The body region where injuries had occurred more frequently was the knee, reported by 7 subjects (38,8%). The shinbone (11%), the thigh (5,5%), the Achilles tendon (5,5%) and the leg (5,5%) were the other affected regions reported by the subjects. Williams et al (1991) cited by Laurino and Alloza (2003), said the knee is the most affected anatomical region during running. The authors also say, however the controversies reported by the literature regarding the region of the body the injuries most occur, the lower limb is cited as the predominant location of injuries related to overload (between 36% to 90%), while the injuries in the upper limb represent 6,5% to 24,4% (LAURINO; ALLOZA, 2003). Langoski (2002) cite the joint injuries as a consequence of swimming and running and for only one of his subjects, that type of injury was related to cycling.

Regarding the reasons for the injuries, the following ones were cited by the subjects: overtraining, 4 subjects (22,2%); the lack of stretching, 2 (11%); running, (11%); the lack of appropriate rest, 1 (5,5%); and muscular shortening, 1 (5,5%). Laurino and Alloza (2003) say the overuse (overtraining) is the responsible for most of the injuries, ranging from 41% to 75% according to the literature. Korkia, Tunstall-Pedoe and Maffuli (1994) observed that 65% of the injuries had occurred during running, 16% during cycling and 12% during swimming, which shows the run as the modality responsible for most of the injuries in triathlon.

The most frequent treatment was the physiotherapy, reported by 9 subjects (50%). The other types of treatment cited were lift weighting (5,5%), surgery (5,5%) and immobilization (5,5%).

Korkia, Tunstall-Pedoe and Maffuli (1994) did not find significant relationship between the injuries in triathlon and the variables training duration, training volume, type of surface, training intensity, warm up conditions, stretching and force training. Other studies emphasize there are no relationship between the injuries incidence and the training volume, years of training and experience in the modalities, differently of some studies with runners.

Vleck and Gregoire (2000) in their study with runners found significant relationship between the injuries incidence because of overload and plenty other factors as the total training volume, the cycling volume, the swimming volume, the total number of running sessions per week and the average speed during cycling.

One can also cite that Korkia, Tunstall-Pedoe and Maffuli (1994) reported that the injuries incidence is higher in the athletes that have been training for 4 years or more comparing them to groups with less experience.

CONCLUSION

The results of this study accord to the results reported in the literature, regarding the type of injury and the body region where the injury occurred. Considering the type of injury, the muscular one was the most cited by the subjects. The body region most affected was the knee and the most cited reason for the injury was the overtraining. As the injuries most occur during the training sessions and not during the competitions one suggest that coaches and athletes should look for preventive actions in order to avoid the overtraining and the incidence of injuries, as stretching every day as part of the daily routine, improving the performance of these young Brazilian triathletes.

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Rua Ataulfo Alves 163- Roçado-São José- Santa Catarina - CEP: 88.108-220
(48) 84223895 / e-mail: elinaisfreitas@yahoo.com.br

INJURIES INCIDENCE IN BRAZILIAN PRO TRIATHLETES

Abstract

The International Triathlon Union (ITU) defines triathlon as a modality composed by swimming in open waters, cycling in streets or roads and running. The sport became popular and, every day, more people adhere to the practice of triathlon and have to overcome obstacles when swimming, cycling and running in order to reach the finish line in a competition. This study aimed to identify the injuries incidence in Brazilian professional triathletes. The study was characterized as descriptive and the sample was composed by eighteen athletes (14 male and 4 female). Six of them were members of the Brazilian National Team in 2003 and champions of the Santa Catarina State Cup of Triathlon, also in 2003. The instrument of the study was a validated questionnaire composed by items that supplied information about the incidence, the type and the reason of the injury; the body region where the injury occurred; and the type of injury treatment. One observed that from the 18 athletes, 13 (72,2%) had already suffered some injury and 5 (27,8%) had never suffered any kind of injury. The results of this study accord to the results reported in the literature, regarding the type of injury and the body region where the injury occurred. Considering the type of injury, the muscular one was the most cited by the subjects. The body region most affected was the knee and the most cited reason for the injury was the overtraining. As the injuries most occur during the training sessions and not during the competitions one suggest that coaches and athletes should look for preventive actions in order to avoid the overtraining and the incidence of injuries, as stretching every day as part of the daily routine, improving the performance of these young Brazilian triathletes.

Key-words: triathlon, injuries, training.

