



(SK) Vplyv zranenia na somatickú a kognitívnu úzkosť u vybranej športovej populácie v Českej republike

(EN) The Effect of Injury on Somatic and Cognitive Anxiety in a Selected Sports Population in the Czech Republic

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SUMMARY/ABSTRACT

Starting point: Injuries are a common and significant stressor in the careers of athletes, often leading to psychological consequences such as anxiety, fear of re-injury, and reduced self-confidence. These effects can negatively influence motivation and performance, and in some cases, lead to early termination of a sports career.

Group: The study involved 167 Czech athletes (121 women and 46 men) aged 15–33, representing various performance levels (elite, competitive, recreational) and sports disciplines (team and individual sports). Data were collected via an anonymous online questionnaire distributed through sports associations and social media.

Methods: A three-part questionnaire was used: (1) demographic and sports background, (2) injury history and coping strategies, and (3) the standardized CSAI-2 (Competitive State Anxiety Inventory-2) to assess cognitive and somatic anxiety and self-confidence. The results were compared with normative data (Martens et al., 2006).

Results: 71 % of athletes reported increased cognitive and somatic anxiety after returning to sport post-injury. Repeated injuries were associated with higher levels of anxiety, particularly cognitive anxiety in both team and individual athletes, and somatic anxiety in individual athletes. 42.5 % of repeatedly injured athletes reported a decline in performance or quitting sport altogether.

Conclusions: Injuries, especially repeated ones, significantly impact athletes' psychological well-being and career trajectories. The findings highlight the need for psychological support, gradual return-to-play protocols, and education on mental health in sports to mitigate the negative effects of injury.

KEYWORDS

sport, injuries, questionnaire CSAI-2, psychological states, motivation, coping strategy

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1 INTRODUCTION

Injury is considered a significant stressor to which each athlete reacts in a different manner. Increased attention should be given to the issue of injury, not just in terms of treatment, but also in terms of its psychological aspects, as athletes often return to their sport with stress, low self-confidence and emotions associated with anxiety or depression. In the case of a sports career, the negative emotions of returning to the training and competitive process can mean a return to the same competitive level, thereby reducing the enjoyment of the given sport, or can lower the competitive level or completely end the athlete's sporting career.

Evaluation and monitoring of the impact of injury on mental health is key for identifying negative states (depression, anxiety, etc.) and providing supportive measures, which include psychological support and therapy, which can help injured athletes handle the emotional demands caused by injury. For this

reason, we decided to conduct a study in which we focused on the impact of (repeated) injuries on the mental state of athletes.

Putukian (2022) states that injury triggers a psychological response in the body. The fear of re-injury or experience with repeated injury can be a contributing factor in the development of anxiety (Podlog & Eklund, 2009), and such factors can also include the perception of a fall-off in one's own performance (Cassidy, 2006). Anxiety itself is viewed by some authors as a factor contributing to good performance; for other authors, anxiety depends on the personality of the athlete and can have both positive and negative effects (Devonport et al., 2005; Murray, 2021). Some authors have also looked at the perceived differences in the impact of injury in team and individual sports (Hurley et al. 2016; Mladenović, 2019; Vighová, 2023). This supports our hypothesis that team athletes may benefit from collective coping mechanisms, which buffer the emotional impact of injury. These insights reinforce the need to consider social and relational dynamics when evaluating post-injury mental states. Sex can also be a factor in the emergence of increased somatic and cognitive anxiety and a potential decrease in self-confidence (Di Cagno et al., 2020; Abrahamson et al., 2008). The seeking of help and the use of coping strategies is highly variegated for each individual, thus there is also diversity and differences in how these are applied in everyday life and in sport. This issue is analysed for example in studies by Compas et al. (2001) and Cotterill (2010).

