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Influence of the physical and psychological variables on physical injuries in football

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ABSTRACT

Fernández, R., Zurita, F., Cepero, M., Molina, V.A., Vilches, J.M., & Ambris, J. (2015). Influence of the physical and psychological variables on physical injuries in football. *J. Hum. Sport Exerc.*, 10(3), pp.785-794. Over the years, a great number of studies have examined the importance of preventing sports injuries and developing effective physical procedures and psychological techniques for the recuperation of the injured athlete. The present study evaluates the effect of age, category, equipment, and anxiety/feature in the occurrence of injuries in football (soccer). A total of 277 players from 26 different football teams of Ciudad del Carmen (Mexico) participated in the study. Data on the variables of interest were compiled by the self-recording of sports injuries together with the questionnaire STAI-RASGO. The results did not reflect statistically significant differences between the variable sports injury and age, category, and anxiety/feature, respectively ($p=.542$; $p=.127$; $p=.598$); significant differences were found only in the relation sport and team ($p<.001$). We conclude that the cause of sports injuries is multifactorial and therefore interdisciplinary work is fundamental, such as the development of programmes that approach the athlete from an integral standpoint. **Key words:** INJURY, SPORTS, ANXIETY, FOOTBALL.

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INTRODUCTION

Currently a large number of sports are practiced in the world, football (soccer) standing out due to its social acceptance and cultural importance. This sport is characterized by, among other things, the economic profits that it can generate, especially in teams with international recognition (Lago, Rey & Lago, 2009). At all levels, athletes are subjected to many and diverse physical and psychological requirements, particularly football players, for the above-mentioned social implications in all aspects of the lives of these athletes. In fact, any error committed by a football player can have considerably greater repercussion than one committed by an athlete in any other sport. On occasions, the continual exposure to public opinion in general and other stressful factors (Aguirre-Loaiza & Ramos, 2011) can eventually diminish the performance of the athlete and even increase the chances of sports injuries (Johnson & Ivarsson, 2010).

In fact, football is a contact sport in which serious physical injuries are common (Gioftsidou et al., 2011; Majewsky, Sussanne & Klaus, 2006). It is calculated that a player can have as many as 5.6 injuries per 1000 hours of competition (Emery, Meeuwse & Hartmann, 2005) or even up to a total of 7.8 injuries (Kontos, 2000). In the United States, a total of 17 million sports injuries have been recorded, of which almost 2 million require emergency-room attention. In Great Britain, for example, sports injuries represent 33% of all injuries described (Gregory & Lynn, 2004). Each sport is usually related to one type of injury or other, since the technical movements differ according to the sport and the exposure to external factors differs. With respect to football, lesions of the ankle, knee (meniscus problems), tendonitis, sprains, etc., fundamentally of the lower members (Junge & Dvorak, 2004).

The causes of injuries that occur in football are diverse and on occasion can depend on each player. In general, these lesions have common factors, i.e. physical and physiological factors as well as levels of fatigue (Clansey, Hanlon & Wallace, 2012), nutrition (Fernández, Gutiérrez & Castillo, 2007), physical condition of each player (Gregory & Lynn, 2004), and age (Díaz, Buceta & Bueno, 2002). With respect to this latter variable, it is evident that as the athlete ages, the stamina and quality of the conjunctive tissues is lower and therefore the probabilities of injury increase (Arnason, Sigurdsson, Gudmundsson, Home, Engebretsen & Bahr, 2004). Furthermore, as time passes, the player is subjected to more instances of risk. This factor should also be taken into account, as in football situations of injury risk continually arise because of the differential characteristics of this sport.

Within the sphere of sports, including football, it is essential to develop physical procedures to diagnose, prevent, and treat sports injuries (Grubor & Grubor, 2012; Reuter & Mehnert, 2012; Rosenthal, Michael, Rainey, Tognoni & Worms, 2012; Yabroudi & Irrgang, 2012; Yuill, Pajackowsky, Jason & Howitt, 2012) which can avoid or alleviate the numerous adverse consequences that could result (Cumps, Verhogen, Annemans & Meeusen, 2008).

