PSYCHOLOGICAL RESPONSE OF ATHLETES TO INJURY

Robert Masten[1], Klemen Stražar[2], Iztok Žilavec[3], Matej Tušak[4] and Manca Kandare[5]

[1]Department of Psychology, Faculty of Arts, University of Ljubljana, Slovenia
[2]Department of Orthopaedic Clinic, University Medical Centre, Ljubljana, Slovenia
[3]Sirius AM, Log pri Brezovici, Slovenia
[4]Faculty of Sport, University of Ljubljana, Slovenia
[5]University Psychiatric Clinic Ljubljana, Ljubljana, Slovenia

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Abstract:

The aim of this research was to investigate the causes of the emergence of sports injuries and to explain the differences in psychological response with regard to the severity of the injury. We examined 68 competing Slovene athletes with surgically treated knee injury. The estimated time of rehabilitation of the more severely injured athletes was six months, while those who sustained less severe injuries faced a month-long rehabilitation. We measured the athletes' personality traits, their athletic identity, coping with pain, rehabilitation beliefs, motivation and social support provided by their family and their coach as well as their colleagues. The results showed that the group of more severely injured athletes demonstrated behaviour that is less inhibited in response than the group of athletes with less severe injuries. The psychological response proved to be almost the same in both groups, except for the higher levels of catastrophizing, and a higher individual coping response found in the group of more severely injured athletes. Furthermore, masculinity was found to predict self-efficacy and the individual coping response, the strength of athletic identity predicted motivation and rehabilitation value, while emotional lability predicted catastrophizing and self-efficacy. Athletes with lower athletic identity, lower masculinity and higher emotional lability are more exposed to adjustment difficulties after sustaining an athletic injury. In our opinion, the strategies for successful rehabilitation after a sports injury should be aimed at the identification of athletes with personality traits that pose a higher risk of experiencing adjustment difficulties, at promoting adequate motivation, increasing coach support and at the application of cognitive-behavioural strategies.

Key words: *knee injury, personality, coping, motivation, social support*

Introduction

Professional sports are characterized by extreme motivation, intense training, competition and a high level of stress. Exceptional level of effort and striving for perfection close to physiological limits also increase the possibility of sports injuries, which are rather frequent in professional sports.

Athletes respond to injuries in very different ways, exhibiting a wide range of cognitive, emotional and behavioural responses (Crossman, 1998). It is important to understand those responses in order to facilitate sportspersons' psychological adjustment to the process of rehabilitation as well as the return to their sports careers.

An estimated 5–13% of athletes report clinically meaningful levels of psychological distress following injury (Brewer, Van Raalte, & Linder, 1993). With the severity of the injury the frustration in athletes rises (Heil, 1993). The greater the likelihood of psychological problems, the more it is likely the athlete is to encounter adaptation difficulties during rehabilitation (Heil, 1993).

The severity of injuries greatly differs and so does the emotional response to an injury. The severity of an injury can clearly affect the athlete's psychological response during the recovery period. Studies have shown that the athletes with more serious injuries tend to experience higher levels of frustration, depression and anger than those with less severe injuries (Crossman, 1998). Furthermore, Smith, Scott, O'Fallon, and Young (1990) concluded that the most severely injured athletes, who were not able to continue their sports career for a very long period due to their injury, experienced greater mood disturbances than the athletes with moderate to acute injuries.

In order to help sport psychologists to develop effective interventions in assisting athletes with the

psychological aspects of post-injury rehabilitation, it is necessary to identify those psychological variables that either facilitate or hinder athletes' abilities to successfully engage in their rehabilitation programmes.

Therefore, the aim of this study is to examine if athletes differ from each other in depression, general irritability, and inhibition of behaviour regarding injury severity. Also, the psychological response to an injury will be examined in relation to its severity. The issue of whether it is possible to predict athletes' psychological response to injury on the basis of specific dispositional characteristics will also be addressed in order to identify those personality and dispositional traits that make athletes more injury prone. Also, guidelines on how to achieve better rehabilitation compliance and less emotional disturbance during rehabilitation should be the result of the study.