Prieto-González et al. (2021) aimed to determine the epidemiology of sport-related injuries in adolescent athletes and the incidence of different risk factors on those injuries. Results this study confirmed that most injury risk factors are modifiable, it is imperative to implement strategies to reduce amateur and professional adolescent athletes' injury rates. Other studies also highlight the broader psychosocial impact of physical limitations and injury. For example, Šagát et al. (2020) found that musculoskeletal pain during quarantine was significantly associated with increased psychological distress, including anxiety and reduced motivation to engage in sport. These findings support the notion that injury-related stress is not only physical but deeply psychological and may be exacerbated by environmental or social isolation.

2 GROUP AND METHODS

The research sample consisted of 167 Czech athletes (121 women and 46 men) aged between 15 and 33 years. Participants represented various performance levels: 49 % identified as elite athletes (national team members or participants in top-level competitions), 32 % as competitive athletes, and 19 % as recreational athletes. The sample included both team sport athletes (77 %) and individual sport athletes (23 %).

Data collection was conducted in March and April 2023 using an anonymous online questionnaire. The questionnaire was distributed via Czech sports associations and social media platforms and further shared among athletes themselves. Due to the method of distribution, the sample was not representative.

The research tool consisted of three parts:

1. A non-standardized questionnaire collecting demographic and sports-related data (e.g., age, sex, sport, performance level).
2. A non-standardized section focused on injury history (type, frequency), motivation to return to sport, and coping strategies used during recovery.
3. The standardized CSAI-2 (Competitive State Anxiety Inventory-2) questionnaire, which measures cognitive anxiety, somatic anxiety, and self-confidence. The CSAI-2 results were compared with normative data published by Martens et al. (2006).

The study was approved by the Ethics Committee of the KTV PedF UK on September 7, 2023 (ref. No. 14/2023).

3 STARTING POINT, OBJECTIVE, TASKS

The objective of the study was to test how Czech athletes perceive injury and repeated injury in connection with their mental state – in particular anxiety (somatic and cognitive), motivation and confidence – using a CSAI-2 questionnaire.

Injuries are a frequent and serious issue in the careers of athletes, often resulting from overtraining and excessive physical load. The psychological consequences of injury—such as anxiety, fear of re-injury, and reduced self-confidence—can significantly affect an athlete's motivation, performance, and overall

mental health. These effects are often underestimated in the rehabilitation process, despite their potential to influence the athlete's return to sport or even lead to early career termination.

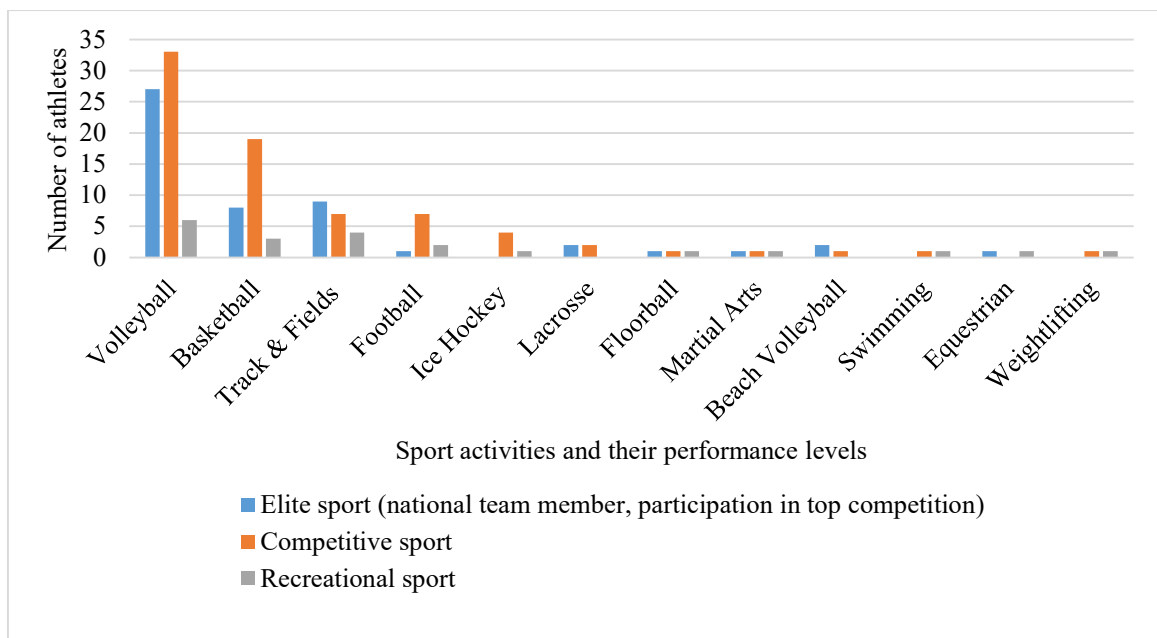
The study aims to assess the levels of cognitive and somatic anxiety experienced by athletes following injury, using the standardized CSAI-2 (Competitive State Anxiety Inventory-2) questionnaire. It seeks to compare the psychological responses of athletes who have sustained a single injury with those who have experienced repeated injuries. The research investigates whether there are significant differences in anxiety levels between athletes participating in team sports and those engaged in individual sports. It evaluates how injury influences athletes' decisions regarding their return to sport, potential reduction in performance level, or complete withdrawal from athletic participation. Finally, the study intends to formulate evidence-based recommendations for psychological support and injury management practices within the sports environment.

