Sports injuries in track and field: comparison between information obtained in medical records and reported morbidity inquires

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ABSTRACT

To understand sports injuries is necessary to quantify and associate them with specific risks factors from sports. Although, formal records about sports injuries are rare overcoat in Brazilian track and field athletes where few clubs have health care service. This fact could not be a problem, because public health researchers adapt with epidemiological methods, like report inquires morbidity, to collect data. From this fault of control about sports injuries records and the facility to have information together athletes, the aim of this study was to collect information about sports injuries, reported by high performance athletes, going back until eight months and compare them with their records. Twenty-five athletes were analyzed (sixteen men and nine women), age 25.7 ± 4.4 (years), height 1.74 ± 0.10 (m), weight 70.4 ± 13.15 (kg) and time of practice 8.38 ± 4.06 (years). Two physiotherapists were trained separately to collect information about sports injuries, one in records and another with the athletes in interview. The binomial proportion test by agreement was used to compare the information with 95% of confidence. After analyzed the agreement between that two collect forms, that variables values were within the limits of confidence established for statistics tests with the following values: 88.33% to the variables injury tip and injury mechanism or high of symptoms, 90% to the variable quality of return to the sports practice and 91.67% to the variables anatomical place and period of training. There was high rate of agreement between collected information, showing reported morbidity inquire efficiency in collect data about sports injuries.

Key words: Track and field. Sports injuries. Morbidity inquires.

INTRODUCTION

Track and field is different from the other sports modalities by attempting several biomechanical gestures due to its variety of events. The constant exposition to risk factors and consequent injuries occurrence due to its practice warns for the necessity of quantifying lesions associated to this sport in order to control and also to avoid them, enabling not only the performance improvement, but also the maintenance of the athlete's health.

In the public health context, the quantification of diseases is performed by means of epidemiological resources, which use strategies adequate to each research possibility[1], where two groups of methods are presented: 1) routine records of attendance such as the clinical records that, when well organized and standardized, become an excellent and reliable instrument for morbidity studies; 2) reported morbidity inquires (RMI), where the injured athlete reports his lesion himself, going back a given period of time, being often used for injuries recordings, where no clinical evaluations or additional examinations are required[2].

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However, reviews on the subject have warn for the difficulty of making comparisons between results of those inquires and of ratifying its validity, especially due to the absence of definitions standardizations and employed methods. Thus, the type of health harm related to the remembrance and to the morbidity report is worthy of emphasis.

Allusive matters regarding the benign affections, common accidents, complaints and non-expressive symptoms are limited to short and recent periods: two weeks are the period selected by many researchers. Data on serious accidents or internment rather include longer intervals, commonly going back 12 months[1,2].

Usually, the epidemiological inquires are used when the existing information are inadequate or insufficient in virtuousness, among other factors, of improper or insufficient notifications[3,4] what, indeed, occurs in the sportive context, especially in Brazil.

Thus, with the objective of investigating the frequency of specific sports lesions in our environment, inquires or forms towards sports modalities or several physical practices were developed[5-10]. In this way, an instrument used in public health was included in the sports in order to describe and to characterize specific injuries, however, yet with no agreement regarding the time of the lesion installation until the interview report as a determinant factor to the remembrance. Specifically regarding this last aspect, the use of the RMI as a collecting instrument, going back to periods of time longer than two weeks, seems to be contradictory.

Hahn[11] verified in his study, that signs or symptoms in the knee articulations of athletes were concordantly remembered between periods from one week up to one year. Pinheiro *et al*.[12], identified information disagreements regarding osteo-muscular symptoms in bank clerks, related to different periods of time, shorter or longer.

Despite the researchers' effort, the records on sports lesions occurrence, even in high performance sports, besides not standardized, are restricted. There is a great difficulty on the access to information on athletes and their lesions, resulting in a lack of control about the current situation of injuries installation to the health of those involved in sports activities, according to findings of Chalmers[13]. Without this adequate control, the difficulties on the prevention and the possibilities for lesions installation are both higher, including track and field.

In this work, it was verified the difficulty of generating information on Sports Injuries(51), especially in track and field, as well as the lack of protocols in that purpose. The training centers spread all over the country, do not dispose of any type of injuries record. Different situation is observed in the Prudentina Track and field Association (PAA), which counts on systematic records of sports injuries during all season, enabling comparison between different collect forms.