Three hypotheses were set for the current study. It was assumed that there are statistically significant differences in personality traits (depression, inhibition of behaviour and general irritability) between more severely and less severely injured athletes.

Further, it was assumed that, there are statistically significant differences in psychological response (state anxiety, coping with pain, catastrophizing and direct coping, susceptibility to injury, perceived injury severity, self-efficacy, treatment efficacy, perceived rehabilitation value, athlete's motivation for rehabilitation, social support, social support provided by both the coach and by the sport colleagues and social support provided by the family) after injury between more and less severely injured athletes.

Finally, it was assumed that, on the basis of personality traits, athletic identity and demographic data (gender, age, categorization, time of injury in the sports season, previous injuries and injury severity) we can statistically significantly predict psychological response to injury with increased state anxiety, coping with pain, catastrophizing and direct coping, susceptibility to injury, perceived injury severity, self-efficacy, treatment efficacy, perceived rehabilitation value, athlete's motivation for rehabilitation, social support, social support provided by both the coach and by the sport colleagues and social support provided by the family.

Methods

Participants

Sixty-eight competing Slovene athletes (47 men, 21 women), with age span between 16 and 40 years of age (M=23.4), were included in the study. The sample was comprised of all athletes who were treated for their injury (meniscus tear, anterior/posterior cruciate ligament tear,kneecap/patella injury and unknown – athletes were not familiar with their diagnosis prior to the operation) at the Orthopaedic Clinic in Ljubljana, Slovenia, from 2007 till 2010 and were willing to sign an informed consent. All participants underwent a knee surgery, a standard rehabilitation protocol and all returned to active sports participation.

The athletes competed in different sports (20.6% handball, 20.6% football, 19.1% basketball, 6% volleyball, and less than 3% alpine skiing, ice-hockey, judo, snowboarding, tennis, running, gymnastics, rugby, dancing, and acrobatic skiing). The groups of more/less severely injured athletes did not differentiate in age (t=.79; p=.43).

The sample was comprised of 28 (41.2%) athletes categorized by the Olympic Committee of Slovenia into the top three classes (world-class athletes, international-rank athletes and promising athletes) and 40 (58.8%) athletes of either a national rank or those regarded as uncategorized. World-class athlete is an athlete with a European championship medal, the Olympic Games and/or world championship participation, etc. International-rank is achieved with the participation at a world championship, at the Olympic Games, a European championship, at world cups and similar competitions. Promising athletes are youngsters under the age of 18 with high achievements on international level. National and uncategorized ranking athletes are athletes who compete at national-level or at smaller international competitions.

All the subjects sustained injuries that could be classified either in the group 4 or group 5 of injury severity (Seil, Rupp, Tempelhof, & Kohn, 1998). Therefore, the sample was divided into two groups of athletes: *less severely injured athletes* (n=6), with the expected rehabilitation time up to one month, and *more severely injured athletes* (n=52), with the expected rehabilitation time over one month and up to six months. Petrie and Falkstein (1998) explain that injury severity must be evaluated by a physician who provides a diagnosis and approximate rehabilitation time. The severity of injury in this study was thus evaluated by the physicians of the Orthopaedic Clinic in Ljubljana.

Instruments

First, the basic demographic data were collected (gender, age, athletic categorization, time of injury in the sports season, previous injuries and the determined injury severity). Secondly, the athletes' personality traits were measured with the Slovene version of *Freiburger Persönlichkeitsinventar FPI 76* (Bele-Potočnik, Hruševar, & Tušak, 1990). This questionnaire was chosen because of its ability to appropriately measure nine different first-order personality traits: neuroticism, impulsivity, depression, irritability, sociability, calmness, dominance, inhibition of behaviour, and frankness, with Cronbach α for individual characteristics being higher than

.70 (Bele-Potočnik, et al., 1990). The questionnaire also measures three second-order personality traits: extraversion, emotional lability and masculinity. Emotional lability, for example, consists mostly of three subdimensions, i.e. depression, inhibition and irritability. Extraversion mostly consists of subdimensions: sociability and dominance, whereas masculinity mostly consists of subdimensions: neuroticism and calmness. The questionnaire includes 76 statements and the participants were asked to answer whether the statements were true for them or not ("yes" or "no" answers).