4 RESULTS

The respondents (n = 167) were active or former Czech athletes. The complete questionnaire was filled out by 121 (73 %) women and 45 men (27 %) aged 15 to 33.

The skill level was assessed jointly for both sexes. 81 (49 %) of respondents identified with the term "elite athlete"; 52 (32 %) engaged in sport at a competitive level and 32 (19 %) at a recreational level.

Graph 1 - type of sport and its representation at various performance levels.



Team players were represented in considerably greater numbers (n = 128,77 %) than individual athletes (n = 39, 23 %).

Through a non-standardised questionnaire, the study ascertained the injuries the respondents had suffered over the course of their career. The detailed results are presented in Table 1, which also includes minor or repeated injuries, as the frequency of injury in sport can also impact the mental state of the athlete. The most frequently reported injury was a knee injury, with respondents most frequently reporting an anterior cruciate ligament tear (n = 33) or torn meniscus (n = 19) or a combination thereof – ACL and meniscal tear (n = 13). The identified types of injuries were significantly more frequent for team players.

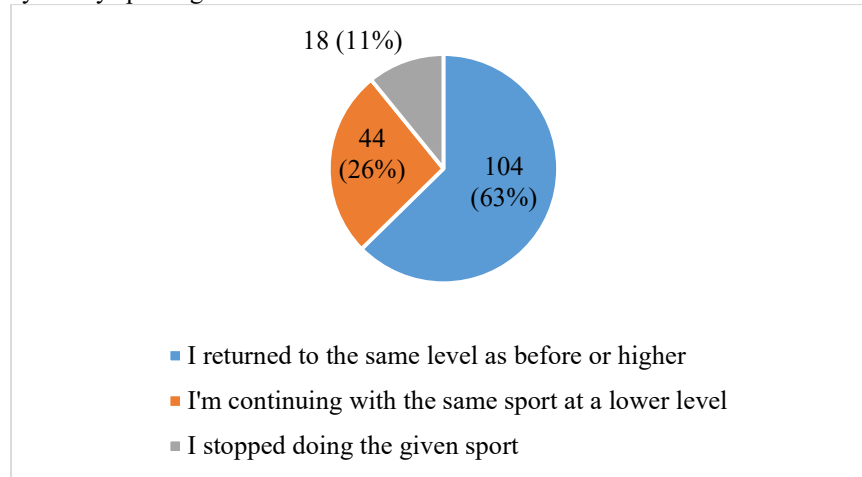
Table 1 - types of injury.

