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Chapter 12

SPORTS PSYCHOLOGY AND SPORTS INJURY MANAGEMENT

Dr Dale Forsdyke and Dr Adam Gledhill

INTRODUCTION

Despite living in an era where modern science has afforded us with the advanced approaches to managing sports injury, the rate and burden of sports injury remains high (Ekstrand et al. 2020). When athletes do sustain a sports injury, their return to sport (RtS) outcomes in the form of re-injury, returning to pre-injury sport, and getting back to pre-injury performance levels, are often poor (Ekstrand et al. 2020; Ishøi et al. 2018). Together, these points highlight a need to reflect on and improve our approaches to reducing the risk of sports injury and how we rehabilitate, recondition and return athletes back to sport following injury. Although research and practice indicate that many factors can contribute to an athlete becoming injured or having poor return to RtS outcomes, there has been an overfocus on physical and biological factors (Burghi et al., 2019). In comparison, our understanding of psychological factors is underdeveloped in research and practice, potentially limiting our effectiveness as sports and exercise therapists (Forsdyke et al., 2016; Gledhill et al., 2018). Often, the role of sport and exercise psychology is marginalised in education and training, leaving therapists feeling underprepared and over-challenged to address psychological factors which may reduce the risk of sports injury and support us to be more effective at returning athletes back to sport (Heaney et al. 2015; Truong et al. 2020). In other words, by gaining a better understanding of sport and exercise psychology principles, and how these can be applied to injury risk reduction and the RtS process, this may enable us to become better practitioners. This chapter is focused on providing an applied understanding of sport and exercise psychology principles and is informed by evidence from theory and research. In aiming to

improve sports and exercise therapy practice, the chapter has several objectives. First, in the spirit of '*doing everything to prevent sports injury*', the aim is to explain the relationship between sport and exercise psychology principles and the risk of sustaining a sport injury. Next, the relationship between sport and exercise principles and the RtS process – from treatment, rehabilitation and reconditioning, through to RtS – will be explained. Finally, sport and exercise psychology interventions and referral processes will be outlined, so that these can be used in a sports injury context to reduce the risk of injury and improve RtS outcomes.

SPORT PSYCHOLOGY AND SPORTS INJURY RISK

While the dominant perspectives on understanding sports injury risk factors have been largely physiological and biomechanical in nature, the past 30 years has manifested and increased understanding of the role of sport psychology and psychological factors in sports injury risk (e.g., Tranaeus et al., 2014; Williams and Andersen, 1998). Arguably, this evidence-base has grown to a level where it can be considered a well-established aspect of understanding injury risk (Ivarsson et al., 2017), but is one that is potentially still under-appreciated and/or under-utilised in certain sport settings (Gledhill and Ivarsson, 2020).

Within this body of work, there is now an acceptance that we should consider traumatic and overuse injuries as separate entities. This is because the psychological factors underpinning these distinct types of injuries are different and, without an understanding of the psychological factors related to each, a sports therapist will not be appropriately preparing themselves for managing injury risk. In the context of traumatic injuries, the dominant perspective comes from the *Model of Stress and Athletic Injury* (Williams and Andersen, 1998), whereas the more emergent perspective on traumatic injuries comes from the model of psychological risk factors for overuse injuries (Tranaeus et al., 2014). While our understanding of traumatic injuries is well-established in the sport psychology literature, the understanding of overuse injury risk has only really gained increased attention over the past 5-10 years.

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Psychological factors contribute to traumatic and overuse injuries in different ways. Clinicians need to understand these different mechanisms to develop a comprehensive understanding of injury risk.

Traumatic injuries

The Model of Stress and Athletic Injury is the most widely cited model of sports injury risk. According to Williams and Andersen (1998), injury risk is influenced by an athlete's stress response that is suggested to have a bi-directional relationship with the athlete's appraisal of a potentially stressful athletic situation. The model suggests that the size of the athlete's stress response and their appraisal of the potentially stressful athletic situation are influenced by the interaction of their personality, history of stressors and coping resources (see Ivarsson et al., 2017 for a systematic review and meta-analysis of the components of this model).