In addition to the physical and physiological variables, we should not overlook the importance of psychological factors and their relation to the lesions in the sport. In this respect, some studies have examined, for example, the effects of psychological support for the injury prevention and rehabilitation (e.g. Christakou & Zervas, 2007; Noh, Morris & Andersen, 2007) or the use of psychological strategies during the injury-recovery process (e.g. Monsma, Mensch & Farroll, 2009). Taking into account the importance of injury prevention, other researchers have nevertheless focused on finding psychological variables for predicting injuries (Chan, King & Martin, 2012; Chan & Hagger, 2012). Many studies related to this topic have realized the influence of anxiety in injuries (Olmedilla, Andreu, Ortín & Blas, 2010). For example, with

respect to football, it has been confirmed that athletes with deep anxiety are injured more in comparison with players free from such anxiety (Abenza, Olmedilla & Ortega, 2010).

Taking as a reference the above, the present study seeks to evaluate to what degree age, team, category and anxiety/risk could affect sports-injury incidence in 277 players. In this way, afterwards, suitable strategies and procedures can be planned to avoid the effect of these variables in the occurrence of injuries.

MATERIALS AND METHODS

Design and Participants

This study has a transversal and descriptive quantitative design. The participants were selected by stratification techniques, proportionality, and randomness. A total of 277 football players from Ciudad del Carmen (Mexico) participated, aged 10 to 18 years ($M=14.24$ years; $D.T=2.58$). With respect to the variable category, 78 players (28.2%) belonged to the beginner category, 94 (33.9%) to the junior category, and 105 (37.9%) to the senior category. The study complied with the ethical guidelines of the Research Committee and the Declaration of Helsinki of 1975.

Variables and instruments

The present study took as a reference the following variables and measuring instruments:

- 1. Category.** Divided into Beginner, Junior, and Senior.
- 2. Team.** Divided into 26 categories, one per team.
- 3. Sports Injury.** Divided into two possible response options: occurrence or not of injury.
- 4. State of Anxiety/Feature.** This is one of the most widely used questionnaires in the world to measure states of anxiety, proposed by Spielberger, Gorsuch & Lusbene (1970). It is used currently within the field of health (Ronquillo, 2012) and specifically in the context of sports (Horikawa & Yagi, 2012). It is composed of a Likert-type scale with values from 0=nothing to 3=much, referring to 40 items which, after scoring, give two levels: State of Anxiety (caused at a given moment by a stressful stimulant) or Feature Anxiety (continuous over time and promoted by the tendency of a person to behave habitually in an anxious way). Taking into account that the injuries were recorded over the season, only anxiety/feature was measured, since we considered that anxiety/state measured only at the moment when the questionnaires were passed out would not offer relevant information on the number of injuries.

- 5. Self-recording of Sports Injuries.** Developed in a specific way in this study for recording the variables categories, age, other socio-demographic variables, number of injuries in the 2010/11 season, and degree of severity. The evaluation system used for reference was the Colorado Injury Reporting System (Hanson, McCullagh & Tonymon, 1990), which classifies the injuries as minor, moderate, and serious, taking as a criterion the down time from normal activity.

Procedure

A request was made of the Mexican Football Association (Federación Mexicana de Fútbol Asociación, A.C; FEMEXFUT) and the Sports Service of the University of Ciudad del Carmen for the teams selected to participate in the study. The parents of the under-age players were asked for consent, with anonymity of the information guaranteed.

In the month of November 2012, information was collected with the Anxiety/Feature Questionnaire at the beginning of the 2011/2012 season. Each player received the self-record of sports injuries so that they could write down the number of injuries and inactivity time for each injury.

Data analysis

The participation index was 100% both for trainers as well as for players, with no questionnaire invalidated. The analysis techniques used were descriptive analyses, the Cronback alpha reliability analysis (see Instruments section), and Pearson's frequency analysis and correlation coefficient. The statistical analysis used for the data was the SPSS Version 20.0

RESULTS

Taking the descriptive analyses as a reference, with respect to the variable "sports injury", most of the participants did not suffer any type of injury during the 2011/12 season ($n=232$; 83.8%). Only 45 participants (16.2%) were injured during the season (Table 1):

Table 1. Results for the number of injuries of the participants.

