DOI: 10.14526/2070-4798-2020-15-2-99-107

Professional specificity and pain perception of professional athletes with limb injuries

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Abstract: Health is one of the most important values of an athlete that allows them professional fulfillment. Health problems in a sports injury situation affect all levels of an individual's functioning, from perceptual to value-semantic. The aim of our study is to study the influence of the profession on the personality of an athlete, by analyzing the comparison of changes in the perceptual component of health- behavior in situations of limb injury, namely, assessing the severity of pain in professional athletes and amateur athletes. This direction seems very interesting to us, because of individual health-related cognitions study that it becomes possible to assess the perceived risk of injury, perceptions about its severity, possible benefits and obstacles to rehabilitation, and how these indicators change due to professional specificity. **Materials and methods.** The study involved 62 athletes - professional athletes and amateurs athletes with limb injuries. We used standardized methods "Index of attitude to health" (SD. Deryabo, VA. Yasvin, 1999), "Questionnaire for the study of health-preserving activity" (NV. Yakovleva, VV. Yakovlev, 2012), "Numeric Rating Scale for pain (NRS)" (M. McCaffery, A. Beebe, 1993), "Level of subjective control" (EF Bazhin, EA Golyunkina, AM Etkind, 1984). Mathematical and statistical analysis was carried out using the nonparametric Mann-Whitney U-test, Spearman's rank correlation coefficient. **Results.** The data obtained indicate an increased threshold for the perception of pain by professional athletes. It coincides with the concept of "risk culture". According to "risk-culture" professional athletes haven't demonstrated high level of pain. In addition, a relationship was found between the intensity of pain perception and the internal locus of control, self-efficacy in relation to health, in contrast to amateur athletes. **Conclusion.** The results demonstrate that health as an instrument of professional realization in the understanding of a highly qualified athlete acquires specific meanings, even influencing the perceptive level. It allows us to talk about the deformational impact of professional activity.

Keywords: professional specificity, health saving behavior, pain perception, sports injury, professional athletes, sports of the highest achievements, limb injury.

For citation: Lyubov A. Malikova*, Natalia V. Yakovleva. Professional specificity and pain perception of professional athletes with limb injuries. Russian Journal of Physical Education and Sport. 2020; 15(2): 80-86. DOI: 10.14526/2070-4798-2020-15-2-99-107

INTRODUCTION

Professional sports are always associated with injuries, which are the most common reason for ending a career [7]. According to NB Stambulova, only 10% of women and 15% of men can avoid serious sports injuries. L.M. Dovzhik and K.A. Bochaver defined sports injury as "damage received during a competition or training, which disables the athlete and renders him unable to take part in competitions or the training process" [5, p. 46]. Sports injury is a frustrating factor in professional activity and is not only a disorder of health, but also a threat to a sports career [10]. So, one of the most frequent

phrases that can be heard from a professional athlete before the competition: "The main thing is to avoid injuries." Like any injury, sports injury is accompanied by pain [13]. The athlete needs to find motivation to recover and return to the sport, despite the pain experienced.

S. Drawer and C.W. Fuller showed that professional sport almost universally implies that an athlete accepts the risk of injury and the accompanying pain. Some authors defined injury as the result of a voluntary decision in the pursuit of higher achievements and at the same time violates this voluntariness in the vision of a life path and career. Considering the perception

of injury in amateur athletes and professional athletes L.M. Dovzhik and K.A. Bochaver, note that injury for amateur carries fewer restrictions. Neutral emotions dominated after rehabilitation, because it does not bring global changes to a person's usual way of life. Professional athletes are more focused on injury, worry about their future, trying to assess the severity and consequences of the injury [5].

The probability of injury increases due to high competition in sports. It increases mental and physical health risks [2]. An additional factor is the objective complication of sports tasks, that depend on to increase in the number of injuries in children and youth sports. Sports of the highest achievements is that area of human activity where there is a high concentration of stressful and extreme situations and athletes have to cope with stress of various origins, including the experiences associated with the injury. Among the studies of sports injuries, the emotional component and ways to cope with stress have the biggest attention. Despite the prevalence of injuries, the aspect of pain has hardly been studied. J. Kotarba studied the social aspects of chronic pain. The author notes that athletes receive chronic pain with victories and fame. They are not able to clearly distinguish between ordinary and chronic pain often. According to J. Cotabra a significant role is a sports identity. Unformed sporting identity increases susceptibility to pain and acceptance of injury in general. The lack of sporting identity associate with a low level of athlete training, lack of skills and a short period of involvement in professional sports [5].