Personality factors

According to the Model of Stress and Athletic Injury, there are personality factors that can either increase or decrease injury risk. In the context of increasing injury risk, personality factors, such as general anxiety and stress susceptibility, are associated with an increased injury risk, most likely because they will increase the magnitude of the stress response or increase the possibility that an athlete will perceive a specific situation as stressful (Williams and Andersen, 1998). Conversely, personality factors such as optimism, confidence, hardiness, and resilience are suggested to decrease the risk of sports injury, with the basic principle being that these factors reduce the likelihood that an athlete will view a situation as potentially stressful.

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Personality factors are associated with both increased and decreased injury risk, with an increased injury risk likely due to poorer decision-making during training or games.

History of stressors

The next group of injury risk variables outlined within the Model of Stress and Athletic Injury is the history of stressors. Typically, history of stressors falls into one of three categories: life event stress, previous injuries, and daily hassles.

Life event stress is associated with increased injury risk in a range of sports (e.g., Johnson and Ivarsson, 2011; Noh et al., 2005). Negative life event stress is the aspect of life event stress that is most associated with an increased injury risk (Ivarsson et al., 2017).

Previous injury is a risk factor, arguably contributing to re-injury risk when an athlete returns to sport when they are not physically, biomechanically, or psychologically prepared to RtS (see *Psychology of return to sport* later in this chapter). Focussing on psychological considerations, there is evidence suggesting that factors such as re-injury anxiety, fear of re-injury, and a lack of sport-related confidence in either the ability to return to pre-injury levels of performance or to remain injury free on RtS are all re-injury risk factors (see Forsdyke et al., 2016 for a review). Typically, the principle behind injury risk here is that the previous injury and associated psychological considerations can increase the magnitude of a stress response which can then impact on decision-making within performance situations and, if an athlete is unable to make appropriate decisions, they could take unnecessary risks or make bad performance choices that result in injury.

Daily hassles are relatively small and seemingly insignificant everyday situations that people can find stressful. Whilst the evidence-base behind this group of stressors is relatively small, it is important to acknowledge that a build-up of daily hassles over time without the ability to cope with these hassles could have a cumulative effect that increases injury risk. If you think about times when you have had lots going on, on a day-to-day basis and have felt that gradually creep up on you, you will likely be able to think of times when you have become quite stressed, worried, or felt in a generally low mood. In the context of athletes, this could then have a similar impact on decision-making capability and other lifestyle behaviours (e.g., poor sleep), which could then increase the likelihood of injury.

Coping

The concept of coping within the Model of Stress and Athletic Injury can be considered from the perspectives of both coping resources and coping behaviours. Coping resources are personal or environmental characteristics that can influence our coping behaviours, whereas coping behaviours refer more to the strategies that athletes use to manage specific stressors. Speaking generally, coping resources and behaviours can influence the magnitude of an individual's stress response and the general principle being that better developed coping

resources and behaviours can reduce the magnitude of the stress response. Similarly, coping resources and behaviours can influence an athlete's appraisal of potentially stressful situations and reduce the injury risk by helping athletes to perceive these situations as more positive, challenging, or facilitative, as opposed to negative, threatening or debilitative. Despite this seemingly straightforward perspective, findings in relation to coping and injury risk are not as consistent as one would expect with contrasting findings found amongst studies that suggest coping can reduce injury risk (e.g., Rogers and Landers, 2005) whilst others suggest negligible influences (e.g., Johnson and Ivarsson, 2011).

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The varied findings related to coping and sports injury risk may be due to differences in injury or coping definitions used within specific studies.

