

The BASES Expert Statement on psychological considerations for injury risk reduction in competitive sport

Produced on behalf of the British Association of Sport and Exercise Sciences by Dr Adam Gledhill FBASES, Dr Andreas Ivarsson, Professor Urban Johnson, Dr Ulrika Tranaeus, Dr Denise Hill and Claire Louise Davidson.

Introduction

Sports injuries can have serious, long-term health implications for athletes (Putukian, 2016) and is a leading cause of athletes' retirement (Ristolainen *et al.*, 2012). Injury occurrence is associated with less successful team performance can have a significant impact on business and asset management. Hence, whether you are most concerned with the health, performance, or financial implications, reducing the risk of sports injuries is pertinent for sports organisations.

Given these considerations, practitioners should try to reduce the risk of injury (Gledhill *et al.*, 2018). Yet, despite the robust evidence demonstrating that psychological factors can increase the risk of acute (e.g., Ivarsson *et al.*, 2017) and overuse (e.g., Tranaeus *et al.*, 2014) injuries, psychological factors are not as well-recognised or planned for as physical factors. This lack of recognition of, or planning for, psychological considerations may be due to potential concerns surrounding uncertainty about the evidence-base regarding psychological factors, a lack of awareness of the benefits of psychological strategies, or resource constraints (e.g., finances). To address these concerns, the purpose of the expert statement is to outline the prominent psychological risk factors for sports injury and provide real-world suggestions which can help sport and exercise scientists reduce sports injury risk.

Which psychological factors increase injury risk?

Personality factors, psychosocial stress, the stress response, and poorer coping resources are related to increased acute sports injury risk (Johnson, 2021). Of these, psychosocial stress - which might be organisational stressors or factors beyond competition stressors - and the magnitude of the stress response have the largest and most consistently reported links with sports injury risk (Ivarsson *et al.*, 2017). There are several mechanisms which can explain the acute injury risk. First, neurocognitive changes can create neuromuscular changes that reduce movement control, thus increasing the risk of acute non-contact injuries. Similarly, neurocognitive changes associated with stress response can increase reaction time in response to environmental injury risk factors (e.g., avoiding collisions). Furthermore, negative life event stress is associated with peripheral narrowing which can increase injury risk through reduced situational awareness, whereas chronic daily hassles can reduce an athlete's capacity to effectively concentrate during training and competition (see Johnson, 2021 for further insight).

The mechanisms for overuse injury risks are different and, whilst growing, the evidence-base regarding psychological risk factors is smaller (Tranaeus *et al.*, 2014). Typically, athletes could be at a higher risk of overuse injury in instances where they

Table 1. Psychological interventions to reduce sport injury risk (experimental trials with control groups).

Study	Participants	N	Intervention	Results
Naderi <i>et al.</i> (2020)	Elite male soccer players	168	Mindfulness (MAC approach)	Number of injuries, average injuries per team and days lost due to injury lower in mindfulness group than control group
Zadeh <i>et al.</i> (2019)	Male soccer players	45	Mindfulness (MAC approach)	Reduced injury rates in mindfulness group
Olmedilla-Zafra <i>et al.</i> (2017)	Male soccer players	74	Stress Inoculation Therapy (PMR, breathing, imagery, self-instructional and attention-focus training)	Decrease in average number of injuries in treatment group
Tranaeus <i>et al.</i> (2015a)	Male and female elite floorball players	346	Stress management, relaxation, goal setting skills and emotional control	Both genders suffered fewer injuries in the treatment group
Tranaeus <i>et al.</i> (2015b)	Male and female elite floorball players	401	Stress management, relaxation, goal setting skills and emotional control	Both genders suffered fewer injuries in the treatment group
Ivarsson <i>et al.</i> (2015)	Male and female junior elite soccer players	41	Mindfulness (MAC approach)	Greater proportion of intervention group players remained injury free
Edvarsson <i>et al.</i> (2012)	Male and female high school soccer players	29	Cognitive behavioural feedback (self-regulation techniques of thought stopping, relaxation and breathing; stress management; video clips)	Fewer injuries in the intervention group
Noh <i>et al.</i> (2007)	Female ballet dancers	35	Autogenic training, broad-based coping skills (AT, imagery, self-talk).	Overall reduction in injury burden in intervention group
Johnson <i>et al.</i> (2005)	Male and female soccer players	235	(a) somatic and cognitive relaxation, (b) stress management skills, (c) goal setting skills, (d) attribution and self-confidence training, and, (e) identification and discussion about critical incidents related to their football participation and situations in everyday life. (PST).	Broad-based coping skills most effective at reducing injury risk
Kolt <i>et al.</i> (2004)	Male and female gymnasts	20	Cognitive-behavioural stress management	Fewer injuries in treatment than control group