To have knowledge about the period of time in which the athlete is able to remember the lesion, as well as the possibility for the application of a RMI, going back such time, may serve as aid for training centers that have no systematic records, besides other health professionals related to sports in general, to be able to collect data about sports injuries.

Due to the doubt about the athletes' remembrance time on their sports lesions, it was understood as convenient to perform an investigation on the application of a RMI, as an attempt of obtaining data on injuries occurring in this modality.

Thus, the objective of this study is to survey information of high-performance athletes, going back eight months through RMI and to compare them to clinical records.

CASUISTIC AND METHOD

1. Nature and population of the study

The research's data were obtained from interviews and files containing SI information occurred during one training season and track and field meetings, what characterizes this study as being of transversal type. However, as reported information address to facts already occurred, a retro-analytical component is also inserted, as described by Pereira[2], where multiple variables were analyzed.

Twenty-five athletes from the Prudentina Track and field Association (PAA) were analyzed, sixteen male (64%) and nine female (36%). All are track and field runners, specialists in power and velocity competitions, who train in the National Center of Track and field Training, at Presidente Prudente – SP, Brazil.

Besides the experience time in sports practice and the participation on the Training National Center, it is worthy mentioning that all athletes analyzed have already participated on important competitions in the national or international fields in the modality studied.

2. Description of the reported morbidity inquire (RMI) and variables involved

The RMI was composed by a questionnaire used as data collecting instrument, elaborated by means of a closed model, initially containing personal data with regard to the athletes such as: genus, age, weight, height and time of training.

For the attainment of information regarding SI, questions about the type of lesion, anatomical place, mechanism and training period were added, besides the information regarding the return to the regular physical activities based on

the experience of other authors who have already worked with similar instruments[7,8,10]. In order to facilitate the attainment of information and its further organization, all items related to the variables researched were numerically classified. The RMI model and its classification are presented on figure 1.

In this study, SI is considered as any pain or muscular-skeleton affection resulting from sportive trainings or com-

File #:_____ Sex:_____ Age:_____ Height:_____ Weight:_____ Training years:_____

Presence of sports injuries in season:

( ) Yes ( ) No

Lesion characteristics:

Variables	Sportive lesion							
Identification of the sportive lesion	1ª	2ª	3ª	4ª	5ª	6ª	7ª	8ª
Type of lesion								
Anatomical place								
Training period								
Lesion mechanism or increase of symptom								
Return to regular activities								

Classification of variables

Type of lesion	Lesion mechanism	Anatomical place	
1-muscular distension	1-start of running	1-shoulder	12-anterior thigh
2-muscular constriction	2-speed running	2-arm	13-posterior thigh
3-tendinopathy	3-resistance running	3-forearm	14-knee
4-sprain	4-hurling/throwing	4-elbow	15-leg
5-myalgia	5-horizontal jumps	5-wrist	16-leg calf
6-periostitis	6-vertical jumps	6-hand	17-ankle
7-synovitis	7-fall	7-thorax	18-foot
8-fracture	8-abrupt stop	8-abdomen	19-other
9-bursitis	9-collision with obstacle	9-lumbar region	
10- unspecified severe pain	10-muscular exercise	10-cervical region	
11- unspecified chronic pain	11-elongation	11-hip	
12- others	12-others		

Return to regular activities
1-asymptomatic
2-symptomatic

***Fig. 1** – RMI representation and classification of the variables investigated*

petitions, sufficient to cause alterations on the regular training, either in type, duration, intensity or frequency[14].

The matter regarding the type of lesion aimed to identify, as epidemiological studies of reported morbidity, the injury noticed by the athlete, regardless the clinical diagnosis. The lesion anatomical place counted on an illustrative figure of the human body, with the purpose of facilitating the athlete's identification.

The mechanisms for the lesion installation or the increase of signs and symptoms were investigated aiming to know the occurrence moment of the reported SI. Now, the training period in which the lesion occurred revealed the specific phase of the training in the season, the lesion was observed, where the following periods are considered: basic, specific and competitive. Finally, the return to activities was presented with the purpose of observing the return to the regular sportive practice, in other words, without any training alterations, occurred with or without the presence of symptoms.