Injury	Frequency	Percentage
With injury	45	16.2%
Without injury	232	83.8%
Total	277	100%

The variable "category" (Table 2) indicated that the number of participants in the category beginners was 78 (28.2%); junior 33.9% ($n=94$) and seniors 37.9% ($n=105$).

Table 2. Results for the variable "category".

Category	Frequency	Percentage
Beginners	78	28.2%
Juniors	94	33.9%
Seniors	105	37.9%
Total	277	100%

With regard to anxiety/feature (Table 3), 52.7% ($n=146$) of the football players presented normal values, followed by 46.2% ($n=128$) with high anxiety and only 3 participants with low anxiety.

Table 3. Results of the variable Anxiety/Feature.

Anxiety/Feature	Frequency	Percentage
Low	3	1.1%
Normal	146	52.7%
High	128	46.2%
Total	277	100%

With respect to the correlation analysis, we found statistically significant differences ($p=.542$) for age and injury (Table 4):

Table 4. Results of the relation between the variables lesion and age ($p=.542$).

Age	Injury		Total
	YES	NO	
10 years	3	33	36
11 years	4	17	21
12 years	2	19	21
13 years	6	23	29
14 years	4	20	24
15 years	11	30	41
16 years	6	31	37
17 years	5	38	43
18 years	4	21	25
Total	45	232	277

No statistical differences ($p=.127$) were found, either, in the relation between the variables injury and category (Table 5):

Table 5. Results for the relation between the variables sports injury and category ($p=.127$).

Category	Injury		Total
	YES	NO	
Beginners	9	69	78
Juniors	21	73	94
Seniors	15	90	105
Total	45	232	277

However, statistically significant differences were found between the variables sports injury and team ($p<.001$), more than 50% of the injuries being distributed among only 5 of the 26 teams studied (Table 6).

Table 6. Results for the relation between the variables sports injury and team ($p<.001$).

Category	Injury		Total
	YES	NO	
Barcelona	4	9	13
Escualos	6	3	9
Monarcas	5	5	10
Tiburones B	4	7	11
Deportivo	4	7	11
Total	24	31	54

Finally, no significant statistical differences ($p=.598$) were found in the relation between injury and anxiety/feature, as reflected in Table 7:

Table 7. Results for the relation between the variables sports injury and anxiety/feature ($p=.598$).

		Anxiety/Feature			Total
		Low	Normal	High	
Yes	Count	0	26	19	45
	% Injury	0	57.8%	42.2%	100%
	% A/R	0	17.8%	14.8%	16.2%
No	Count	3	120	109	232
	% Injury	4.3%	63.4%	32.3%	100%
	% A/R	100%	82.2%	85.2%	83.8%
Total	Count	3	146	128	277
	% Injury	1.1%	52.7%	46.2%	100%
	% A/R	100%	100%	100%	100%

DISCUSSION AND CONCLUSIONS

In sports, especially those related to performance, athletes are subject to many demands, sometimes provoking stress as well as physical and emotional overload that is difficult to overcome. As commented above, one of the consequences of this overload, despite that in some cases appropriate injury-prevention programmes are developed (Gioftsidou et al., 2012), sports injuries can nevertheless occur (Bahr & Maehlum, 2007; Horikawa & Yagi, 2012), related to periods of overtraining (Mesussen, Duclos, Gleeson, Rietiens, Steinacker & Urhausen, 2006) maintained by the athlete as a way to control different states and emotions that can be generated by stress.

Focusing on the variable sports injury, we find that 16.2% of the participants were in fact injured. This percentage cannot be considered high, given that football is a contact sport with frequent situations of bodily impact. Olmedilla et al. (2006) for example, recorded 31.5% of the 92 players between 10 and 15 years old sustained injuries. In any case, it is probable that our results were due to a lower number of matches than the athletes had during the 2011/2012 season. This factor could have influenced the low injury rate of, as it is mainly during matches that the greatest number of actions involving physical risk occur, resulting in traumas by direct impact (Emery et al., 2005).