The final consideration within the Model of Stress and Athletic Injury is the role of psychological intervention in reducing injury risk. Whilst this is covered in more detail later in this chapter, it is important to note at this stage that psychological intervention has consistently demonstrated the ability to reduce injury risk in competitive athletes (e.g., Gledhill et al., 2018; Ivarsson et al., 2017). Typically, findings point to the notion that interventions that can reduce the magnitude of the stress response, influence how athletes interpret or appraise potentially stressful situations, or that can help enhance attention, all reduce the risk of sports injury (Gledhill et al., 2018; Ivarsson et al., 2017).

Despite its widespread recognition, the Model of Stress and Athletic Injury does not account for key injury risk variables such as impaired self-care or psychophysiological stressors as injury risk factors (Appaneal and Perna, 2014). Moreover, as noted, the Model of Stress and Athletic Injury does not adequately explain the causes of overuse injuries.

Understanding overuse injuries

Following the dominance of the Model of Stress and Athletic Injury and the assertion that it might not be able to adequately explain the causes of overuse injuries, we can next consider two approaches to understanding overuse injuries that have gained traction over the past 15

years: the *Overtraining Risks and Outcomes Model* (Richardson et al., 2008) and the *Working Model of Psychological Risk Factors for Overuse Injuries*.

In the Overtraining Risks and Outcomes Model, Richardson and colleagues noted that intrapersonal, interpersonal, situational, sociocultural factors and/or the combination of all of the aforementioned factors can elicit overtraining symptoms. As a result, there can be an imbalance between stress and recovery which creates physiological and psychological changes that require action from the athlete to manage these changes. If the athlete ignores these changes and continues to increase their training load, ignore their stressors, or not afford sufficient time for recovery, the athlete leaves themselves more susceptible to injury.

Furthering our understanding of overuse injuries, Tranaeus and colleagues (2014) produced a working model of psychological risk factors for overuse injuries. Within this model, the authors noted that a history of stressors, personal factors, psychophysiological factors, and psychosocial factors can all contribute to an athlete's risk of overuse injuries. Once at risk, if the athlete exhibits ineffective coping, they are more likely to experience an overuse injury.

What is consistent across both models is that overuse injuries are likely to be more prevalent in instances where there is an imbalance between stress and recovery. The important consideration in this regard is why do athletes demonstrate this imbalance between stress and recovery, sometimes choosing to actively engage with sporting activities when their body is telling them that they are at a breaking point? Some potential reasons behind this are the culture, norms, and values within sport (Tranaeus et al., 2014), perceived pressure from external sources (e.g., coaches or parents; Pensgaard et al., 2018), or poor communication networks within team environments (e.g., Ekstrand et al., 2019). Consequently, an awareness of these considerations and developing potential ways of improving these cultural, norm, or value-based considerations within team environments could be a fruitful way of reducing overuse injury risk.

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Overuse injuries are often the product of an imbalance between stress and recovery. Understanding preceding factors that create this imbalance is important for understanding overuse injury risk.

Our understanding of overuse injury risk has been refined and developed in recent years, there are still comparatively fewer studies that have examined overuse injuries in comparison to acute or traumatic injuries (Gledhill and Ivarsson, 2020) and future research should seek to explore this further. Specifically, this aspect of our body of research would benefit from multi-wave, longitudinal studies with designs that can investigate relationships between multiple variables. Moreover, given that overuse injuries are likely to be the product of complex interactions of multiple factors in different sociocultural, the body of research would benefit from considering sociocultural factors and their role in overuse injury risk.

SPORT PSYCHOLOGY AND THE RETURN TO SPORT PROCESS

There is consensus that in optimal sports therapy practice both physical and psychological factors should be considered during the RtS process (Ardern et al. 2016). This is because injury impacts athletes physically and psychologically and as such both aspects require attention from initial diagnosis and treatment until returning the athlete to their pre-injury sport. Moreover, an athlete should only be evaluated as being able to RtS when they are physically and psychologically '*ready*' to do so (Forsdyke et al. 2016). However, evidence from reviewing contemporary sports medicine practice suggests that practitioners frequently adopt an approach that is dominated by healing time and physical factors (Burghi et al. 2019). Not addressing psychological factors during the RtS process is associated with several undesirable RtS outcomes, including not returning to sport, re-injury, and not being able return to pre-injury levels of performance (McPherson et al. 2019). Together, an applied understanding of theory and research may enable sports and exercise therapists to work more effectively with injured athletes and make more robust decisions over '*readiness*' to RtS in a hope that this leads to more desirable injury outcomes.