3. Field procedures

Two physiotherapists who received identical questionnaires were trained separately to collect information about sports injuries suffered by athletes during the last season of trainings and competitions (eight months). One of them obtained data from personal interview using specific form, therefore, characterized as RMI. The other one, using the same form, attempted to fill it out based on records from the PAA health sector, covering the period relative to the same season. Those procedures are described on literature as procedures used to perform morbidity studies within a population or institution[1-3].

It is worthy elucidating that the information contained in the PAA records are retroactive until 4 days from the athlete's exposition to the sports injury and are complemented with information obtained from the technical commission and from the team's health sector, while RMIs bring information of up to 8 months preceding the research, only regarding to the injured athlete.

4. Statistical procedures

The SI records were considered as gold standard for being recorded shortly after the event and for counting on the identification of lesion signs and symptoms, which enabled to characterize more clearly history, nature, situational cause and procedures adopted for the control and treatment of the injury.

The study of responses agreement on both collect forms (records and inquires) considering type of lesion, anatomical place, lesion mechanism or symptom increase, training period and quality of return to activities was performed using the binomial proportion test by agreement and the limit of 95% of confidence was established[15].

5. Legal aspects of the research

The participation of the population investigated was given by means of reading, comprehension and written authorization of a term for clear and free permission, which was approved together with the original project for this research by the Research and Ethics Committee from the Medical School of São José do Rio Preto – SP, Brazil.

RESULTS

On table 1, one verifies, besides the SI frequency distributions, according to the means of data attainment, the information agreement values and the proportion test with the respective intervals of confidence. The muscular injuries were the most observed in both the records and the inquires and the tendinopathy also presented high rate in both collect forms, where the information agreement value showed proportion test significant for $p < 0.0001$.

The frequencies distributions of injured anatomical places, as well as the agreement values for this variable, are presented on table 2. The lower members were the most injured, regardless the collect forms, with emphasis to the

TABLE 1
Absolute and relative frequency distribution of SI according to the collect form, information agreement values, proportion test and limits of confidence

Type of lesion or injury	Collect form	
	Record	Inquire
Distension	12 (20%)	12 (20%)
Constriction	6 (10%)	8 (13.33%)
Sprain	3 (5%)	2 (3.33%)
Unspecified severe neuralgia	1 (1.67%)	1 (1.67%)
Tendinopathy	14 (23.33%)	13 (21.67%)
Myalgia	5 (8.33%)	2 (3.33%)
Periostitis	7 (11.67%)	7 (11.67%)
Pubalgia	2 (3.33%)	2 (3.33%)
Synovitis	1 (1.67%)	1 (1.67%)
Unspecified chronic neuralgia	9 (15%)	7 (11.67%)
Without reports	–	5 (8.33%)
Total	60 (100%)	60 (100%)
Agreement	53 (88.33%)	
Disagreements	7 (11.67%)	
Proportion test	9.25 ($p < 0.0001$)	
Limits of confidence agreement	80.21% ≤ agreement ≤ 96.45%	

thigh, ankle/foot and leg calf; in this case, the agreement level was of 91.67%.

The lesion mechanism or the increase of signs and reported symptoms is presented on table 3. The speed running is a moment where most injuries occur in both records and inquires with only one disagreement. The high jumps are also worthy of emphasis, once besides presenting high rates, also showed total information agreement.

The table 4 regards to the variable training period, where an agreement of 91.67% is observed in the reported information, when compared to the records, emphasizing the basic and specific periods as the selected for SI installation.

The table 5 presents data regarding the quality of return to regular activities, in other words, whether return occurred with or without signs or symptoms associated to SI. It was verified that the return to training for the group studied,

TABLE 2
Distribution and agreement of lesion or injuries places (reports x inquires), proportion test and limits of confidence

Anatomical place	Collect form	
	Report	Inquire
Upper members	1 (1.67%)	1 (1.67%)
Trunk	7 (11.67%)	7 (11.67%)
Hip	2 (3.33%)	2 (3.33%)
Thigh	15 (25%)	13 (21.67%)
Knee	11 (18.33%)	9 (15%)
Leg/leg calf	12 (20%)	12 (20%)
Ankle/foot	9 (15%)	8 (13.33%)
Groin	3 (5%)	3 (5%)
Without reports	–	5 (8.33%)
Total	60 (100%)	60 (100%)
Agreement	55 (91.67%)	
Disagreement	5 (8.33%)	
Proportion test	11.68 (p < 0.0001)	
Limits of confidence agreement	84.68% ≤ agreement ≤ 98.66%	