The perception of pain in a result of sports injury has a social context. The injury often "normalized". Athletes consider serious injuries like a minor, because this behavior is supported by colleagues and fans. Often, athletes can continue training and competition, being already injured, overcoming pain. Many authors agree that although athletes evaluate such actions as independent and conscious, it is more likely that their behavior depends on the interests of the team and assessment their colleagues.

N.A. Nixon has described the "risk culture", R. Hughes and J. Coakley have described a similar "sporting ethic," according to that there is no place for fear of injury and pain in the sport of high-achievement. Many athletes think that demonstrating to others their emotional state, perception pain is unacceptable, and the athlete must sacrifice and "pay the price for participation in the sport." A number of researchers associate the acceptance of pain with the dominant concept of masculinity in some sports and the early adoption by boys of an athlete role, who must be assertive, aggressive and strong in both body and spirit. The pressure of competition and the need to return sports positions leads the athlete to return to the competition immediately after the injury has just healed, without going through the proper recovery period. However, K.A. Bochaver, L.M. Dovzhik note that now there is a tendency to health-saving behavior during competitions and training process [1].

At present, in foreign sources, the pain perception by professional athletes is described in the framework of clinical psychology and the use of the terms "kinesiophobia" and "pain catastrophizing" (J.S Everhart, A.J Chafitz, K.M Harris, S.E Schiele, C.F Emery, D.C Flanigan) [4]. Kinesiophobia refers to fear of movement due to the possible recurrence of the injury. Kinesiophobia measure with using the method: The Tampa Scale for Kinesiophobia 11 item questionnaire (TAK 11). The catastrophization of pain reflects a tendency to exaggerate the severity of pain and constant pain perception (method: The Pain Catastrophizing Scale (PCS)).

According to the results of American scientists who studied the pain perception by professional athletes with injuries before surgery, after surgery, and also after the rehabilitation period, professional athletes had a fairly high level of kinesiophobia and catastrophic pain. As a rule, the severity of kinesiophobia decreased during the rehabilitation of the athlete, even if these indicators were quite high before surgery. During the study, it was shown that athletes who did not have high indicators on these scales, but noted that they experienced severe

pain, subsequently demonstrated a high level of kinesiophobia. An interesting fact was that if the athlete experiences severe pain before the surgery, then kinesiophobia that developed after the surgery persisted after rehabilitation. The authors attributed a high level of catastrophic pain and kinesiophobia to the fear of the inability to return to professional sport at the same level [11].

According to C.A. Poss and A. Clifford studies, the high level of pain by a professional athlete associated with fear of subsequent injury, that confirmed the phenomenon of catastrophic pain [14].

MATERIALS AND METHODS

Analyzing the scientific research devoted to the study of sports activities, we found that it is often the influence of personal characteristics of an athlete on his professional activity and the ability to achieve significant results [1,3,4]. In our research, we tried to study the influence of the profession on the athlete's personality, through the study of the athlete's health-saving behavior as behavior aimed at maintaining optimal health. In addition, we studied these components in a stressful situation for each athlete - injury's situation.

We studied the severity of pain and its inclusion in the health-saving behavior of professional athletes with injuries of the limbs in comparison with amateur athletes who also had similar limb injuries. The study of health-saving behavior precisely in the situation of the athlete injury allowed to track the motivational component of his rehabilitation process, especially the changes in patterns of health-saving behavior depending on the severity of pain.

Based on the theoretical base and expert opinion of sports doctors, we suggested that professional athletes adhered to a "risk culture" and assessed the severity of pain as less intense in the situation of sports injury, that affected the characteristics of their health-saving behavior.

We used in our research methods: "Index of attitude to health" (S.D. Deryabo, V.A. Yasvin,

1999), "Questionnaire for the study of health saving behavior" (N.V. Yakovleva, V.V. Yakovlev, 2012), "Numeric rating Scale for pain (NRS)" (M. McCaffery, A. Beebe, 1993), "Level of subjective control" (E.F. Bazhin, E.A. Golynkina, A.M. Etkind, 1984). Mathematical and statistical processing was carried out using the nonparametric Mann-Whitney U-test, Spearman's rank correlation coefficient.

The research bases were Ryazan Regional Medical and Physical Dispensary and Regional Clinical Hospital (injury department). In total, in the research 62 male athletes with injuries of the lower extremities took part. The average age of the subjects was 22 years. Athletes who participated in the research were engaged in such sports as: football, hockey, judo.