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Effective decisions on return to sport following injury should consider both the *physical* and the *psychological* status of the athlete.

Theoretical Perspectives

There are several theoretical approaches that may help sports therapists understand how psychological factors may influence the RtS process and as such provide a framework to guide practice. The key approaches are cognitive appraisal approaches, biopsychosocial approaches, and motivation approaches.

Cognitive appraisal approaches

Cognitive appraisals are individual processes (i.e., they will change from person to person) in which a potentially stressful situation is perceived, and the extent of the given stress is evaluated by the individual. Cognitive appraisals take two forms, *primary appraisal* and *secondary appraisal* (Lazarus and Folkman, 1984). Primary appraisal relates to the athlete's assessment of what is at stake by evaluating the challenge, benefit, risk, and value. Subsequently, secondary appraisal refers to the athlete's assessment of their coping skills in terms of being able to address the demands of the situation. Together, an athlete's appraisal of a potentially stressful situation and the resources they possess to cope with the situation predicts their emotional and behavioural responses. For example, two athletes with the same injury and severity of injury (e.g., moderate grade lateral ankle sprain) could have different responses to being injured based on their individual initial appraisal of the situation, and the bespoke coping skills they possess.

In the sports injury domain, the most widely accepted cognitive appraisal-based approach is the *Integrated Model of Response to Sport Injury and Rehabilitation Process* (see Figure 12.1). The integrated model identifies three broad propositions:

i. that individual pre-injury and post-injury factors influence the psychological response of the player to sustaining injury (i.e., it accounts for individual differences)
ii. this response will change over time in a dynamic way
iii. that physical and psychological recovery is the outcome of this process (Santi and Pietrantoni, 2013).

During the RtS process, personal and situational factors continually mediate cognitive appraisal of injury stressors. Examples of *personal factors* include the nature of the injury (i.e., injury type and severity), and the individual make-up of each player (psychological, demographic and physical). Examples of *situational factors* include the nature of the sporting environment (i.e., level of competition and time in season), and the availability and quality of the player's social support network (i.e., the sports therapist's influence and the coach's influence).

