

*Translated from the original in spanish*

## **Effect of sports injuries on psychological variables in pitchers of baseball**

### **Efecto de las lesiones deportivas sobre variables psicológicas en lanzadores de béisbol**

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**Received:** April 17<sup>th</sup>, 2017.

**Approved:** September 2<sup>nd</sup>, 2019.

#### **ABSTRACT**

The present research is framed in the field of sports injuries, having as object of study its relation with the psychological variables associated to the sports performance in baseball pitchers. The work was developed with 24 pitchers constituting a heterogeneous population in terms of chronological age, sports age, history and number of injuries suffered. The following instruments were used for its evaluation: Questionnaire on Sports Aspects and Injuries, the Inventory of the State of Anxiety in Competition and the Psychological Inventory of Sports Execution. The results obtained indicate statistically significant differences in the state of the psychological variables between pitchers with a history of injuries and those who did not at the time of the study, which allowed determining the negative effect of the injuries on self-confidence, competitive anxiety, negative coping control, attention control and imaginative visual control. In the group of pitchers with a history of injuries, statistically significant relationships were shown in self-confidence and negative coping control, establishing relationships with the number of injuries suffered in such a way that the greater the number of injuries, the greater the difference in both variables. On the other hand, motivation, attitude control and positive coping control did not offer any differences between injured and uninjured pitchers. The negative effect of the injuries on the psychological variables studied showed different levels of relationship and dependence in these athletes studied.

**Keywords:** effect; baseball pitchers; sport injury; psychological variables.

## RESUMEN

La presente investigación se enmarca en el campo de las lesiones deportivas, teniendo como objeto de estudio su relación con las variables psicológicas, asociadas a la ejecución deportiva en lanzadores de béisbol. Se trabajó con 24 lanzadores lo que constituye una población heterogénea en cuanto a edad cronológica, edad deportiva, antecedentes y cantidad de lesiones sufridas. Para su evaluación, se utilizaron los siguientes instrumentos: cuestionario sobre aspectos deportivos y lesiones, el inventario del estado de ansiedad en competición y el inventario psicológico de ejecución deportiva. Los resultados obtenidos indican diferencias estadísticamente significativas en el estado de las variables psicológicas entre lanzadores con historial de lesiones y aquellos que no las presentaron en el momento del estudio, lo cual permitió determinar el efecto negativo de las lesiones sobre la autoconfianza, la ansiedad competitiva, el control del afrontamiento negativo, el control de la atención y el control visuoimaginativo. En el grupo de lanzadores con antecedentes de lesiones, se mostraron relaciones estadísticamente significativas en la autoconfianza y el control del afrontamiento negativo, estableciendo relaciones con la cantidad de lesiones sufridas, de manera tal, que, a mayor número de lesiones, mayor es la diferencia en ambas variables. Por otra parte, la motivación, el control de la actitud y el control del afrontamiento positivo no ofrecieron diferencias algunas entre lanzadores que se han lesionado y los que no lo han hecho. El efecto negativo de las lesiones sobre las variables psicológicas estudiadas mostró diferentes niveles de relación y dependencia en estos deportistas estudiados.

**Palabras clave:** efecto; lanzadores de béisbol; lesión deportiva; variables psicológicas.

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## INTRODUCTION

Sports injuries are a major medical problem in sport. Its multicausal aetiology and the adverse effects it causes on the health of sportsmen and women and their performance have contributed to the fact that its study is diverse in terms of the field of science that deals with it and from the moment that this approach is produced, whether it is called prevention, treatment or rehabilitation. Despite its transcendence, it was not until the 1970s of the 20th century that Psychology focused its attention on sports injuries, and several researchers initiated the first works in this field: Abadie, (1977); Brown, (1971); Irwin, (2019); Jackson, et al., (1978).

his beginning, still recent, establishes the novelty of the subject in each field and sports context where it is applied, since the evident has always been by nature, in the causal relationship between physical and sports factors as antecedents of injuries, ignoring the role of psychological processes in sports activity, since there is no human behavior stripped of subjectivity. However, it was not until the work of Andersen and Williams (1988) that the first theoretical model is constructed that explains the relationship of psychosocial stress with sports injuries and from then on an intense scientific production begins until the lines of research affirmed by Olmedilla and García-Más (2019) are established.