TABLE 3
Distribution and agreement of SI mechanisms or increase of symptom (reports x inquires), proportion test and limits of confidence

Lesion mechanism or increase of symptom	Collect form	
	Report	Inquire
Speed or explosion running	25 (41.67%)	24 (40%)
Resistance running	4 (6.66%)	3 (5%)
Hurling/throwing	1 (1.67%)	1 (1.67%)
Jumps	18 (30%)	18 (30%)
Muscular exercise	7 (11.67%)	6 (10%)
All athletic gestures	5 (8.33%)	3 (5%)
Without reports	–	5 (8.33%)
Total	60 (100%)	60 (100%)
Agreement	53 (88.33%)	
Disagreement	7 (11.67%)	
Proportion test	9.25 (p < 0.0001)	
Agreement confidence limits	80.21% ≤ agreement ≤ 96.45%	

TABLE 4
Distribution and agreement of training periods in which SI or injuries occurred (reports x inquires), proportion test and limits of confidence

Training period	Collect form	
	Report	Inquire
Basic	22 (36.67%)	21 (35%)
Specific	33 (55%)	29 (48.33%)
Competitive	5 (8.33%)	5 (8.33%)
Without reports	–	5 (8.33%)
Total	60 (100%)	60 (100%)
Agreement	55 (91.67%)	
Disagreement	5 (8.33%)	
Proportion test	11.68 (p < 0.0001)	
Agreement confidence limits	84.68% ≤ agreement ≤ 98.66%	

TABLE 5
Distribution and agreement of the return quality to regular sportive activities after SI (reports x inquires), proportion test and limits of confidence

Return to regular sportive activities	Collect form	
	Report	Inquire
Asymptomatic	11 (18.33%)	10 (16.67%)
Symptomatic	49 (81.67%)	45 (75%)
Without reports	–	5 (8.33%)
Total	60 (100%)	60 (100%)
Agreement	54 (90%)	
Disagreement	6 (10%)	
Proportion test	10.33 (p < 0.0001)	
Agreement confidence limits	84.21% ≤ agreement ≤ 97.59%	

occurred with higher frequency, still with presence of signs and symptoms and that the information agreement for this variable was of 90% with $p < 0.0001$.

DISCUSSION

When investigating SI, one notices the lack of agreement between researchers in the conceptual field. Such fact must always be recalled in discussions on the subject, once the disagreements make the analysis between similar studies difficult, in other words, discussions involving populations of athletes[5,7,8].

The SI in this research, as observed in other researches, were presented with high rates, what lead us to agree with the affirmation of Laurino *et al*.[9], who concluded that track and field may be considered as a high risk sport for the appearance of SI, in his study. Besides the training load itself, other factors such as age, genus, modality, time of training and precocious specialization seem to contribute for its installation.

Among the SI most observed, the tendinopathy and the muscular distension stand out, which are also observed as the most frequent in studies of Shiffer[16] and D'Souza[17], involving track and field. Those lesions showed to be marking for the athletes who participate on this research.

Another injury observed in this study was the periostitis, involving 11.67% from the total, disregarding, however, injuries caused by stress, different from what was observed in the research of Bennell and Crossley[14], where such occurrence, involving track and field modality, was the most observed. The main reason suggested for such variations involves intrinsic and extrinsic characteristics, particular of each situation, such as surface of sportive practice, weather, specialty and the sports training itself and its adaptive characteristics[18].

From the conceptual point of view, the word periostitis has also generated subsidies for discussion: initially, all athletes referred to this injury as "shinbone injury". Indeed, this word is used systematically by many people involved with track and field, replacing the expression tibial stress syndrome. Thus, reports considering the installation of "shinbone injury" were reviewed, being related to a more adequate terminology proposed for the study and disregarding the specificity of the anatomical place for the injury. Thus, the "shinbone injury", representing the tibial stress syndrome was replaced into the definition considered for the periostitis installation.

With the analysis of results, particularities were observed in three injuries: constriction, myalgia and unspecified chronic neuralgia. During the data collecting, it was observed that some athletes that reported to be suffering from constrictions, in fact presented signs and symptoms of myalgia.

