the athletes for the preventive equipments used. The five goalkeepers, two of the feminine team and three of the masculine team, told to use the whole equipment for the function (helmet, chest guards, padded shorts, heavily padded hand protectors, leg guards, and foot guards, monthguards, etc.). Two female players use monthguards, leg guards and gloves and the others (14) use only monthguards and leg guards. Of the 14 male players, six told to use only leg guards and monthguards, four only leg guard and just one doesn't use any equipment protection. All players use soccer shoe so much for the trainings as for the games, and they maintain them in good use conditions and change them every six months.

It is important to mention that the preventive equipments is indispensable to reduce the injuries occurrence, mainly the monthguards, because in according to Jamenson and Lee (1989), 1% of the lesions occurred in the face happen in the teeth (fractures) due to beaten, sticking and balls shock, in which the players were without the monthguard. Even being little the percentage of lesions in this area, it is considered one of the most aggressive and irreversible.

3.3 Relationship among number of injuries with the time of practice and with the players' age of field hockey Brazilian selections.

The fifth and last specific objective of this study was to relate the number of injuries with the time of practice and with the players' age of the two teams.

Table 2 - Relationship among number of injuries with the time of practice and with the players' age of field hockey of the female and male teams.

Variables	Female		Male	
	r_c	p	r_c	p
Nº of injuries x practice time	0,32	0,22	-0,20	0,50
Nº of injuries x age	-0,05	0,86	-0,016	0,96

With the application of the *Pearson* correlation with $p \leq 0,05$, is verified in the Table 2 that there was not significant correlation among number of injuries, time of practice and the players' age. However, considering the probability founded, the females with smaller age and with larger time of practice presenting more injuries. The behavior of the correlation for the male was similar of the females; however, the age factor presented larger correlation with the injuries occurrences than the time of practice.

These results could have several justifications. However, it is important to emphasize to the leaders, coaches, physical trainers and players the importance of the work together aiming to fortify and to compensate the requested muscular groups, to incentive the use of preventive equipments, as well as improve the technical aspects to reduce the consequences of the injuries.

4 CONCLUSIONS

With base in the obtained results and respecting the limitations of the study, we conclude that:

a) the female team is homogeneous in terms of body mass and stature, however heterogeneous in the age and time of practice; the masculine team is heterogeneous with relationship at the time of practice;

b) the most part of players had already sporting experience in other modalities, mainly in the indoor football, soccer and swimming;

c) considering the time of practice of the international elite players' selections, the two Brazilian selections of this study can be considered beginners;

d) all the male players had already suffer injuries, mainly in the areas of the knee, shoulder, fist and hand; the great majority of the feminine team already suffered lesions, mainly in the lumbar area, in the fist and hand, and in the thigh;

e) both teams had already injured in lumbar column, and they complain about pains after the training;

f) the largest injuries mechanisms, according to the players, are the training excess and the body position (flexion of trunk) adopted for the game;

g) even being a beginner group, many players was great periods out of the trainings for treat the injuries;

h) the most of players use protection equipments for training and during the games and they, caring about for the quality of the same ones;

i) until the moment, for the two teams, the injuries seems didn't have interference of the time of practice or of the age of the players.

The data obtained by the athletes' perception pointed for the need of improvement so much of the physical training as of the technical level of the teams, to reduce the effects of the overloads happened during the trainings and consequently the number of injuries.

5 REFERENCES

ALCOCK, J.; BAKER, W; DONALDSON, A.; GILL, L. New South Wales youth sports injury report. **Northern Sydney Area Health Services**, 1997.

EGGER, G. **Sports Injuries in Australia:** Causes, Costs and Prevention. Sydney: Centre for Health Promotion and Research, 1990.

FENETY, A.; KUMAR, S. Isokinetic trunk strength and lumbosacral range of motion in elite female field hockey players reporting lower back pain. **Journal of orthopedic and sports physical therapies.** v. 16, n. 3, p. 129-135, 1992.

FREKE, M.; DALGLEISH, M. Injuries in women's hockey: part one. **Sport Health.** v. 12, n. 1, p 41-42, 1994.

GERBERICH, S. G. *et al.* Analysis of severe injuries associated with volleyball activities. **Physician and Sports Medicine**. v. 15, n. 8, p. 75-79, 1987.

GOTTSCHALL, J. S.; KRAM, R. Ground reaction forces during downhill and uphill running. **Journal of Biomechanics**, v. 38, 445-452, 2005.

GOMES, F. P. **Curso de estatística experimental.** 13. ed. Piracicaba: Nobel AS. 1990.

JAMISON, S.; LEE, C. The incidence of female injuries on grass and synthetic playing surfaces. **Australian Journal of Science and Medicine in Sport.** v. 21, n. 2, p.15-17,1989.