The first of these lines of research is the one that groups together the relationship between psychological factors and the vulnerability of the athlete when injured, which has an important group of studies. Olmedilla, (2006); Nicholls and Polman, (2007); Abenza, et al., (2009); Johnson and Ivarsson, (2011); Olmedilla, et al., (2010); Olmedilla, et al.,(2010); Ortín, et al., (2010); Abenza, (2010); Zurita, et al., (2015); Berengüí, et al., (2011); Berengüí, et al., (2015); Gonzales, et al. On the other hand, the study of the history of injuries and their influence on the psychology of the sportsman constitutes the second line, although with less empirical evidence due to the number of studies conducted Ramírez, A. et al. (2010); Short, et al. (2004); Olmedilla, et al., (2019); Abenza, et al. While the third is the one that groups the investigations that focus their analysis on the emotional and psychological reactions of the injured sportsman. Bricker and Fry, (2006); Arvinen-Barrow, et al., (2007); Jeansonne, et al., (2008); Scherzer and Williams, (2008); Tracey, (2008); Abenza, et al., (2009); Abenza, et al., (2010).

According to Ortín et al., (2010) and Palmi y Solé (2014), although there is currently recognition of the relationship between injury and psychological variables, the current dispersion of data and concepts leaves open the possibilities of new research in search of consolidating a unitary criterion, constituted on the basis of a broad accumulation of scientific results in multiple sports and contexts, which make it possible to understand with greater accuracy, this dialectical relationship between the psychological variables in the occurrence of the injury during their treatment, rehabilitation and its effect on the psychology of the sportsman.

From the general point of view and to find points of contact between research dedicated to psychology in baseball and the situation reflected in this object of study, we consulted the work of notable scholars on the subject, such as: Milanese, H. S., & Sabates, H. R. (2015); López Solana, M. (2015); Cordella, B., & Grasso, M., (2015); Diaz, F. B., (2015); Fuentes, A. R. et al., (2019); Gutiérrez-García, P et al., (2019); Liens, Á. G. O. (2016); Martín-Rodríguez, et al., (2018).

In this sporting context, the study of the relationship between psychological variables and injuries does not constitute a habitual practice, and this is a subject that is hardly dealt with by Cuban sports professionals, in spite of the scientific evidence accumulated and socialized by the main foreign researchers. As a consequence of the foregoing, plans for physioprophyllaxis, medical or surgical treatment and physical rehabilitation of the affected limb or function are more relevant than the suppression of risk behaviors of the sportsman himself, psychological intervention to prevent the occurrence of the injury, evaluation of the impact of the injury on the subjectivity of the sportsman and the psychological treatment consistent with that impact.

In addition to the foregoing, research measuring the effect of sports injuries evaluates variables related to psychological well-being and the degree of impact by areas of personality relationship, as in the case of Liberal, et al. (2014) and the moods of athletes with a history of injuries in terms of severity and number of injuries, an example being the research conducted by Ramírez, et al. (2010). However, the study carried out by Abenza, et al. (2010) shows an analysis focused on the comparison of the state of psychological variables that influence performance (anxiety, self-confidence, influence of performance evaluation and concentration) between a group of athletes with a history of injuries and another without injuries.

Similarly, the present research is focused on the study of the effects produced by injuries on the psychology of sportsmen and women, based on the evaluation of the state of the psychological variables recognized as determinants of sports performance, which constitutes a way to establish diagnostic guidelines for objective planning of psychological preparation of those athletes with a history of injuries.

Therefore, the objective of this work constitutes the evaluation of the effect of the injuries on the subjectivity of the sportsman with the purpose of generating a research precedent that makes it possible to compare a posteriori, the results in other years and categories to identify regularities on which strategies of psychological intervention can be traced, focused not only in the sport execution, but also, in the prevention, treatment and psychological rehabilitation of the sport injuries.

## **MATERIALS AND METHODS**

The research responds to a correlational transverse descriptive design. We worked with 24 pitchers who made up the pre-selection of the Villa Clara team of the 56 national baseball series, which had a minimum age of 18 and a maximum of 33 for an average of 22.38 years and an average sports age of 12.63.

### **Techniques and instruments**

Questionnaire on sports aspects and injuries: it was applied to identify the behaviour of injuries in the target population. It has been elaborated by Olmedilla, et al., (2006). It collects information related to the history of injuries, the number of injuries suffered, the severity of the injuries and the context in which they occurred.

Psychological inventory of sport execution (Iped): this instrument is based on the work of adaptation and baremación de Hernández, (2007). It is the adaptation of the Psychological Performance Inventory (PPI) by Loehr, (1986), and is made up of 42 items, grouped in seven Likert type response scales). The psychological variables are: Self-confidence, Negative Coping Control, Attention Control, Visual and Imaginative Control, Motivational Level, Positive Coping Control and Attitudinal Control.