INCIDENCE DE LÉSION ON TRIATHLON BRÉSILIEN DE ÉLEVÉ NIVEAU TECHNIQUE

Résumé

Le Triathlon est une compétition de natation dans des eaux ouvertes, suivie d'une compétition de cyclisme dans des rues ou des routes, finissant avec une course. Il a un augmentation d'adeptes du triathlon, lequel pratiquer trois sports dans une seule modalité prend les athlètes au défi de surpassement. Cepedant, la grand prévalence de lésion cause interruptions sur l'entraînement et la nécessité de traitement médical. L'objectif de cette recherche est indentifier l'incidence de lésion aux athlètes

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ELINAI DOS SANTOS FREITAS, GRAZIELA AVELINE SILVEIRA,
LUCIANA GASSENFERTH ARAUJO, SUZANA MATHEUS PEREIRA
Santa Catarina State University - Cefid-Udesc; Florianópolis/Santa Catarina, Brazil;
elinaisfreitas@yahoo.com.br

INTRODUCTION

The International Triathlon Union (ITU) defines triathlon as a modality composed by swimming in open waters, cycling in streets or roads and running (LAURINO; ALLOZA, 2003).

The sport became popular and, every day, more people adhere to the practice of triathlon and have to overcome obstacles when swimming, cycling and running in order to reach the finish line in a competition.

Considering triathlon is a recent sport, scientific studies are necessary in order to promote the modality evolution and development.

This study aimed to identify the injuries incidence in Brazilian professional triathletes.

METHOD

The study was characterized as descriptive and the sample was composed by eighteen triathletes (14 male and 4 female). Six of them were members of the Brazilian National Team in 2003 and champions of the Santa Catarina State Cup of Triathlon, also in 2003.

The instrument of the study was a validated questionnaire composed by items that supplied information about the incidence, the type and the reason of the injury; the body region where the injury occurred; and the type of injury treatment.

The data collection was carried out in two places: at *Casa Brasil Telecom*, which is a temporary shelter of the Brazilian National Team; and in the Santa Catarina State Cup of Triathlon 2003 (the top ten male and the first and second female to cross the finish line were invited to participate of the study). After a brief explanation of the objectives of the study, the researchers scheduled the date and time for data collection.

The questionnaire answers provided the data base information and data were analyzed through the descriptive statistics (average, standard deviation, frequency and percentage).

RESULTS AND DISCUSSION

The sample characteristics are presented in Table 1: number of subjects and age when practice triathlon started:

Table 1 - Characteristics of the sample subjects (number of subjects - *n*, average and standard deviation for age and for age when the triathlon practice started - *started in triathlon*).

	n	Age	Started in triatlhon
Male	14	23,8 ± 3,5	17,0 ± 4,6
Female	4	23,5 ± 5,8	18,2 ± 3,8
Total sample	18	23,7 ± 3,8	17,0 ± 4,4

The age average shows that Brazilian Pro Athletes are young and may have chances of success in Olympic Games and World Championships, since the age average of the highest level athletes of short distance triathlon is 27 years old for females and 35 years old for males (ROWLANDS; DOWNEY, 2000).

Concerning the age the subjects started to practice the modality, men initiated around 17 years old (sd 4,6), a little sooner than women, who initiated around 18 (sd 3,8). According to the literature, subjects older than 15 years old are able to tolerate more intensive training sessions and are ready to start performing specific exercises, when the physical development improves the performance (PATCO, 2003).

One observed that from the 18 triathletes, 13 (72,2%) had already suffered some injury and 5 (27,8%) had never suffered any kind of injury. Langoski (2002) found that 90% of the sample of his study, composed by 21 Pro triathletes, reported some kind of injury (61% of them were swimmers before becoming triathlon athletes).

Table 2 presents the type of injury reported by the athletes in this study.

Type of injury	**Muscular 5 (28%) Ligament/tendon 4 (22,2%) Joint 3 (16,6%)** **Bone 2 (5,5%)**		
Body Region	Knee 7 (38,8%)	Shinbone 2 (11%)	Thigh 1 (5,5%)
	Scapula 1 (5,5%)	Achilles Tendon 1 (5,5%)	Leg 1 (5,5%)
Reasons	Over training 4 (22,2%)	Lack of stretch 2 (11%)	Run 2 (11%)
	Muscular Shortening 1 (5,5%	Lack of rest 1 (5,5%)	
Treatment	Physiotherapy 9 (50%)		Lift weighting 1 (5,5%)
	Surgery 1		(5,5%)
	Immobilization 1 (5,5%)		

As observed in Table 2, 5 subjects (28%) reported muscular injuries; 4 (22,2%) reported tendon and ligament injuries; 3 (16,6%) reported joint injuries; and 2 (5,5%) reported bone injuries. Korkia, Tunstall-Pedoe and Maffuli (1994) found in their study, 15% of the subjects reported tendon injuries, 12% presented skin injuries, 2% presented bone injuries and 5% presented other types of injury, as isquiotibial syndrome, meniscus injury, bone fracture and fascite plantar. According to Langoski (2002), most of the injuries occur during training sessions and not during competitions.