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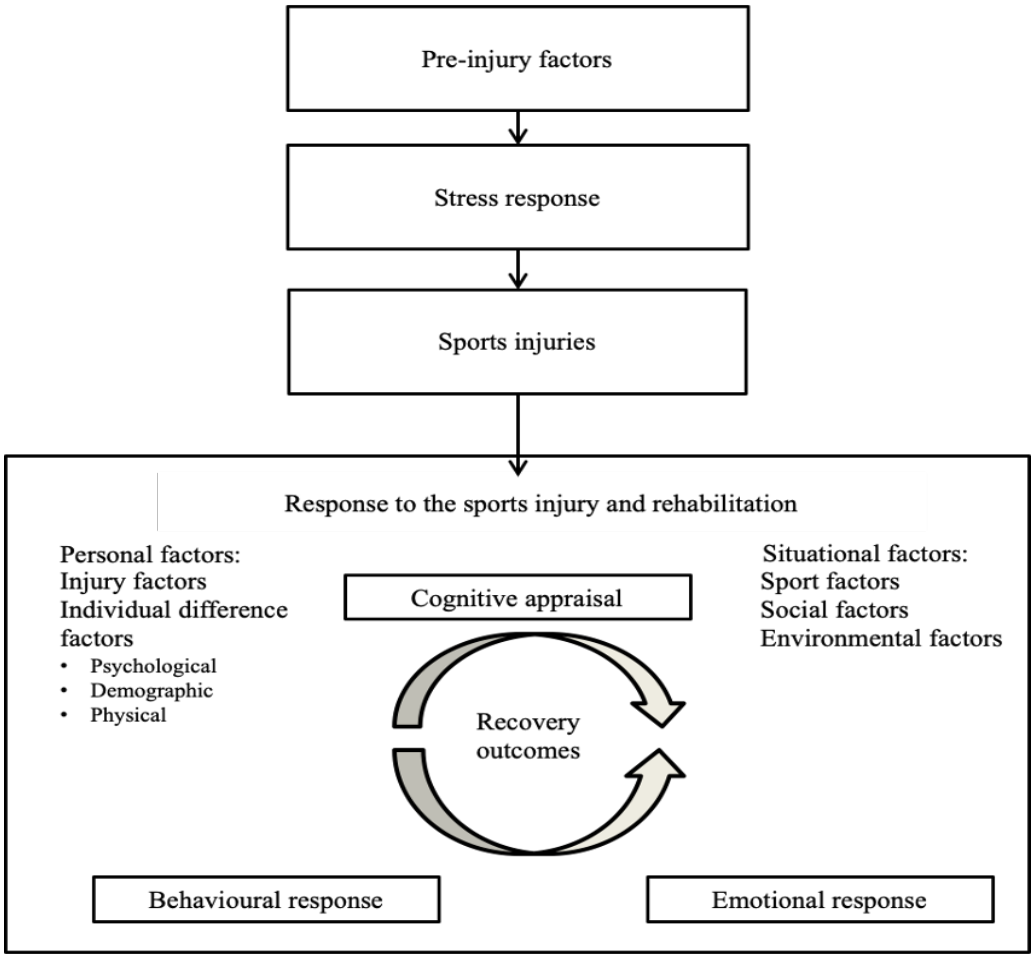

Figure 12.1 Integrated Model of Psychological Response to the Sport Injury and Rehabilitation Process (adapted from Wiese-Bjornstal et al., 1998).

According to the integrated model, cognitive appraisal will influence several emotional (e.g., anxiety, anger and guilt) and behavioural responses of the athlete to injury (e.g., adherence to set exercises, help-seeking and malingering), and consequently lead to further cognitions (e.g., over self-confidence, self-worth and goal adjustment). This cyclical process of cognitive appraisals, and emotional and behavioural responses, is often referred to as the *dynamic core*, which should be viewed as a three-dimensional spiral (Walker et al., 2007). Whereas the spiral may head upwards for positive RtS outcomes (i.e., possessing physical and psychosocial readiness), it may also shift downwards to signify negative RtS outcomes (i.e., not returning to pre-injury sport).

Biopsychosocial approaches

Although these approaches are thought to be relatively contemporary, biopsychosocial approaches can be dated back to the early work of Engel (1977). These approaches suggest additional biological, psychological and social processes compared to cognitive appraisal approaches, through which psychological factors influence RtS outcomes (Brewer, 2010). This is an important feature of this approach, given that cognitive appraisal-based approaches do not fully acknowledge biological or physical factors, and fail to articulate the mechanism behind the interaction of psychosocial factors and physical factors (Brewer et al., 2002). A similar critique is often directed at traditional medical models of injury and illness which commonly place an exclusive focus on biological or physical factors (e.g., Virchow's Biomedical Model; Dijkstra et al., 2014). Therefore, biopsychosocial approaches acknowledge the multifaceted nature of the RtS process. As such, biopsychosocial approaches may have greater use in practice, compared to other predominantly psychological or physical approaches.