Descriptive statistics and the application of tests were used as the minimum, maximum and mean for the evaluation of the state of the psychological variables of the pitchers and the behaviour of the injuries in the group. Student's T-test was applied to two independent samples to compare the state of psychological variables between injured and non-injured athletes, as well as Anova of a factor to evaluate the relationship between the number of injuries suffered and psychological variables with a 95 % confidence interval. The statistical package SPSS for Windows version 22.0 was used.

## **RESULTS AND DISCUSSION**

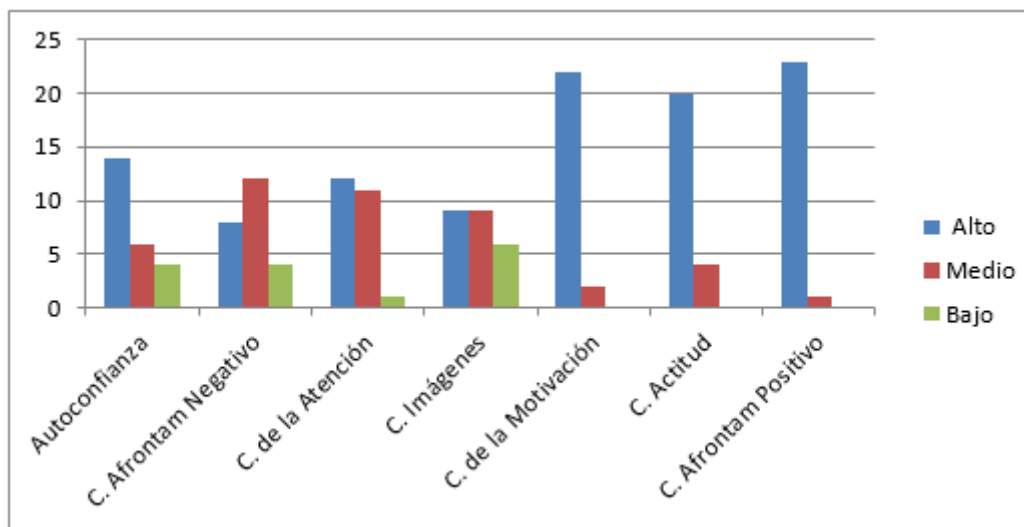
As Chart 1 shows, there are more pitchers with a history of injury in the target population and more repeated injuries. Of the injuries suffered, all were of a moderate type, which indicates that their severity does not affect the athlete's sports performance or health to any great extent, as none had been away from training and competition for more than one month, nor had produced disability or functional

impairment. More injuries occurred in the context of competition than during training, which may be due to the fact that the demands of sporting activity take on greater magnitude and expression. (Chart 1)

**Chart 1.- Behavior of sports injuries**

Total	Presence of Injuries	Absence of Injuries	Number of Injuries		Type of injury according to severity				Context of injury	
			1	2	Mild	Moderate	Severe	Very severe	Training	Competition.
24	14	10	6	8	14				3	11
%	58.3	41.7	42.9	57.2	100				21.4	78.6

In the group of pitchers, motivation, attitude control and positive coping are the best state variables, as the high level is predominant with little presence of low scores. In addition, self-confidence and attention control exhibit a more upwardly inclined behavior, as opposed to the control of negative coping and mental images. (Figure 1)



**Fig. 1-** Behavior of psychological variables in the group

Table 2 shows the comparison of the psychological variables studied between the group of pitchers with a history of injuries and the group of pitchers who do not have it, clearly showing the marked differences in self-confidence, since athletes with a history of injury have this variable at a lower average level than athletes who have not been injured. (Table 2)

On the other hand, competitive state anxiety is higher in athletes with a history of injuries and differences in the control of negative coping show those pitchers, who have not been injured, better control emotions such as: anxiety itself, anger and fear in stressful situations during competitions. These results show that pitchers, who have a history of injuries, not only experience anxiety with greater intensity, but their

coping resources are also lower to achieve optimal adaptive responses to certain acting situations.

The cognitive variables studied also showed differences between both groups of pitchers, so that the control of attention and visualization is greater in those athletes with no history of injury. In addition to the above, the results obtained in the comparison of motivational level, attitude control and positive coping did not show statistically significant differences, so it is assumed an independence with respect to the history of injuries in these athletes.