LILLEGARD, W. A.; BUTCHER, J. D.; RUCKER, K. S. **Manual de Medicina Desportiva**: uma abordagem orientada aos sintomas. 2. ed. São Paulo: Manole, 2002.

LINDGREN, S.; MAGUIRE, K. Survey of field hockey injuries. **Sports Science and Medicine Quarterly.** v. 1, n.3, p. 7-12, 1985.

MAGILL, R. **Aprendizagem motora:** Conceitos e aplicações. 5ª ed. São Paulo: Editora Edgard Blücher, 2000.

SANTOS, S. G. dos. **Estudo das características de impacto e da percepção humana de conforto na prática de "ukemis" em diferentes tatames.** 2003. 177 f. Tese (Doutorado)-Engenharia de Produção e Sistemas da UFSC, Universidade Federal de Santa Catarina, Florianópolis, 2003.

STACOFF, A. *et al.* Running injuries and shoe construction: some possible relationships. **International Journal Sport Biomechanics**, v. 4, p. 342-357, 1988.

VALIANT, G. A.; CAVANAGH, P. R. A study of landing from a jump: implications for the design of a basketball shoe. **Biomechanics.** v. 9, p. 117-122, 1985.

WILLIAN W.; BENJAMIM J. Volleyball Injuries: managing acute and overuse disorders. **The Physician and Sportsmedicine Jounal.** v. 27, n. 3, p. 1-8,1999.

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FIELD HOCKEY ATHLETES INJURIES: A STUDY WITH THE MASCULINE AND FEMININE BRAZILIAN SELECTIONS

Abstract

The purpose of this descriptive study was to analyze the injuries and the mechanisms of injuries pointed for the athletes of the Brazilian selection of feminine and masculine hockey. Participated of the study 17 females players with average of 18,8+3,95 year-old and practice time of 3,69 ± 3,8 years and 14 male players with average of 18,8±1,3 year-old and practice time of 6,0±4,2 years. As measure instrument was used a questionnaire validated with 93% of validity and 100% of clarity. The data were treated with descriptive statistics and correlation of Pearson with p=0,05. The results show that the females are most injured in the lumbar area (8/39), followed by the fist and hand (7/39) and thigh (6/39). The males presented more injuries in the knee (7/26), followed by the shoulder (5/26), fist and hand (4/26). The female team pointed as largest injuries mechanisms the training excess followed by the posture adopted for the game (previous flexion of the trunk). The male team mentioned all the injuries mechanisms that the feminine team, increasing the defensive and offensive actions during game. Most of athletes use preventive equipment and prioritize the quality of the footwear. There was no relationship among number of injuries and the time of practice (rc=0,32;0,22 - feminine; and rc=-0,20;0,05 - masculine) and with the players' age (rc=-0,05;0,86 - feminine; and rc=-0,016;0,96 - masculine). This results emerge for improvement initiatives so much of the physical conditioning, accomplishing a compensatory muscular work, as for the improvement of the athletes' technical level, for to reduce the deleterious effects caused by the mechanical solicitations of the modality.

Key Words: field hockey, injuries, injuries causes

LES BLESSURES DES ATHLÈTES DE HOCKEY SUR GAZON: UNE ÉTUDE AVEC LES SÉLECTIONS BRÉSILIENNES MASCULINES ET FÉMININES

Résumé

Le but de cette étude descriptive a été d'analyser les blessures et les mécanismes de blessures précisés par les athlètes de la sélection brésilienne de hockey féminin et masculin. Les participantes de l´étude ont été 17 joueuses avec l'âge de 18,8+3,95 années et avec le temps d'entraînement de 3,69 ± 3,8 années et 14 joueurs avec l'âge de 18,8±1,3 années et avec le temps d'entraînement de 6,0±4,2 années. L'instrument de mesure utilisé a été un questionnaire validé pour ce but avec 93% de validité et 100% de clarté. Les données ont été traités avec des statistiques descriptives et la corrélation de *Pearson* avec p=0,05. Les résultats montrent que les les blessures des femmes sont la plupart dans la région lombaire (8/39), au poing et à la main (7/39) et aux cuisses (6/39). Les athlètes de l'équipe masculine ont présenté plus de blessures aux genoux (7/26), à l'épaule (5/26), au poing et à la main (4/26). L'équipe féminine a cité comme les plus grands mécanismes des blessures l'excès d'entraînement bien que la posture adoptée pour le jeu (la flexion antérieure du tronc). L'équipe masculine a mentionné tous les mécanismes des blessures que l'équipe féminine et aussi les actions défensives et offensives pendant le jeu. La plupart des athlètes ulilise le matériel préventif et donne priorité à la qualité des chaussures. Il n'ont pas été trouvés des rapports entre le nombre de blessures et le temps d'entraînement (rc=0,32;0,22 - féminin; et rc=-0,20;0,05 - masculin) avec l'âge des joueurs (rc=-0,05;0,86 - féminin; et rc=-0,016;0,96 - masculin). Les résultats obtenus suggérent des initiatives d'amélioration du conditionnement physique, en faisant un travail musculaire compensateur, ainsi que d'amélioration du niveau technique des athlètes, pour réduire les effets nuisibles causés par les demandes mécaniques de la modalité. **Mots clef :** hockey sur gazon, des blessures, les causes des blessures.