¹ MAC = Mindfulness, Acceptance and Commitment Approach; PMR = Progressive Muscular Relaxation; AT = Autogenic Training; PST = Psychological Skills Training

experience organisational stressors and cultures that impact on decisions and behaviour (e.g., poor coach-athlete relationships; poor communication between coach, medical, support staff, and the athlete; environments which emphasize negative sporting social comparisons). These manifest unrealistic training and performance demands for athletes and have the potential to heighten psychosocial stress. Without the opportunity or resource to manage that stress, or in instances where athletes demonstrate poor lifestyle choices and behaviours (e.g., insufficient recovery, poor sleep planning, over-training, general poor self-care), athletes become more susceptible to injury. It is likely that the risk of overuse injury in such instances is the product of complex interactions between these different factors that influence stress hormone perturbation, immunosuppression and/or impair soft tissue repair (Johnson, 2021; Tranaeus *et al.*, 2014).

Reducing uncertainty: which psychological strategies can reduce injury risk?

Given the prominence of psychosocial stress and stress responses for acute and overuse injury risk, most intervention studies have investigated the role of various stress-management-based interventions (Gledhill *et al.*, 2018; Ivarsson *et al.*, 2017). Table 1 outlines key studies, demonstrating their intervention approach and outcomes (references available from the lead author). Whilst demonstrating promise, this body of research has quite a narrow focus of mainly investigating intra-individual interventions. This is an important consideration, given that many stressors contributing to injury risk might be more a product of organisational stressors or cultures. Future research should examine the impact of interventions that includes the athlete's environment, organisation, or culture, and how such interventions might reduce injury risk.

Applied recommendations

To support sport and exercise scientists in integrating psychological considerations into their injury prevention planning, we offer the following suggestions:

- Screen athletes daily for psychosocial stress indices, sleep quality, and perceived recovery (e.g., by using the Acute Recovery Stress Scale or the Short Recovery and Stress Scale; see Kölling *et al.*, 2020 for English language validation).
- Offer stakeholder education around organisational injury risk factors. This could include organisational culture, psychosocial stressors and relational issues. Such education could contribute to reducing athlete stressors and mitigating against poor behavioural choices, thus reducing overuse injury risk.
- From the outset, facilitate open communication between athletes, coaches, and medical/support staff, to understand and ensure appropriate demands on the athlete.
- Create psychologically safe (e.g., Edmondson & Lei, 2014) sporting environments as this type of environment can encourage athletes to discuss and raise concerns about stressors, demands and potential injuries.
- As a sport and exercise scientist, form strong relationships with your athletes. Common factors such as shared goal consensus/collaboration, empathy, working alliance, and positive regard are all important for open dialogue regarding injury and injury risk factors.
- Adopt psychological intervention strategies. Of those in table 1, mindfulness and acceptance-based practice and stress management interventions (e.g., cognitive-behavioural stress management) demonstrate promise for injury risk reduction.
- Consider athlete (and coach/other stakeholder) education, so that they understand the performance-related benefits of engaging with mindfulness and acceptance-based strategies. This increases the likelihood of athletes engaging and maximise potential benefits.

Concluding thoughts

The evidence behind psychological strategies for sports injury risk reduction provides largely consistent, clinically meaningful results: athletes with higher psychosocial risk indices for sports injury suffer more sports injuries, and injury risk is lower in groups exposed to psychological interventions aimed at injury prevention. Sport and exercise scientists have an important role to play in facilitating the adoption of psychological strategies into sports injury prevention programmes for competitive athletes. ■



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