Area of injury	Specific area of injury	Type of injury	Number of respondents who reported the given injury
Head	Injury to the facial region	Fracture of facial bones	1
		Skin tear	1
	Injury to the cerebral region	Concussion and brain haemorrhage	1

Upper extremities	Wrist injury	Forearm ligament injury	2
		Inflammation of the wrist	1
		Dislocation of the wrist	1
	Finger injury	Torn finger ligaments	1
		Finger dislocations and sprains	5
	Elbow injury	Torn elbow ligaments	2
		Inflammation of the elbow	1
	Shoulder injury	Shoulder dislocation	4
		Ligament tear (partial and complete tears)	2
		Rotary cuff injury	2
		Unspecified shoulder injury	3
	Upper extremity fracture	Fingers, wrists, etc.	12
	Upper extremity muscle system injury	Muscle tears	1
	Unspecified upper extremity problems	<i>(reported for example as an arm injury)</i>	1
Torso	Back injury	Herniated disc	5
		Problems with the lumbar region (especially blockages)	7
	Torso muscle injury	For example trapezius, latissimus dorsi, pectoral muscles, etc.)	2
Lower extremities	Knee injury	Fracture of the anterior, posterior or lateral cruciate ligament	39
		Rupture of the meniscus	20
		Patella injury	1
		Knee dislocation	3
		Inflammation of the knee	1
		Unspecified knee injury	9
	Ankle injury	Ankle sprain	33
		Unspecified ankle injury	2
		Ankle fracture	4
		Achilles problems	9
	Fracture	For example toes, tibia and fibula, talus, etc.	7
	Lower extremity muscle system injury	Groin problems	4
		Pulled muscles in the lower extremities	1
		Torn muscles in the lower extremities	5
		Ruptured muscles in the lower extremities	1
Unspecified		Fractures	2
		Sprains	2

4.1 IMPACT OF INJURY ON RETURN TO SPORT

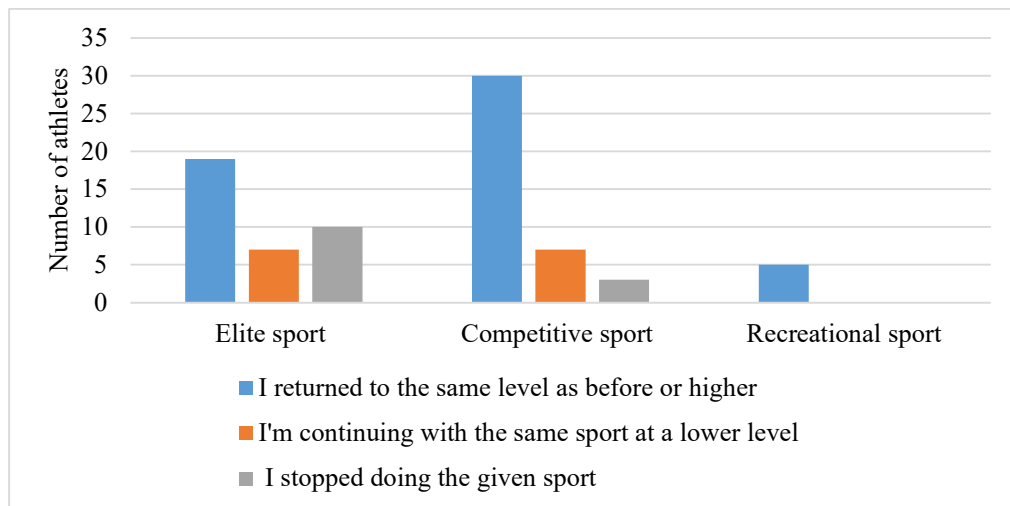
The impact of injury on the respondents' careers is shown in Graph 2: 63 % of respondents stated they returned to the same competitive level or higher. In contrast, 26 % of respondents reported a lower level of performance after recovery; 11 % of study participants quit their sport altogether.