For the purpose of measuring the athletes' psychological response to injury and to the oncoming difficulties in postoperative and rehabilitation processes, 12 psychosocial variables were collected through the application of the following measurement instruments, all adapted to Slovenian population:

- State anxiety was measured with the *STAI X1 Questionnaire* (Spielberger, Gorsuch, & Lushene, 1970). We chose to apply the adapted version of the questionnaire, which is more commonly used in a sports environment. The 20 items of the questionnaire are adapted as to measure the level of anxiety before the match, on the day of competition (retrospectively). Cronbach's α, calculated in our study, was .81. The participants responded on a 4-point scale (almost never, sometimes, often, almost always). All further reports on Cronbach's alpha measure of reliability of the instruments used were obtained in the present research.
- Coping with pain was measured with the *Sports Inventory for Pain (SIP 15)* (Meyers, Bourgeois, & LeUnes, 2004). The questionnaire consists of 15 items and measures three aspects of coping with pain: direct coping, catastrophizing and individual coping. Direct coping is a positive dimension of coping with pain. Catastrophizing stands for the tendency to be overwhelmed by pain. Individual coping is a calculated score, obtained by subtracting the measure of catastrophizing from the measure of direct coping. The participants responded on a 5-point Likert scale (from *not at all* to *completely agree*). The scale was translated into Slovene; Cronbach's α was reported to be.73 for direct coping and.72 for catastrophizing.
- Athletic identity was measured with the *Athletic Identity Measurement Scale (AIMS)* (Brewer, et al., 1993), measured on a 7-point Likert scale. We used the translated, Slovene version of the instrument; Cronbach's α, as measured in our study, was .83.
- *Sports Injury Rehabilitation Beliefs Survey* (SIRBS; Taylor & May, 1996), measured on a 7-point Likert scale (from *completely disagree* to *agree completely*). It measures the following variables: susceptibility to injury *(*i.e. *"My rehabilitation could be endangered if I do not follow the rehabilitation programme"),* treatment efficacy ("*Success of rehabilitation is not possible if I do not follow the rehabilitation programme*"), self-efficacy (i.e. "*I am able to complete all aspects of my rehabilitation programme, although I have to be less active or if the procedure could be unpleasant"*), perceived rehabilitation value (i.e. "*It is very important that I recover completely")*, and perceived injury severity (i.e. *"An injury is a serious threat to my sporting activities"*). The SIRBS was translated into Slovene, and Cronbach's α was .73 for susceptibility, .77 for treatment efficacy, .87 for self-efficacy and .61 for the subscale of perceived injury severity. We decided to keep the subscale *perceived injury severity* of SIRBS, although Cronbach's alpha was poor (α=.61). Ferligoj, Leskovšek, and Kogovšek (1995) reported that Cronbach's α below .60 could be treated as critically low; if it is between .60 to .70, it is considered to be moderate, and on that basis we decided to keep this measure in the analyses.
- Finally, we constructed additional six questions that measured the last three variables: social support provided by the family (Cronbach's α was .72), social support provided by both the coach and by the sport colleagues (Cronbach's α was .81) and the athletes' motivation for rehabilitation (Cronbach's α was .72).

Procedures

Data were sampled from each patient upon his/her admission to the hospital followed by the complete diagnostic procedure prior to the surgery, which included the expected rehabilitation time prognosis known to the patient. The data on 68 medical cases were collected throughout two and a half years (starting in 2007). Each subject was individually approached by a psychologist who explained the purpose of the study and asked him/her to join the research, and the written informed consent was obtained from every participant. Afterwards, the psychologist administered research inventories (listed and described previously) to the subject and stayed in the room with him/her just to be able to answer any additional questions the subjects might have. The athletes needed 40 to 60 minutes to complete the questionnaires.