In a sports injury context, Brewer et al. (2002) developed the *Biopsychosocial Model of Sport Injury Rehabilitation* (see Figure 12.2). Broadly, the biopsychosocial (BPS) model aims to provide a comprehensive overview of the numerous factors and pathways involved in sports injury rehabilitation, from the occurrence of injury to sports injury rehabilitation outcomes. The model contains several key components: characteristics of the injury; sociodemographic factors; biological factors; psychological factors; social/contextual factors; intermediate biopsychosocial outcomes; and sport injury rehabilitation outcomes.

According to the model, characteristics of the athlete's injury (e.g., cause, severity, location, and injury history) and the sociodemographic background of the player (e.g., age, sex, race and ethnicity, and socio-economic status) influence biological, psychological, social and

contextual factors. Each athlete will have a different profile of injury characteristics and socio-demographic backgrounds. Therefore, this model accounts for some of the variability seen in sports injury outcomes between athletes. Psychological factors (e.g., personality, cognition, affect, and behaviour) are placed centrally in the model, and share reciprocal relationships with biological (e.g., tissue repair, sleep, neurochemistry, and metabolism), social and contextual factors (e.g., social network, life stress, rehabilitation environment, and situational characteristics; Brewer et al., 2002). The various interactions between these biopsychosocial factors influence outcomes directly, or through mediated pathways.

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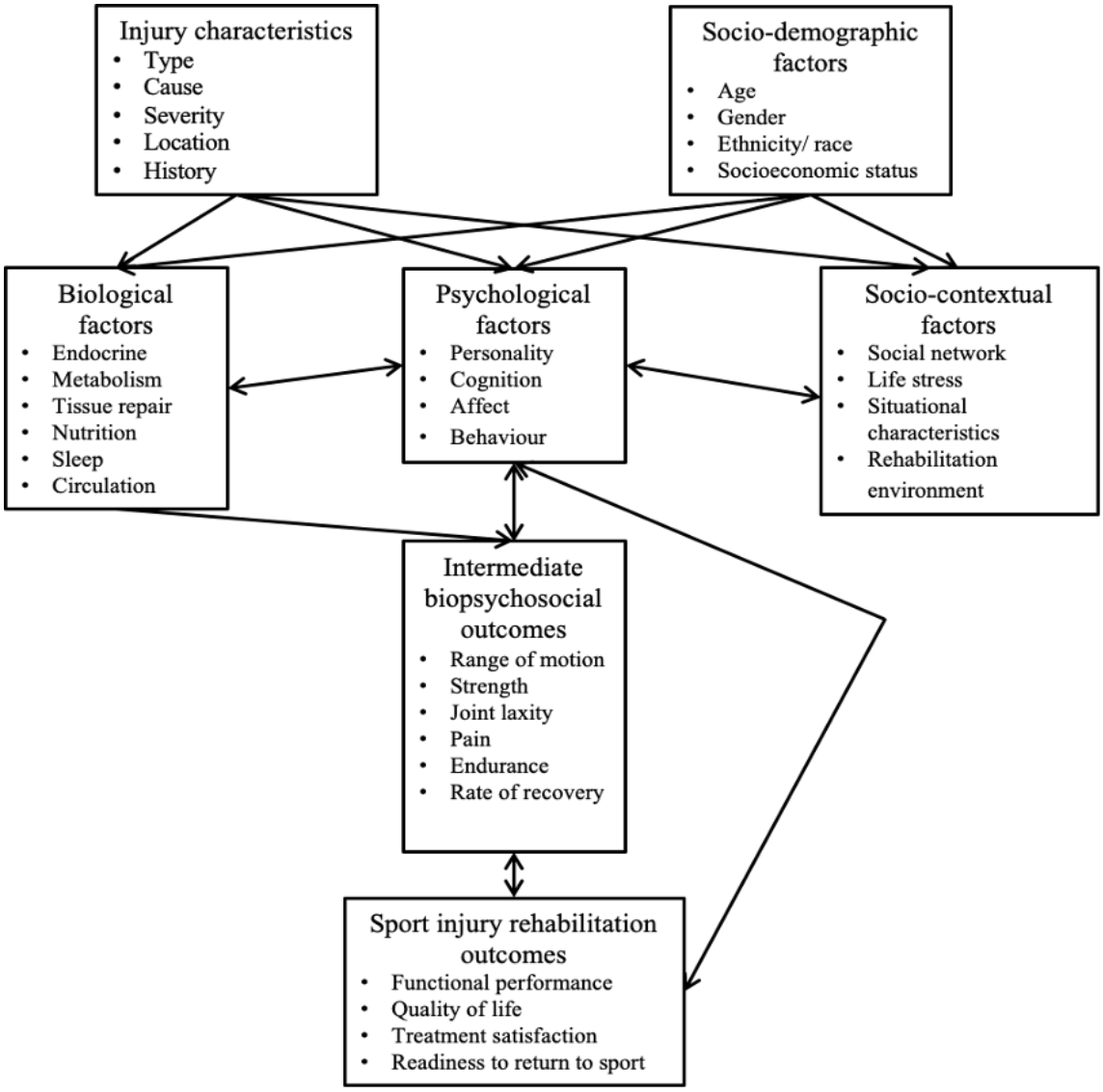