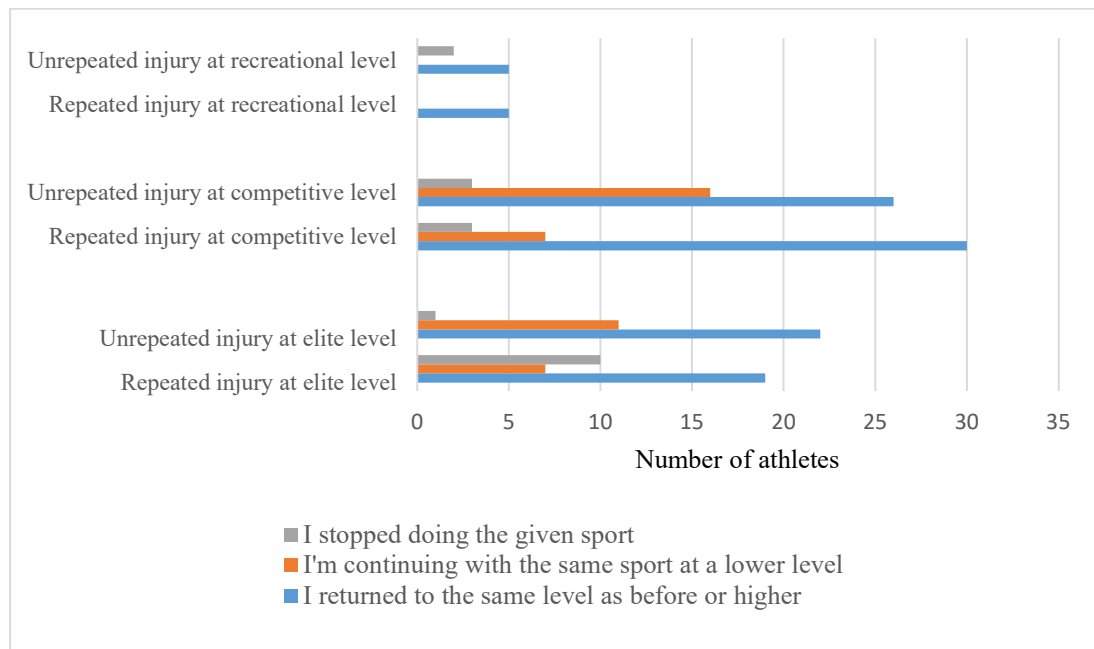
Graph 2 - impact of injury on my sporting career.

Repeated injury (Graph 2) was experienced by 47 % of respondents ($n = 79$). Elite athletes with repeat injuries generally returned at the same level of competition (50 %, $n = 20$); 5 respondents moved to a lower level (14 %); 10 respondents completed ceased sporting activities (28.5 %). For competitive athletes, 71 % ($n = 27$) reported a return to the same level of competition, 18.5 % ($n = 7$) reported a reduction, and 10 % ($n = 4$) reported a complete end to sporting activities. As expected, recreational athletes returned to the same or a higher level of physical activity following injury (5 of 5 respondents).

4.2 IMPACT OF REPEATED INJURY ON PERFORMANCE LEVEL

Graphs 2 and 3 show the consequences of injury based on the frequency thereof at various levels of performance. Most of the recreational athletes surveyed returned to recreational sport. Competitive athletes returned to the same or higher competitive level in the case of unrepeated injuries. As expected, different results were found for elite athletes: 19 athletes with repeat injuries and 22 athletes with non-repeat injuries returned to the same competitive level; 7 athletes with repeat injuries and 11 with non-repeat injuries moved to a lower competitive level.

Graph 2 - impact of injury on sporting career.

Graph 3 - comparison of repeated and one-time injury for respondents at various performance levels.

The consequences of injury after returning to the training process and competition were both physical (e.g. pain, loss of fitness, reduced flexibility, loss of muscle mass, etc.) and psychological (e.g. fear, uncertainty, mental block, loss of confidence, etc.). Such consequences were reported by 89 % (n = 146) of respondents.