The confirmation of the mistake by the interviewed was given through writings on records and through observations of the technical commission that established what actually occurred. Such fact explains the situation presented in the results, pointing out a disagreement regarding the highest rate of reported constrictions in inquires written on reports, and also the low agreement with regard to the myalgia, when reports and inquires were compared.

In cases of unspecified chronic neuralgias, the justification for the account of their high disagreement rate involves their own unspecificity. In other words, signs and symptoms poorly defined, non-specific and also of lower importance are unlikely to be remembered.

Generally, the injuries verified in this research showed coherence with other studies[9,10,14].

With regard to the preference places for lesions installation, one noticed that they are found in other investigations within populations of athletes, which researched the physical compromising originated from the mentioned sportive practice[9,10,14,16]. Such fact may be explained by the higher demand applied to the lower members when compared to other regions, above all by dealing about athletes specialized in speed and muscular explosion competitions.

When disagreeing values are discussed for this variable, comments on the athlete's behavior are needed, about his act of reporting the anatomical place of the lesion. In many cases, the non-remembrance of injuries occurred to thigh region, knee and to the ankle/foot complex was justified, due to amount of injuries in these places.

The SIs occur in all physical preparation phases of athletes. However, the highest prevalence of installation was observed in the specific period. It is worthy recalling that this is the longest interval among the other three analyzed. 55% from the total of lesions were registered on records and 48.33% of information on inquires.

D'Souza[17], in a study with track and field athletes of different competition levels, observed that most lesions occur at the training period (60%) and 20% at the competition period. Although the division of SIs into training periods is coherent with our research, the proportions are different. Only 8.33% of injuries were recorded in competitions within the modality. This fact should be valorized, above all by the characteristics of the training level of each individual, in this study, only high performance athletes.

The main reported or registered activities responsible for the highest number of injuries were the activities that require speed and muscular explosion with 41.67% and 40% in records and inquires, respectively. This fact was confirmed by several authors, who identified the activities that

require explosive movements as the activities that most injure, regarding track and field[9,10]. This situation may be explained especially by the excessive biomechanical requirements, either of articulations or of muscular groups involved in such mechanism[19].

The return to the regular physical activities was presented mostly in the presence of signs and symptoms. 81.67% of lesions were registered in records and 75% of lesions registered in inquires. We observed a higher disagreement rate between instruments in the symptomatic return, if compared to the asymptomatic return. Thus, the information collected seem to disagree from the affirmations of Pereira[2], about the most marking injuries to the individuals. However, it is worthy recalling that the total number of symptomatic returns to the sportive practice was higher than the asymptomatic returns and, this way, it has a higher probability of disagreement.

The investigation results, generally showed to be conflicting with findings of Pinheiro *et al.*[12], who tested agreement levels in osteo-muscular symptoms reports in 7 days and 12 months before the application of an interview. It was verified that only in one region of the body, the shoulders, the agreement between findings occurred. However, the sample was composed of bank clerks, what could explain such results.

Hahn[11] verified the validity of the self-report knee symptoms among athletes and concluded that weekly questionnaires could be replaced by yearly ones, due to the disagreement level found in his responses. Those statements confirm the results of this research regarding the interval period of the injury installation and report in inquires.

When analyzing the researches abstracts from Hahn[11] and Pinheiro *et al.*[12] and comparing their results to results of this study, one notices that the populations investigated inform, through RMI, the muscular-skeletal lesions occurred, where such injuries seem to be more marking to individuals who need the locomotive device in perfect conditions in order to perform their work duties, fact observed in high-performance athletes.

Based on results found, it was also observed that it is possible to use RMI with time interval going back eight months after the SI installation with relative accuracy, as an instrument of data collecting for scientific research purposes, involving high-performance athletes, especially SI which signs and symptoms showed to be remarkable.

Those statements are in agreement with Girotto *et al.*[7] and Netto Jr.[10] who used similar instrument arguing the importance of SI for high-performance athletes in order to collect information going back long periods since the injury installation until the moment of the interview.

CONCLUSION

From the survey and comparison of information suggested as objective of this research, it was verified that a high rate of agreement between all information surveyed occurred, showing the efficiency of the Reported Morbidity Inquire as instrument of information collecting about sportive lesions for the population investigated.

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