**Chart 2.** - Comparison of psychological variables between injured and uninjured

Variables	Injury history	N	Medium	Test T (bilateral)
Competitive state anxiety	He has been injured	14	2,43	,000
	He has not been injured	10	1,10	,000
Self-confidence	Se ha lesionado	14	2,00	,001
	He has been injured	10	3,00	,000
	He has not been injured			
Motivational level	He has been injured	14	2,86	,229
	He has not been injured			
	He has not been injured	10	3,00	,165
Attention Control	He has been injured	14	2,14	,001
	He has not been injured	10	2,90	,000
Negative Coping Control	He has been injured	14	1,71	,000
	He has not been injured			
	He has been injured	10	2,80	,000
	He has not been injured			
Positive Coping Control	He has been injured	14	2,93	,410
	He has not been injured			
	He has been injured	10	3,00	,336
	He has not been injured			
Visual and Image Control	He has been injured	14	1,64	,000
	He has not been injured	10	2,80	,000
Attitude Control	He has been injured	14	2,86	,229
	He has not been injured	10	3,00	,165

Chart 3 shows the results of the comparison of psychological variables within the group of pitchers with a history of sports injury, taking as a factor of grouping and analysis the number of injuries suffered. The results show that self-confidence acquires lower levels in those athletes who have suffered more injuries and in the same sense happens with the control of negative coping, while the rest of the variables did not show statistically significant differences, so, regardless of the variables mentioned above, it can be said that the negative effect of injuries on the variables studied depends more on the occurrence or absence than on the number

of times a pitcher is injured. This result may be due to the fact that all injuries were of a moderate type. (Chart 3)

**Chart 3.** Relationship between the number of injuries suffered and the state of the psychological variables

Variables	Number of Injuries	N	Medium	ANOVA Sig. (bilateral)
Competitive state anxiety	one	6	2,17	,102
	two	4	2,75	
	More than two	4	3,00	
	Total	14	2,57	
Self-confidence	one	6	2,83	,001
	two	4	2,25	
	More tan two	4	1,25	
	Total	14	2,21	
Motivation Control	one	6	3,00	,480
	two	4	2,75	
	More tan two	4	2,75	
	Total	14	2,86	
Attention control	one	6	2,33	,226
	two	4	2,25	
	More tan two	4	1,75	
	Total	14	2,14	
Negative Coping Control	one	6	2,00	,001
	two	4	1,50	
	More than two	4	1,00	
	Total	14	1,57	
Possitive Coping Control	one	6	3,00	,309
	two	4	2,75	
	More than two	4	3,00	
	Total	14	2,93	
Visual and Image Control	one	6	2,17	,094
	two	4	1,50	
	More than two	4	1,50	
	Total	14	1,79	
Attitude Control	one	6	3,00	,480
	two	4	2,75	
	More than two	4	2,75	
	Total	14	2,86	

The results obtained show the negative effect of injuries on specific variables such as self-confidence, competitive anxiety, negative coping control, attention control and visuomaginative control, as statistically significant differences were evidenced in pitchers with a history of injuries. In addition to the above, it occurred that another group of variables integrated by motivation, positive coping control and attitude control, showed a relational independence in the comparison made.

Another analysis with outstanding results is that the number of injuries suffered only negatively affected the state of self-confidence and the control of negative coping of pitchers with a history of injuries, which indicates that self-confidence and control of emotions, such as anxiety itself, are more affected to the extent that these pitchers suffer more injuries. It should be noted that it was not possible to perform the analysis according to the severity of the injury because all presented were of moderate type.

The negative effect of lesions on anxiety differs from the results obtained by Liberal et al. (2014) since this author did not find a relationship between lesions and this variable; however, they coincide with those of Abenza, et al. (2010) although, in a partial way, since the statistically significant relationship was established in his study with the severity of the lesion, whereas in the present investigation it was established from the antecedents of lesions.

Similarly with self-confidence, Abenza et al. (2010) determined that athletes who experienced serious and very serious injuries had less self-confidence and in this study athletes with a history of injury had less self-confidence and, among them, those who had suffered more injuries.

The rest of the variables could not be contrasted with investigative antecedents because no similar study was found in the consulted bibliography that used the same instrument or another similar one that evaluates them.

In spite of the results obtained and in a conclusive way, it is essential to make several considerations:

The scope of the research design allows an approach to the causal relationship between sports injuries and the state of the psychological variables studied, showing the adverse effect on them in a given group of athletes, however, this relationship cannot be stated in a linear and simplistic way, because the study is carried out at a given time and psychological processes have the characteristic of being dynamic and dialectical.

In view of the above, it is pertinent to carry out longitudinal studies where the effect on the subjectivity of the athlete can be measured, at various times, before the occurrence of the injury, since this may be a factor that mediates this relationship.

These studies should be characterized by being methodologically homogeneous in terms of the population being studied, time of application, instruments, variables to be evaluated, and statistical methods to systematize them and establish regularities and specificities that this area of knowledge does not have today.



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