4.3 GENDER DIFFERENCES IN ANXIETY RESPONSES

In comparison with the norm (Martens et al., 2006), our returned results indicate that the respondents had a higher incidence of somatic anxiety and change in confidence levels, but lower somatic anxiety. Table 3 presents the data for several men selected from the results of our CSAI-2 questionnaire, the group mean and the standard deviation.

Table 2 - Norms of CSAI-2 questionnaire (Martens et al., 2006).

Norm	Cognitive anxiety		Somatic anxiety		Self-confidence	
	Score	Deviation	Score	Deviation	Score	Deviation
Women	17.98	5.20	20.11	5.42	24.56	5.33
Men	16.29	4.65	19.29	4.80	26.21	4.81

Respondents (women)	Cognitive anxiety	Somatic anxiety	Self-confidence
1.	25	20	11
2.	17	11	12
3.	12	9	25
4.	21	17	19
5.	16	13	28
Mean	20.13	16.61	17.02

Table 3 - CSAI-2 results in men and women.

Respondents (men)	Cognitive anxiety	Somatic anxiety	Self- confidence
1.	25	15	13
2.	15	14	14
3.	21	16	15
4.	25	18	16
5.	11	9	15
Mean	17.76	14.65	19.43
Standard deviation	5.59	3.80	4.48

Standard deviation	6.58	5.47	4.99
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Table 3 shows the mean for women and men, also revealing higher values for somatic anxiety and change in confidence.

Cognitive anxiety after returning to sport increased in both team and individual female athletes with repeated injury. Somatic anxiety only increased for those female athletes engaged in individual sports.

Table 4 - impact of repeated injury in female athletes engaged in collective and individual sports.

WOMEN	Cognitive anxiety		Somatic anxiety		Self-confidence	
	Score	Deviation	Score	Deviation	Score	Deviation
Norm	17.98	5.20	20.11	5.42	24.56	5.33
Individual sport repeated injury	20.41	7.34	21.41	7.21	19.58	5.58
Individual sport unrepeated injury	17.69	3.38	16.38	3.05	20.76	3.84
Team sport repeated injury	21.70	6.69	18.53	5.76	18.61	4.8
Team sport unrepeated injury	19.9	6.54	16.72	4.57	19.68	5.98

Table 5 - impact of repeated injury for male athletes engaged in collective and individual sports.

MEN	Cognitive anxiety		Somatic anxiety		Self-confidence	
	Score	Deviation	Score	Deviation	Score	Deviation
Norm	16.29	4.65	19.29	4.80	26.21	4.81
Individual sport repeated injury	17	4.42	15.6	2.41	23.8	2.71
Individual sport unrepeated injury	17.25	5.76	16.37	4.49	23.5	5.31
Collective sport repeated injury	16.53	5.12	14.26	3.35	21.06	6.8
Collective sport unrepeated injury	17.4	4.7	15.2	3.03	19.4	5.13

The presented data reveal notable gender differences in psychological responses to injury. Compared to CSAI-2 normative values, female athletes in our sample exhibited higher levels of cognitive anxiety and reduced self-confidence, particularly after repeated injuries. Somatic anxiety increased primarily among women engaged in individual sports. Male athletes showed less pronounced changes, with cognitive anxiety remaining relatively stable and somatic anxiety decreasing across both sport types. These findings suggest

that gender plays a significant role in how athletes experience and process injury-related stress, with women generally reporting more intense emotional reactions and lower confidence during recovery.

4.4 DIFFERENCES BETWEEN TEAM AND INDIVIDUAL SPORTS

A comparison of repeated injuries for collective and individual male athletes shows that the cognitive anxiety values increased for both groups; male athletes from individual sports did not report increased somatic anxiety.

Table 6 - comparison of repeated injury in team and individual sports.

