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PSYCHOLOGY

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The Psychophysiological State of Athletes with Different Levels of Aggression

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Abstract

Purpose. Study of the link between psychophysiological state and levels of aggression in elite wrestlers.

Methods. 27 elite wrestlers aged between 18 and 30, all members of the Ukraine National Greco-Roman Wrestling Team were examined. The scale of aggression by Buss & Darkee [1957] was used. The following parameters were estimated: subjective comfort / discomfort and balance of process of excitation / inhibition.

Results. The athletes were separated into two groups by level of aggression: group 1 with low levels of aggression (15 wrestlers); and group 2 with high levels of aggression (12 wrestlers). The first group is characterized by low significant levels of physical and verbal aggression compared to the second group ($p<0,01$). The results of subjective psychical state assessment indicate the prevalence of discomfort in athletes in group 2 compared to the first group ($p<0,05$). The study of the balance of nervous processes revealed the presence of excitation of the nervous system in group 2 athletes with high levels of aggression.

Conclusions. Aggression is a non optimal emotion which influences an increase in subjective psychical discomfort and processes excitation of the nervous system in elite athletes.

Introduction

Aggression is a personal trait which indicates the influence of internal emotions to the social environment [Filaire *et al.* 2001; Cynarski *et al.* 2015]. In the opinion of some authors, aggression is an antisocial phenomenon, which includes four factors: physical aggression, verbal aggression, anger and hostility [Archer *et al.* 2005; Buss *et al.* 1992]. However, in the everyday consciousness of coaches, there is the idea that aggression accompanies athletic activity as a necessary characteristic of an athlete's emotional mood. The manifestation of aggression in sporting activity is one of the factors which may mobilization an athlete's psychical reserves. At the same time, aggression is a manifestation reflecting the athlete's inner emotions [Maxwell 2004; Korobeynikov *et al.* 2017].

Aggression in sport is often associated with violence. This applies to violence to the opponent's personality, violence as a violation of the rules of competition, aggression and the violence of sports fans [Sacks *et al.* 2003; Keeler 2007; Grange *et al.* 2010].

But we believe that aggression in sport is linked to the internal emotional experiences of athletes before the start of competition.

The complex mechanisms of emotional organization are determining of manifestation of personal traits of athletes during the psychical and physical tensions of sports activities [Robazza *et al.* 2006; Vallerand 2010]. The different emotional phenomena in athletes can be characterized as the specific influence of either external on inner processes [Korobeynikov *et al.* 2017; Moseychuk *et al.* 2018]. This is processes of emotional specific

influence on psychical state of athletes related to psycho-physiological functions. The fine link between psychic and physiological processes forms the psycho-emotional state of athletes. If we are considering the link between the psychic phenomenon and physiological structures we can determined what influences, causes or conditions lead to the results in sports activity.

Considering that psycho-physiological functions constitute a major link to the formation of psycho-emotional reactions in situations of extreme conditions, it is logical to expect the connection between aggressive emotions and the psychophysiological state of athletes [Iermakov *et al*. 2016].

Modern sport wrestling is characteristic of the rise in levels of emotional tension during competitive activity. A fight is the clash of two people with different individual psychological characteristics. Traditionally wrestling is considered an aggressive sport [Graczyk *et al*. 2010]. However, our previous study showed that anger is not the activating emotion factor in wrestling activity [Korobeynikov *et al*. 2017]. We established that anger interferes with processes of reasoning and choice: the person is worried, emotionally excited and as a result there is a loss of control in this situation. That is why we can establish the relation between psychophysiological states and levels of aggression in elite athletes.

Thus, our hypothesis indicates the relationship between psychophysiological state and levels of aggression in elite athletes. We can assume that aggression is not always accompanied by the optimal psychophysiological state of elite wrestlers.

Purpose

Study of the link between psychophysiological state and levels of aggression in elite wrestlers.

Methods

Participants

27 elite wrestlers (age: 24.34±5.65 years; the duration of sports activities: 10.32±3.73 years) age 18-30, members of the Ukraine National Greco-Roman Wrestling Team were examined.

The athletes were separated into two groups by level of aggressiveness: the first group – wrestlers with low levels of aggression (15 athletes, 56%), the second group – wrestlers with high levels of aggression (12 athletes, 44%).

Measures

Written authorization in accordance with the recommendations of the ethical committee, were received from all the athletes. The experimental study was approved by the Ethics Committees for Biomedical Research in accordance with the ethical standards of the Helsinki Declaration.