In accordance with the aim and hypothesis of the research, we decided to form the main group and the comparison group. The main group represented professional male athletes with limb injuries (32 athletes, average age 21.75 years). Comparison group - male athletes involved in sports at an amateur level, having limb injuries (30 athletes, average age 22 years).

RESULTS AND DISCUSSION

The first stage was to study the specific of pain perception, in particular, assess the severity of pain. To assess the severity of pain and the sensory-perceptual level of the internal picture of health, as a structural component of health-saving behavior, we used the Numeric Rating Scale for pain, NRS (M. McCaffery, A. Beebe). The results showed us that professional athletes were really inclined to assess the severity of pain in a trauma situation as less pronounced, unlike amateur athletes. So professional athletes on average assessed the severity of their pain as moderate ($M_x = 4.3$), and amateurs believed that they experienced significantly more pain ($M_x = 7$) (differences in the groups were significantly significant at $p < 0.01$). Amateur athletes tended to assess the severity of pain as high.

S. Schafer obtained similar results in his research, he empirically verified the phenomenon

of “sacrificing one's own body”. S. Schafer found that young wrestlers ignored warning pain signals and continued to fight, despite acute physical pain. Analyzing the results, the author suggested that the identification mechanism in athletes with “masculine” character traits played an important role in this problem. Some kind of sports, such as boxing, football, wrestling, rugby had a high risk of injuries, while at the same time it had the association of exclusively male occupations. In this regard, athletes in these sports in advance perceived pain as an integral and sometimes necessary component of a “real male game” [6]. Sometimes athletes, especially young athletes, perceived injury as a means of achieving respect from teammates [4]. L. Hardy conducted a research in which he showed that the process of socialization and identification of wrestlers related to how they could endure pain. Young athletes perceived pain and injury as normal components of sports activities. The ability to tolerate pain became widespread with the professionalization of wrestlers, their transition to a higher level, [6].

A.V. Karpov and N.V. Yakovleva in their study of the health models of professional athletes and amateurs, note that the individual model of athletes' health is more narrow and more specific, due to the peculiar sign system

of health assessment. The authors suggest this specificity of the reference and criteria-based system for assessing health determine the importance of health for continuing a successful professional career. Health model of amateur athletes is presented in the form of “physical comfort of a state”. This indicator is found less frequently in the model of professional athletes health. Efficiency gains a decisive importance as the indicator of endurance and fitness, while pain and uncomfortable bodily sensations are not considered by athletes as a criterion for reduced health [9].

In general, the obtained results consistent with the described “risk culture” N.A. Nixon. An interesting fact is that the data do not coincide with the results of foreign studies, that report on the assessment of pain by professional athletes as an overly pronounced and marked tendency to kinesiophobia and catastrophic pain [10,14]. We assume that this feature is associated with a greater inclusion of psychological support during the rehabilitation process in foreign countries.

The next stage was the study of the relationship between the severity of pain and other components of health-saving behavior. The results of the correlation analysis in the group of professional athletes are presented in table 1.

Table 1 - The relationship of the pain severity and components of the health saving behavior in the group of professional athletes

Components of the health saving behavior		Numeric rating Scale for pain (NRS)
Questionnaire for the study of health-saving behavior	Health self-efficacy	-0,403*
Index of attitude to health	Cognitive scale	-0,481**
Level of subjective control	General scale of internal	-0,508**
	Scale of internal in the field of health and illness	-0,426*

Note: * - at $p < 0,05$, ** - $p < 0,01$.

The results demonstrate the correlation between the severity of pain with components of health-saving behavior, the intensity of attitude to health and the locus of control in a group of professional athletes.

Expressed pain is interconnected with low cognitive activity in relation to health, lack of desire to learn new information about health problems and in the best case only to receive this information from other people than to search for it on their own. Conversely, the perception of pain and its assessment as weak or slightly pronounced is associated with high cognitive activity, the desire to obtain as much competent information as possible about treatment methods. This feature is a kind of protective mechanism when the athlete assessed the pain as excessively strong and this blocks all cognitive activity in relation to his injury or illness in order to protect the psyche from traumatic experiences [3].