	Cognitive anxiety		Somatic anxiety		Self-confidence	
	Score	Deviation	Score	Deviation	Score	Deviation
Norm	17.13	4.92	19.7	4.8	25.38	5.07
Individual sport repeated injury	18.7	5.88	18.5	4.81	21.69	4.145
Individual sport unrepeated injury	17.47	4.57	16.37	3.77	22.13	4.58
Collective sport repeated injury	19.11	5.9	16.39	4.55	19.83	5.8
Collective sport unrepeated injury	18.65	5.62	19.96	3.8	19.54	5.55

The comparison between team and individual sports highlights distinct patterns in anxiety responses following repeated injuries. Athletes from both groups experienced elevated cognitive anxiety, yet somatic anxiety remained unchanged or decreased among individual sport participants. Self-confidence scores declined more sharply in team athletes, indicating that repeated injuries may disrupt collective dynamics and perceived performance expectations. These results underscore the importance of tailoring psychological support to the specific context of the sport, recognizing that individual and team athletes may require different coping strategies and rehabilitation approaches.

5 DISCUSSION

It was determined using the CSAI-2 standardised questionnaire that returning to sport after an injury had an impact on the somatic and cognitive anxiety of all respondents (118 athletes mild anxiety, 49 athletes more severe). Our findings are consistent with previously published research. Putukian (2022) states that injury triggers a psychological reaction in the body and can take the form of sadness, isolation, irritation, reduced or complete loss of motivation, anger, frustration, and sleep disorders, which can then lead to anxiety or, in extreme cases, depression. Podlog & Eklund (2009) found that fear of repeated injury also contributes to anxiety. Their findings suggest that physiological stressors can amplify anxiety responses, which aligns with our observation that repeated injuries intensify both cognitive and somatic anxiety.

A majority ($n = 65$) of respondents in our study stated they feared repeated injury, while another 68 respondents noticed a loss in performance level; 45 individuals reported a combination of both factors. Similar findings were published for example by Cassidy (2006), who added another factor, which is perception of the loss of one's own performance. Some studies (Devonport et al., 2005; Murray 2021) however point out that athletes' performances are affected both negatively and positively, depending on the increased values of anxiety and depression.

The sex of athletes influences the occurrence of negative states: of our 146 respondents, problems associated with returning to sporting activities were perceived by 76.6 % women and 23.3 % men. These values are generally consistent with the standards of the CSAI-2 questionnaire (Martens et al., 2006), which reports mild anxiety after returning from injury for 70 % of female respondents and more severe states of anxiety for 30 % of women. For men, mild states of anxiety occurred for 84.4 % and more severe states for 15.6 %. These findings correlate with the research of Di Cagna (2020), who states that women achieve higher scores of perceived stresses than men. García-Fernandez et al. (2020) also published a higher occurrence of anxiety in women (nearly 40 %) than in men (28 %). Abrahamsen et al. (2008) states that women have a higher occurrence of performance anxiety and somatic anxiety.

Repeated injury also negatively affected the sporting career of athletes that moved into lower-level competitions or completely quit sports. Mladenović (2019) found significant differences in the incidence of cognitive anxiety in individual athletes compared to team athletes. Our findings however showed increased cognitive anxiety in team athletes as well. Sex also played a role in the occurrence of cognitive and somatic anxiety in athletes with recurring injuries.

A positive of the study is the relatively large sample of respondents ($n = 167$), which is higher than most publications relevant to the issue. A limit on interpreting the results is the fact that it was not a representative sample, and the research group was unbalanced in terms of sex (women: $n = 121$, men: $n = 45$). Another limiting factor is the unbalanced representation of athletes engaged in collective or individual sports (collective: $n = 128$; individual: $n = 39$). In collecting data, it would be advisable to focus on greater homogeneity of the research group in these respects. The higher representation of team players was evidently the result of the sporting focus of the article's co-author.

In retrospect, we are of the opinion that it would be ideal to focus more on recruiting respondents who are engaged in sport at the top level. We consider the fact that the study was conducted in March and April 2023 to be another limiting factor, as it is possible individual respondents had an individual view and approach due to the fact they were in different parts of the training or competitive cycle.