Procedure

The hardware and software complex for psychophysiological diagnostics «Multipsuchometer-05» were used. The sequence of the study methods: level of psychical state (color test of Luscher [1990]) and balance of nervous process were used.

The scale of aggression by Buss & Darkee [1957] was used. The following parameters were estimated: subjective comfort / discomfort and balance of process of excitation / inhibition.

Statistical analysis

The statistical analysis used the applied program "Statistica 6.0". Also used were non parametric statistical analysis by Wilcoxon criterion with processing of median and low (25%), upper (75%) quartiles.

Results

The mean of aggression in wrestlers of different level of aggressiveness are presented in Table 1. This data showed that the group with low levels of aggressiveness is characterized by low significant levels of physical and verbal aggression by comparison with the group of athletes with high levels of aggressiveness. Corresponding results are shown for parameters of general aggressiveness. In indicators of objective and auto aggression we can see the tendency to low absolute values in wrestlers with low levels of aggression. For the parameter of emotional aggression, there are no differences between either group of athletes, with different level of aggressiveness.

Table 2 presents the medians of means of psychical state (by Color Test of Lusher) in wrestlers with level of aggressiveness.

Table 2 data shows a significant decrease of the absolute mean of the indicator "deviation from autogenous norms" in athletes with low levels of aggressiveness in comparison to athletes with high levels of aggressiveness. The indicator of deviation from autogenous norms reflects the psychical state as subjective discomfort or comfort. Thus, the observed fact in athletes with high levels of aggressiveness is indicative of the prevalence of subjective discomfort in the psychical state. In wrestlers with low levels of aggressiveness comfort tin the psychical state is observed.

The indicator "vegetative coefficient" revealed higher means in athletes with low levels of aggressiveness than in athletes with high levels of aggressiveness. The revealed results are characterized by the greater contribution of vegetative systems in forming the psychical state of athletes with low aggressiveness compared in athletes with high levels of aggressiveness.

Table 1. Aggression indicators in athletes with different level of aggressiveness (Median, Lower Quarter, Upper Quarter)

Indicators	Low aggression (n=14)	High aggression (n=13)
Verbal aggression (conditional unit)	3,00 3,00; 4,00	5,00* 3,00; 5,00
Physical aggression (conditional unit)	3,00 3,00; 4,00	6,00* 3,00; 6,00
Objective aggression (conditional unit)	2,00 1,00; 3,00	3,0 3,00; 4,00
Emotional aggression (conditional unit)	1,00 1,00; 2,00	1,00 1,00; 1,00
Auto aggression (conditional unit)	2,00 0,00; 3,00	4,00 3,00; 4,00
Aggressiveness (conditional unit)	12,00 10,00; 13,00	18,00* 15,00; 22,00000

Notes: * - $p < 0,05$, for concerning to low aggression

Table 2. Indicators of psychical state in athletes with different levels of aggressiveness (Median, Lower Quarter, Upper Quarter)

Indicators	Low aggression (n=14)	High aggression (n=13)
Psychical capacity (conditional unit)	11,00 9,00; 13,00	10,00 8,00; 12,50
Fatigue (conditional unit)	2,00 1,00; 4,00	2,500 1,50; 4,50
Anxiety (conditional unit)	1,00 0,00; 2,00	2,00 1,00; 2,00
Deviation from autogenously norms (conditional unit)	12,00 8,00; 14,00	19,00* 14,00; 22,00
Eccentricity (conditional unit)	10,00 8,00; 12,00	9,00 5,50; 11,50
Concentricity (conditional unit)	7,00 6,00; 9,00	7,50 6,00; 10,50
Vegetative coefficient (conditional unit)	15,00 11,00; 18,00	13,50* 7,00; 17,50
Heterogeneity (conditional unit)	7,00 6,00; 10,00	7,50 5,50; 8,50
Autonomy (conditional unit)	9,00 6,00; 11,00	10,00 8,50; 11,00

Notes: * - $p < 0,05$, for concerning to low aggression

Table 3. Indicators of balance of nervous process in athletes with different level of aggressiveness (Median, Lower Quarter, Upper Quarter)

Indicators	Low aggression	High aggression
Accuracy (conditional unit)	2,91 2,53; 3,85	2,26 2,24; 2,31
Stability (conditional unit)	3,82 2,67; 5,66	3,47 3,40; 3,87
Excitation (conditional unit)	-0,32 -0,82; 0,03	0,09* 0,001; 0,30

Notes: * - $p < 0,05$, for concerning to low aggression

As a seen in Table 2 the psychical capacity is higher (not reliably) in wrestlers of low aggressiveness than in wrestlers with higher aggressiveness. Fatigue and anxiety have a tendency to decrease in athletes with low levels of aggressiveness. The tendency to an increasing indicator of eccentricity reflects the activity and the search for ways to implement the problem with the ability to compromise in athletes with low levels of aggressiveness.