Statistical analysis

Statistically significant differences between the athletes with less severe and athletes with more severe injuries were tested using one-way between-subjects analysis of variance (ANOVA) with regard to their personality and psychosocial characteristics. We also applied multiple regression analysis

(stepwise method) to identify the possible ways of predicting the psychological response.

Results

The results of our research showed (Table 1) that the group of less severely injured athletes had a higher level of inhibition of behaviour than the group of athletes with more severe injuries.

A significant difference between more and less severely injured athletes was found in coping with pain (catastrophizing and individual coping response, Table 2). Interestingly, the athletes with more severe injuries used more positive coping (individual coping response) and less negative pain coping abilities (catastrophizing) than the athletes with less severe injuries.

The of our study, displayed in Table 3, showed that it was possible to predict the psychological response to injury on the basis of dispositional characteristics of an injured athlete. The athletes' masculinity further predicted higher self-efficacy and higher individual coping response; the athletes with a stronger athletic identity were more motivated and had higher rehabilitation value scores, while emotional lability predicted catastrophizing and self-efficacy. The athletes with poorer athletic identity, lower masculinity and higher emotional lability were found to be more at risk of adjustment difficulties after sustaining an athletic injury.

Table 1. Statistically significant differences in personality traits of more and less severely injured athletes

Variable	Injury severity	N	M	SD	F-test	p
Inhibitedness	Less severely injured	16	3.63	2.16	5.65	.020 *
	More severely injured	52	2.38	1.72		

** .01 level of significance (2-sided), *.05 level of significance (2-sided).

Table 2. Statistically significant differences in psychosocial variables between the groups of more and less severely injured athletes

Variable	Injury severity	N	M	SD	F-test	p
Catastrophizing	Less severely injured	16	17.56	3.44	5.94	.018 *
	More severely injured	52	14.75	4.2		
Individual coping abilities	Less severely injured	16	3.37	8.17	4.74	.033 *
	More severely injured	52	7.94	7.06		

** .01 level of significance (2-sided), *.05 level of significance (2-sided).

Table 3. Dispositional characteristics as predictors of psychological response to an injury (dependent variable)

		General model		Selected predictors	
Predictors	Dependent variables	F–test; p	R2	std. Beta coeff.	*t–test*; p
Masculinity	individual coping abilities	8.25; p=.001**	0.20	0.45	3.93; p=.000**
Age				-0.24	-2.07; p=.042*
Emotional lability	catastrophizing	12.47; p=.000**	0.28	0.45	4.18; p=.000**
Injury severity				-0.22	-2.10; p=.040*
Emotional lability	anxiety	42.54; p=.000**	0.39	0.63	6.52; p=.000**
Categorization	perceived injury severity	5.09; p=.027*	0.07	-0.27	-2.26; p=.027**
Emotional lability	self-efficacy	8.52; p=.000**	0.28	0.58	4.26; =.000**
Masculinity				0.43	3.15; p=.002**
Categorization				-0.28	-2.68; p=.009**
Athletic identity	rehabilitation value	5.47; p=.022*	0.08	0.28	2.34; p=.022*
Athletic identity	motivation for rehabilitation	5.8; p=.019	0.08	0.28	2.41; p=.019*
Time of season	social support from the coach	8.60; p=.005**	0.11	0.34	2.93; p=.005**
Age	social support from the family	4.45; p=.039*	0.06	-0.25	-2.11; p=.039*

** .01 level of significance (2-sided), *.05 level of significance (2-sided).

Discussion and conclusions

Previous research has shown that the severity of injury can be linked to higher levels of frustration, depression and anger in athletes (Crossman, 1998), as well as greater mood disturbances (Smith, et al., 1990). Emotional disturbance due to sports injuries is more likely to occur when the athletes perceive their injuries to be severe (Crossman, 2001). In our research we therefore assumed that there would be a significant difference between the groups of athletes with more and less severe injuries with regard to their psychological response to injuries. We further assumed that this difference would be found for all psychosocial variables measured (i.e. anxiety, coping with pain, rehabilitation behaviours, social support and motivation for rehabilitation). The only difference found, however, was a significant difference in coping with pain (catastrophizing and individual coping response). Interestingly, athletes with more severe injuries used more positive coping (individual coping response), and less negative pain-coping strategies (catastrophizing) than the athletes with less severe injuries.