et vérifier leurs manifestations les plus courants. On participé de la recherche 18 triathlétes brésiliens de élevé niveau technique (6 ont intégrants de l'Equipe Brésilienne de Triathlon - 2003). L'âge moyenne est de 24 ans. L'âge moyenne de début au triathlon de 17 ans pour les hommes et 18 ans pour les femmes. Un questionnaire a été utilisé pour lever de données. Le banque de données ont été analysées à travers de la statistique descriptive et ils sont présentés à travers des graphiques et des tableaux. Parmi les 18 triathlètes interviewées, leurs 13 ont ou ont eu quelque type de lésion, tant que seulement 5 n'ont eu lésion. Les résultats dans cette étude sont d'accord avec la littérature, principalement en ce qui concerne le tyle de lésion et de la région du corp concernée. La lésion musculaire a été le plus fréquent. Le genou a été la région du corp avec la plus atteinte el la raison principale de lésion a été l'excès d'etraînement. La kinésitherápie a éte le principal traitement. La lésion tendent à arriver pendant l'etraînement, et pas dans les compétitions. On suggère des actions préventives, comme la fortificacion musculaire et éviter l'excès d'entraînement, lequel contribueront à l'améliorantion du niveau technique du triathlon brésilient.

Mots clés: triathlon, lésion, entraînement.

INCIDENCIA DE LESIONES EN TRIATHLETAS BRASILEÑOS DEL ALTO NIVEL TÉCNICO

Resumen

Triathlon es definido por la Unión Internacional de Triathlon (ITU), como una competición de natación en aguas abiertas, seguida competición por una competición de ciclying en las calles, acabando con una competición de carrera. Cada día más adeptos están implicando en este deporte donde practicar tres deportes en apenas una modalidad lleva los atletas a superación de desafío. Sin embargo, el alto predominio de lesiones causa interrupciones en el entrenamiento y la necesidad del tratamiento médico. El objetivo de este estudio foie identificar la incidencia de lesiones ocurridas y verificar lás mas comunes. Dieciocho triathletes brasileños han participado de esta investigación. Seis de ésos son participante del Selección Nacional de Triatlon - 2003, promedio de la edad 24 años, promedio de iniciación en el triathlon 17 años para los hombres y 18 años para las mujeres. Para el recoger datos fue utilizado un cuestionario reorganizado y validado para el estudio. Los datos fueran analizados con estadística descriptiva y presentados a través de gráficos y de tablas. Trece (13) de los dieciocho (18) triathletas entrevistados habían tenido cierto tipo de lesión, mientras que solamente 5 nunca habían tenido lesión. Los resultados encontraron en este estudio entran de acuerdo a la literatura, principalmente cuanto al tipo de lesión y región del cuerpo. Las principales lesiones fueran en el tejido muscular, la rodilla fue la región del cuerpo con más incidencia y la razón principal fue el excesivo entrenamiento. El principal tipo de tratamiento fue la fisioterapia, pues lesiones tienden en suceder durante el entrenamiento y no en competiciones, se puede sugerir acciones para prevenir las lesiones como el excesivo entrenamiento y la consolidación de las estructuras debe ser parte del entrenamiento rutinario diario de estos jóvenes triathletes, contribuyendo para la mejora del nivel técnico del triathlon brasileño.

Palabras clave: triathlon, lesiones, entrenamiento

INCIDÊNCIA DE LESÕES EM TRIATLETAS BRASILEIROS DE ALTO NÍVEL TÉCNICO

Resumo

O Triathlon é uma competição de natação em águas abertas, seguida por uma competição de ciclismo em ruas ou estradas, terminando com uma competição de corrida. Cada dia há mais adeptos nesse esporte em que praticar três esportes em uma única modalidade leva os atletas ao desafio de superação. Entretanto, a alta prevalência de lesões causa interrupções nos treinamentos e necessidade de tratamento médico. O objetivo dessa pesquisa foi identificar a incidência de lesões ocorridas em triathletas e verificar seus acometimentos mais comuns. Participaram da pesquisa 18 triathletas brasileiros de alto rendimento, sendo 6 integrantes da Seleção Brasileira de Triathlon - 2003, média de idade de 24 anos, média de idade de início no triathlon de 17 anos para os homens e 18 anos para as mulheres. Para a coleta de dados foi utilizado um questionário reestruturado e validado para o proposto trabalho. Os dados foram analisados através da estatística descritiva e apresentados através de gráficos e tabelas. Dos 18 triathletas entrevistados 13 tem ou tiveram algum tipo de lesão, enquanto apenas 5 nunca tiveram lesão. Os resultados encontrados nesse estudo vão de acordo com a literatura, principalmente no que se refere ao tipo de lesão e região do corpo. Os maiores acometimentos foram as lesões musculares; a região do corpo de maior incidência foi o joelho e o motivo principal foi o excesso de treinamento. O principal tipo de tratamento realizado foi a fisioterapia. Como as lesões tendem a acontecer durante o treinamento e não nas competições, sugere-se que ações preventivas como evitar o excesso de treinamento e o fortalecimento das estruturas em questão deva fazer parte da rotina diária de treinamentos desses jovens triathletas contribuindo para a melhora do nível técnico do triathlon brasileiro.

Palavras chaves: triathlon, lesões, treinamento.