The means of the balance of nervous process in athletes with different levels of aggressiveness are presented in Table 3. The results of the study view the decrease in the "excitation" indicator in athletes with low levels of aggressiveness.

This fact indicates the inhibition and balance of the nervous system between processes of excitation and braking [Kozina *et al.* 2017]. Results correspond to the means of the "accuracy" and "stability" indicators which

are of better quality in athletes with low levels of aggressiveness. This indicates higher quality reactions to visual stimulus in wrestlers with low levels of aggressiveness.

Thus, the higher levels of aggressiveness in elite wrestlers provoke mechanisms which influence the balance of the nervous process. An increase of excitation in elite wrestlers with high aggressiveness are indicators of the violation of balance between nervous process which result in a decline of stability and accuracy of sensory-moving reactions. This fact corresponds with the prevalence of subjective discomfort in the psychical state in elite wrestlers.

On the contrary, low aggressiveness links to inhibition of nervous process and improved quality of moving skills in elite athletes. In this condition subjective comfort in elite wrestlers is observed.

Discussion

The results obtained indicate significant links between psychophysiological state and levels of aggression in elite wrestlers. The high level of physical and verbal aggression relate to subjective discomfort in the psychical state and excitation of the nervous system in elite athletes. The low aggressiveness in elite wrestlers results in comfort in the psychical state and a balance between excitation and inhibition of nerve processes.

Thus, one of the factors which influences the psychophysiological state of elite wrestlers is aggression.

Some authors believe that aggression is not an emotion, motive or psychological setting, but a model of behavior [Ahmadi *et al.* 2011]. Aggression is a reflection of competition and may be subject to different changes [Carre *et al.* 2010]. Apart from this, higher levels of aggression provoke a deterioration in psychical state; increase in fatigue and anxiety and decline in compromise behaviors in athletes.

The biological mechanisms of aggression are testified by support of aggression behaviors by vegetative functions [Marasescu *et al.* 2014; Kozina *et al.* 2017]. This was obtained in our study. This revealed that in athletes with low aggressiveness support from the autonomic nervous system is greater than in athletes with high aggressiveness. A decline in aggressiveness in athletes promotes improvement in the accuracy and stability of moving skills due to the balance between excitation and inhibition of nerve processes.

Our previous work is consistent with the data of Maxwell [Maxwell *et al.* 2004], that aggression is a consequence of anger in athletes. Thus, we can summarize that aggression in wrestling is not the optimal emotional influence on the psychophysiological state of athletes and its effects on the quality of moving skills.

According to our results a schema of links between psychophysiological state and level of aggression of elite wrestlers are proposed (fig. 1). The decline in aggressiveness levels in athletes are association with comfort of the psychical state and inhibition of balance of nervous process. Increased aggressiveness links to discomfort in the psychical state and excitation of nerve process.

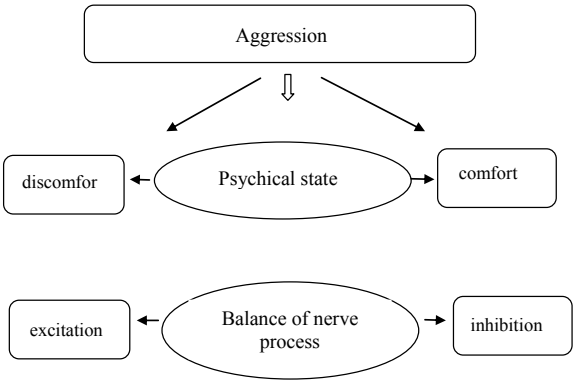

Fig. 1. Schema of links between psychophysiological state and level of aggression of elite wrestlers.

Conclusion

The links between psychophysiological state and levels of aggressiveness in elite wrestlers were established. High levels of physical and verbal aggression relate to subjective discomfort of the psychical state and excitation of the nervous system in elite athletes.

Thus, aggression is a non optimal emotion which influences an increase of subjective psychical discomfort and processes excitation of the nervous system in elite athletes.

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