Based on our results, we were further able to predict the psychological response to injuries on the basis of personality traits of an athlete (athletic identity, masculinity and emotional lability). Athletes with certain personality traits can perceive situations as more stressful and are therefore more vulnerable to stress due to their personality. Those athletes in our study who were more inhibited were also more reserved in making social interactions with others, which usually make them less frequently exposed to risky situations. It is also possible that, due to their shyness, they do not generally overestimate their physical abilities and are able to estimate the top levels of their functioning more objectively – and therefore, probably are less likely to sustain severe sports injuries. Additionally, the results also showed a relationship between extraversion, inhibited behaviour and number of injuries. The athletes, who scored higher on extraversion and lower on inhibited behaviour, were more likely to had been injured before. Perhaps, the strong need for social interaction with others combined with their uninhibitedness and the wish to succeed may be the reason for those athletes to find themselves more frequently in risky situations during competitions and training sessions.

For an athlete, a sports injury represents a source of major stress. The severity of injury can have a significant impact on athlete's psychological response to it. However, in our study the differences in psychological response were found only for the dimension of coping with pain. Surprisingly, the athletes with more severe injuries were found to cope with pain better than the group of athletes with less severe injuries. The fact that the athletes with more severe injuries reported more effective abilities for pain-coping despite being confronted with more stress could perhaps be explained by their wish to become an active part of the rehabilitation process as quickly as possible and therefore they activate more positive (and less negative, less catastrophizing) abilities to cope with pain. Moreover, the more severely injured athletes simply had more time to adjust to rehabilitation, which might be another reason for them to cope with pain more constructively. In contrast, the athletes with less severe injuries have to rehabilitate faster, have less time to adjust to the situation, and therefore cope with pain less efficiently.

Bricker-Bone and Fry (2006) reported results similar to our findings; the athletes with more severe injuries coped with them more effectively (self-efficacy and rehabilitation value) than those with less severe injuries. Expecting the recovery after a sports injury to be fast can indeed affect the rehabilitation process in a negative way (Heil, 1993). Previous studies have also revealed that the greater the stress, the more intense the coping mechanisms an injured athlete applies (Udry, 1997).

We also hypothesized that there would be significant differences in anxiety between the groups of athletes with more and less severe injuries; however, the results did not confirm our expectations. This is contrary to previous reports about the duration of the injury (Smith, et al., 1990) correlating with greater emotional distress after an injury. With regard to the psychological response, our study found no significant differences in the athletes' rehabilitation beliefs, motivation for rehabilitation and social support. The question that thus poses itself is: what is the reason for the similarity in emotional response after an injury in the case of less and more severe injuries?

Similarly to our research previous studies encountered some problems in defining injury severity (Flint, 1998). In fact, both groups of athletes in the current study sustained a relatively serious injury that demanded a surgical procedure and at least one-month long absence from sport activity participation. Perhaps the two groups of athletes in our study were too similar and not exclusive enough. In our study the division into two groups was based on the definition of injury severity by Petrie and Falkstein (1998). However, according to the standards of the National Athletic Injury Reporting System (NAIRS), both groups of athletes participating in our research could indeed be classified as having severe injuries. Significant differences were found only in the variable of coping with pain, while in all the other aspects the two groups of athletes were relatively homogeneous. Statistically significant differences were proven for coping with pain and catastrophizing.

As is evident from the results in Table 3, we were able to identify some of the specific disposi-

tional factors that correlated with adaptation difficulties leading to prolonged rehabilitation after an injury. Risk factors proved to be those of low masculinity (predicting less effective mechanisms of coping with pain), high emotional lability (predicting catastrophizing and anxiety), low athletic identity (which predicts motivational problems and low rehabilitation value) and higher sport categorization (predicting lower perceived injury severity, lower self-efficacy and also lower rehabilitation adherence).