There is a negative correlation between evaluating the effectiveness of one's behavior in relation to health and the severity of pain. A. Bandura described the concept of self-efficacy in his theory of social learning [12]. Self-efficacy is the individual's belief in the effectiveness of their own actions, which should lead to success. A person avoids certain types of activity if he estimates the available resources as insufficient to carry out this activity. If a person considered the activity as corresponding to his abilities and capabilities and successful, then he is more likely to start its implementation [8]. The results indicate a tendency to avoid health care if the injury is associated with severe pain. In a study conducted by Dutch scientists W. Lankveld, N. Melick, B. Habets, Y. Pronk, J.V. Staal, R. Cingel, it was shown that there is a negative correlation between self-efficacy and catastrophic pain ($r = -0.6$, $p < 0.01$), which confirms our results [12].

There is the relationship between the severity of pain and the general level of subjective control in relation to health and illness. Severe pain associated with the desire to blame external forces in his injury: the opponent in competitions, improper training, coaches, doctors. The

identified feature also represents a protective mechanism and is aimed at maintaining positive self-image [3].

L.M. Dovzhik and K.A. Bochaver studying the relationship between the likelihood of sports injury and the locus of control, note that with repeated injuries, the level of subjective control rises. The authors suggest that it is a high level of internality that contributes to injury, but not injury that increases internality. An excessive sense of responsibility, attributing what is happening at one's own expense, continuous monitoring increase the level of anxiety and, as a result, reduce concentration, and along with experiencing severe pain and negative assessment of their actions effectiveness can lead to repeated injury [5].

The results of the correlation analysis in the group of amateur athletes are presented in table 2.

Experiencing severe pain in general associate with a low level of health-saving behavior in relation to maintaining one's health. The data obtained indicate that amateur athletes have the high degree of pain severity that associated with the emotional component of the attitude to health. It indicates a decrease in the degree of emotional experience about the state of one's health. Severe pain is associated with the desire to shift responsibility for events to those around you, fate or bad luck. In addition, the severity of pain is associated with difficulties in describing feelings. The obtained negative correlation demonstrates that experiencing severe pain associated with the inability to describe bodily sensations and emotions due to the fact that the pain is so pronounced and in some cases unbearable that it blocks the ability to recognize signals from other analyzer systems [14].

Thus, the obtained results reflect the commitment of professional athletes to a "risk culture", manifested in the assessment of pain sensations resulting from sports injuries as unexpressed or moderate, due to the conviction that the demonstration of pain experience and emotional reactions associated

with it are unacceptable. Authors studying this phenomenon associate this behavior with the early identification of male athletes with “male” character traits. When a professional athlete notes that he is experiencing severe or excessive pain, there is a tendency toward a decrease in self-efficacy in relation to health in the features of his health care. Describing the results from the standpoint of the self-efficacy concept, we note

that severe pain is associated with the blocking of cognitive activity in relation to health, the assessment of our resources for recovery as insufficient to restore and return to sport to the previous level. This feature leads to the decision on the inefficiency of the rehabilitation process and worries about the possible completion of a sports career.

Table 2 - The relationship of the pain severity and components of the health saving behavior in the group of amateur athletes

Components of health saving behavior		Numeric rating Scale for pain (NRS)
Index of attitude to health	Emotional scale	-0,405*
Level of subjective control	General scale of internal	-0,521**
Toronto Alexithymia Scale (TAS-20-R (TAS-20-R))	Difficulties in describing feelings	-0,419*

Note: * - at $p < 0,05$, ** - $p < 0,01$.

CONCLUSION

The specific increase in the threshold of sensitivity to pain revealed in our study, manifested in the assessment of pain as unexpressed or moderate. It has certain positive resources for a professional athlete. These resources need to maintain a high level of health protection, self-efficacy, a positive attitude to health and the internal personality orientation. They allow a professional athlete to maintain good health. This feature confirms the importance of health for the athlete as a terminal value. It is essential for the implementation of professional activities [1,3,4].

Unlike professional athletes, amateur athletes believe that they experience severe pain in a situation of a similar sports injury. Expressed pain is primarily associated with the manifestation of an external personality orientation, as well as a kind of blocking of emotions that arise in relation to injury.

Thus, health is a professionally significant value of a highly qualified athlete. It gives sports activities specific meaning and is

a kind of tool for professional implementation. Analyzing the obtained results, we assume that the inclusion of professional activity in the psychological system of the personality affects all levels of the individual's functioning, including perceptual one. The low severity of such components as pain and uncomfortable bodily sensations in the health model of professional athletes, unlike amateur athletes, allows us to say that health-saving behavior does not “fit” into professional activity to a critical level of a change in the functional state of health, but, on the contrary, exerts deformation impact on professional activities.

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Submitted: 15.06.2020

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