Given that no statistically significant differences were found between the variables age and sports injury ($p=.542$), it is certain that the participants of 15 years of age registered the most injuries. This finding is similar to that of Emery et al. (2005), who reported that players of 14 years old showed the highest incidence of lesions. On the other hand, it was also confirmed that the younger football players were injured to a lesser degree, as reported by other researchers such as Majewski et al. (2006). The reason that players of 15 years of age had more injuries may be because of the different physical, hormonal, and psychological states and changes that occur at this age, possibly leading to a higher number of aggressive incidents on the playing field (Barkley & Robin, 2011).

Concentrating on the variables category and injury ($p=.127$) we find that there were no statistical differences, either, although we did identify an irregular trend in the number of injuries, these being distributed mainly in the category of juniors and seniors. These data are consistent with those of Olmedilla et al. (2006) showing a higher number of injuries in the upper categories. Other authors such as Majewski et al. (2006) have also found that football players belonging to the junior category sustained more injuries than did beginners. The reasons may be varied, since the higher the category, the greater the physical and

psychological demands as athletes are subjected to steadily longer hours and more instances of mental and physical overexertion (Hill, Hall, Appleton & Kozub, 2008). On the other hand, the number of matches increases exponentially with respect to the lower categories, this factor being crucial, as the degree of demand and stress becomes more evident than in situations of training, exposing the athlete to more situations prone to injuries (Emery et al., 2005).

Regarding the variable “team”, significant differences were found ($p < .001$), these results indicating that certain teams among all those selected were affected to a greater degree by certain external and internal factors predisposing athletes to injury. Other factors may include a greater number of inadequate exercises (Faude et al., 2005), worse conditions of the playing field, exposure to situations of overtraining (Mesussen, Duclos, Gleeson, Rietiens, Steinacker & Urhausen, 2006) or teaching styles of the trainers themselves. With respect to this latter point, it bears noting that trainers with their communication methods and abilities act mainly on the training styles (García-Mas et al., 2011). In this sense, the ways of teaching and transmitting football skills have been defined by many authors (Ponce, 2006; Sánchez-Sánchez, Molinero & Yague, 2012), as has the importance of not fomenting unfavourable psychological states in the athlete (Sousa, Cruz, Torregrosa, Vilches & Villamarín, 2006; Smith, Smoll & Cumming, 2007) which could lead to some type of injury (Johnson & Ivarsson, 2011; Ortín, Garcés de los Fayos & Olmedilla, 2010).

With respect to the results for anxiety/feature, 46.2% of the football players presented high levels for this variable. These values can be considered significantly high if we take as a reference the study made by Olmedilla, Bazaco, Ortega & Boladeras (2011), where the percentage of anxiety/feature found was 17.3% in senior players aged 16 to 19 years.

From our perspective, the levels of anxiety registered in the participants may have been because these players may have been influenced by certain variables present in the sports context that encourage this type of state, e.g. the relationship with teammates, motivational factors, learning styles of the trainers, competition, or the capacity for self-control (Alarcón, Cárdenas, Piñar, Miranda & Ureña, 2011; Englert & Bertrams, 2012; Ledochowsky et al., 2012).

Taking as a reference the correlational results, we find that anxiety/feature do not specifically encourage these sports injuries (only 45 players over the season). Other authors, however, have detected a clear relation between lesions and anxiety (Johnson & Ivarsson, 2011; Rivas et al., 2012). Also, we should note that the sample selected included athletes belonging to the base sports and therefore it is probable that psychological factors such as anxiety/feature had no relevance in the occurrence of injuries such as physical factors, where at this age the football players suffer a lower number of direct traumas, more common on the other hand in professional categories (Garret, Kirkendal & Contiguglia, 2005).

Finally, it is bears highlighting certain limitations of the present research that could limit the extrapolation of the results. First of all, it would be of interest to record other variables in addition to the ones used in this study. Also, the number of participants could be increased to include females and examine athletes in other sports. For the present study, the main conclusions are:

1. In the sample selected, age, category, and anxiety/feature did not influence the incidence of athletic injuries.
2. The distinctive personal characteristics of each team may be factors determining the possibility of developing effective measuring instruments for the diagnosis of sports injuries as well as the formulation of objective and reliable injury-prevention programmes.

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