By employing psychological testing as a preventive measure, we should be able to identify athletes who are more likely to experience adaptation problems at the very beginning of the rehabilitation process. It is important to reduce the levels of stress and to employ experts to teach the athletes appropriate techniques of coping with stress and moderate the athletes' possibly dysfunctional beliefs interfering with the rehabilitation process. Implementing specific psychological techniques can help to make the rehabilitation process shorter and more successful (Brewer, 1998).

In our opinion, the strategies for successful rehabilitation after a sports injury should focus on the identification of those athletes with a higher risk of experiencing adjustment difficulties, on promoting adequate motivation, increasing coach support and on the application of cognitive-behavioural strategies. We need to reduce the sources of stress and to teach athletes specific techniques that reduce stress. Through adopting special psychological techniques of relaxation, athletes would simultaneously receive a more suitable social support, which also buffers rehabilitation problems. Apart from boosting their coping abilities, prevention should also involve enhancing those protection factors that enable successful emotional adaptation following an injury. The highly significant protection factor of social support has thus, for example, been shown to reduce the levels of cortisol (Roy, Steptoe, & Kirschbaum, 1998), as well as to boost individuals' general well-being and their coping with injury and pain (Grove & Gordon, 1995).

Many athletes with specific dispositional characteristics are more at risk of encountering adaptation difficulties following an injury and an appropriate rehabilitation setting could indeed help them avoid prolongation and failure in rehabilitation process.

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Correspondence to:
Robert Masten, Ph.D.
Department of Psychology, Faculty of Arts,
University of Ljubljana
Aškerčeva 2, Ljubljana, Slovenia
Phone: + 386 41 759 012
E-mail: robert.masten@ff.uni-lj.si

PSIHOLOŠKI ODGOVOR SPORTAŠA NA OZLJEDU

Cilj je ovog istraživanja bio utvrditi uzroke nastajanja sportskih ozljeda te objasniti razlike u psihološkom odgovoru na ozljede različite težine. Istražili smo 68 slovenskih natjecatelja koji su bili podvrgnuti kirurškoj operaciji koljena. Procijenjeno vrijeme rehabilitacije za teže ozlijeđene sportaše iznosilo je šest mjeseci, dok je za one ispitanike s manje teškim ozljedama ono iznosilo jedan mjesec. Mjerili smo sportaševe osobine ličnosti, njihov sportski identitet, sposobnost suočavanja s boli, povjerenje u rehabilitacijski proces te motivacijsku i sociološku potporu koju su sportaši dobivali od svoje obitelji, trenera i kolega. Rezultati su pokazali da je grupa ispitanika koja je bila teže ozlijeđena pokazala oblik ponašanja koji je manje inhibirao reakciju na ozljedu no što je to slučaj s grupom ispitanika koji su bili lakše ozlijeđeni. Psihološki odgovor bio je gotovo isti u obje grupe, s iznimkom veće razine katastrofiziranja i individualnog suočavanja u grupi ispitanika koji su bili teže ozlijeđeni. Nadalje, pokazalo se da razina muškosti objašnjava samoučinkovitost i razinu individualnog suočavanja, snaga sportskog identiteta predviđa motivaciju i rehabilitacijsku vrijednost, dok je emocionalna nestabilnost predviđala razinu katastrofiziranja i samoučinkovitosti. Sportaši s nižom razinom sportskog identiteta, muškosti i većom razinom emotivne nestabilnosti bili su više izloženi poteškoćama u prilagodbi nakon ozljeđivanja. Prema našem mišljenju, strategije za uspješnu rehabilitaciju nakon sportske ozljede trebale bi biti usmjerene na identifikaciju sportaša s osobinama ličnosti koje predstavljaju veći rizik za doživljavanje poteškoća u prilagodbi na trenutačno stanje, zatim na poticanje odgovarajuće motivacije, povećavanje potpore trenera te primjenu kognitivno-bihevioralnih strategija.

Ključne riječi: *operacija koljena, ličnost, suočavanje, motivacija, sociološka potpora*