LESIONES DE ATLETAS DE HOCKEY DEL CAMPO: UN ESTUDIO CON LAS SELECCIONES BRASILEÑAS MASCULINAS Y FEMENINAS

Resumen

Este estudio de cuño descriptivo tuvo como objetivo analizar las lesiones y los mecanismos reportados por los atletas de la selección brasileña de hockey femenino y masculino. Participaron del estudio 17 jugadoras con un promedio de edad de 18,8±3,95 años y tiempo de práctica de 3,69 ± 3,8 años y 14 jugadores con un promedio de edad de 18,8±1,3 años y tiempo de práctica de 6,0±4,2 años. El instrumento de medida utilizado fue una encuesta válida para este fin, con un 93% de validez y un 100% de clareza. Los datos fueron tratados con estadística descriptiva y correlación de *Pearson* a p=0,05. Los resultados apuntan que las lesiones más relatadas por las atletas fueran en la región lombar (8/39), seguida de la muñeca y manos (7/39) y muslo (6/39). Los atletas del equipo masculino presentaron más lesiones en la rodilla (7/26), seguido del hombro (5/26), muñeca y manos (4/26). El equipo femenino reportó como mayores causadores de sus lesiones el exceso de entrenamiento seguido de la postura adoptada para el juego (flexión anterior del tronco). Por otro lado, el equipo masculino citó todos los mecanismos que el equipo femenino apuntó, acrecentando como causadores de lesiones, las acciones defensivas y ofensivas. La gran mayoría de los atletas utiliza equipamientos preventivos y prima por la calidad de los calzados. No se encontró relación entre el número de lesiones con el tiempo de práctica (r_c=0,32;0,22 - femenino y r_c=-0,20;0,05 - masculino) y con la edad de los jugadores (r_c=-0,05;0,86 - femenino y r_c=-0,016;0,96 - masculino). Los resultados obtenidos apuntan para iniciativas tanto en nivel de mejoría del condicionamiento físico, trabajando el aspecto compensatorio cuanto a la mejoría del nivel técnico de los atletas, para desde modo, amenizar los efectos delecterios advenidos de las solicitaciones mecánicas de la modalidad.

Palabras llave: hockey del campo, lesiones, causas de las lesiones.

LESÕES EM ATLETAS DE HÓQUEI SOBRE A GRAMA: ESTUDO COM AS SELEÇÕES BRASILEIRAS MASCULINA E FEMININA

Resumo

Este estudo de cunho descritivo teve como objetivo analisar as lesões e os mecanismos de lesões apontados pelos atletas das seleções brasileiras de hóquei feminino e masculino. Participaram do estudo 17 jogadoras com média de idade de 18,8 ± 3,95 anos e tempo de prática de 3,69 ± 3,8 anos e 14 jogadores com média de idade de 18,8 ± 1,3 anos e tempo de prática de 6,0 ± 4,2 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 e correlação de *Pearson* a p=0,05. Os resultados apontam que as lesões mais relatadas pelas atletas da equipe feminina foram na região lombar (8/39), seguida do punho e mão (7/39) e coxa (6/39). Os atletas da equipe masculina apresentaram mais lesões no joelho (7/26), seguido do ombro (5/26), punho e mão (4/26). A equipe feminina reportou como maiores causadores de suas lesões o excesso de treino seguido da postura adotada para o jogo (flexão anterior do tronco). A equipe masculina citou todos os mecanismos de lesões que a equipe feminina, acrescentando ainda como causadores de lesões às ações defensivas e ofensivas. A grande maioria dos atletas usa equipamento preventivo e prioriza a qualidade do calçado. Não se encontrou relação entre número de lesões com o tempo de prática (r_c=0,32;0,22 - feminino; e r_c=-0,20;0,05 - masculino) e com a idade dos jogadores (r_c=-0,05;0,86 - feminino; e r_c=-0,016;0,96 - masculino). Os resultados obtidos apontam para iniciativas de melhoria tanto do condicionamento físico, realizando um trabalho muscular compensatório, quanto para a melhoria do nível técnico dos atletas, para assim amenizar os efeitos deletérios advindos das solicitações mecânicas da modalidade. **Palavras Chaves:** hóquei de grama, lesões, causas das lesões.