As part of the recommendations for given situation, we recommend the follow key measures to support the mental health of athletes during and after their return to training and competition:

1. **Psychological support and therapy:** Ensuring access to sports psychologists who can provide athletes with individual, or group therapy focused on managing anxiety, depression and other negative emotions associated with injury and returning to competition.
2. **Gradual return to training:** Implementation of a gradual and monitored programme for returning to training that allows athletes to gradually increase the volume and avoid overloading, thereby minimising the risk of re-injury and improving their mental well-being.
3. **Education and raising awareness:** Providing educational programmes for athletes, coaches and other team members on the importance of mental health, injury prevention and stress management techniques.
4. **Team and family support:** Support from coaches, teammates and family is key for the positive mental state of an athlete. Creating a supportive and motivating environment can contribute significantly to an athlete's successful return to competition.
5. **Monitoring and assessment:** Regular monitoring of athletes' mental and physical condition following injury and during rehabilitation with the aim of identifying potential problems in a timely manner and providing the necessary intervention.

6 CONCLUSIONS

The results of a questionnaire survey of Czech athletes confirm that injury influences their mental health. The observed data show significant changes because of injury or repeat injury in relation to the cognitive and somatic anxiety of athletes.

The conducted study showed that 71% of respondents showed signs of anxiety when returning to sport after injury. Repeated injuries lead to further increases in cognitive anxiety values in both team and individual athletes; in addition, increased somatic anxiety scores were observed in individual athletes.

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7 ZUSAMMENFASSUNG

Ausgangspunkt: Verletzungen sind ein häufiger und bedeutender Stressfaktor in der Karriere von Sportlern und führen oft zu psychischen Folgen wie Angstzuständen, Angst vor erneuten Verletzungen und vermindertem Selbstvertrauen. Diese Auswirkungen können sich negativ auf die Motivation und Leistung auswirken und in einigen Fällen zu einem vorzeitigen Ende der sportlichen Karriere führen.

Gruppe: An der Studie nahmen 167 tschechische Athletinnen und Athleten (121 Frauen und 46 Männer) im Alter von 15 bis 33 Jahren teil. Sie repräsentierten verschiedene Leistungsniveaus (Spitzensport, Wettkampfsport, Freizeitsport) und Sportarten (Mannschafts- und Einzelsportarten). Die Datenerhebung erfolgte über einen anonymen Online-Fragebogen, der über Sportverbände und soziale Netzwerke verbreitet wurde.

Methoden: Verwendet wurde ein dreiteiliger Fragebogen: (1) demografische und sportliche Angaben, (2) Verletzungshistorie und Bewältigungsstrategien, (3) der standardisierte CSAI-2-Fragebogen (Competitive State Anxiety Inventory-2) zur Erfassung von kognitiver und somatischer Angst sowie Selbstvertrauen. Die Ergebnisse wurden mit Normdaten (Martens et al., 2006) verglichen.

Ergebnisse: 71 % der Befragten berichteten über erhöhte kognitive und somatische Angst nach der Rückkehr zum Sport nach einer Verletzung. Wiederholte Verletzungen standen in Zusammenhang mit höheren Angstwerten, insbesondere kognitiver Angst bei Mannschafts- und Einzelsportlern sowie somatischer Angst bei Einzelsportlern. 42,5 % der mehrfach verletzten Athletinnen und Athleten gaben an, ihre Leistung reduziert oder den Sport ganz aufgegeben zu haben.

Schlussfolgerungen: Verletzungen, insbesondere wiederholte, haben erhebliche Auswirkungen auf das psychische Wohlbefinden und die sportliche Laufbahn. Die Ergebnisse unterstreichen die Notwendigkeit psychologischer Unterstützung, schrittweiser Wiedereinstiegsprogramme und Aufklärung über mentale Gesundheit im Sport.

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