Figure 12.2. The Biopsychosocial Model of Sports Injury Rehabilitation (adapted from Brewer et al., 2002).

Relating to specific outcomes, the BPS model proposes that intermediate BPS rehabilitation outcomes (e.g., rate of recovery, pain, strength, and range of motion) will determine sport injury rehabilitation outcomes (functional performance, quality of life, treatment satisfaction, and readiness to RtS). It is proposed that psychological factors will influence outcomes (i.e., intermediate biopsychosocial and sports injury rehabilitation) directly and in a mediated fashion through their relationship with biological, social and contextual factors. For example, psychological distress (a psychological factor) may negatively influence the rate of recovery

(an intermediate biopsychosocial outcome) mediated by its effect on sleep quality (a biological factor). It is important to note that only psychological factors are believed to directly influence both intermediate and sport injury rehabilitation outcomes, and that this relationship is bidirectional. Using the aforementioned example, a perceived slow rate of recovery may then lead to increased psychological distress. In addition, social and contextual factors will only influence outcomes mediated by psychological factors. For example, an athlete's social network may influence their readiness to RtS, and this relationship would be mediated by psychological factors (e.g., anxiety).

Motivation approaches

Motivation-based approaches focus on what motivates an athlete to engage in adaptive rehabilitation behaviours, and which conditions may determine these behaviours. The assumption is that higher levels of self-motivated behaviour augment positive health outcomes. Podlog and Eklund (2007) suggest that motivation is likely to be the principal psychological factor impacting on RtS after injury. For example, adhering to prescribed sports therapist advice and instructions (i.e., being more motivated) would enhance a player's physical readiness to RtS. The principal motivation-based approach in the sports injury domain is *self- determination theory* (SDT) (Deci and Ryan, 1985).

SDT is a meta-theory comprising several mini-theories describing the socio-environmental conditions that can influence an athlete's tendency towards self-motivated behaviour, psychological health, and task performance (Podlog et al., 2011). These mini-theories are *cognitive evaluation theory*, *organismic integration theory*, *causality orientations theory*, *basic psychological needs theory*, *goal content theory*, and *relationship motivation theory* (Deci and Ryan, 1985).

As a meta-theory, SDT propositions are thought to span multiple contexts (e.g., education, health, parenting), contending that an athlete's actions and behaviours are not only instigated by intrinsic motivation (i.e., engagement for personal reasons), but also that there is a continuum from amotivation (i.e., absence of any intention) to intrinsic motivation, inclusive of forms of external motivation (Santi and Pietrantoni, 2013). However, whether an injured athlete can be truly intrinsically motivated (i.e., engaging for inherent interest and enjoyment) to engage in rehabilitation activities is questionable. This is because athletes typically engage in such activities to achieve a discernible external goal (e.g., to RtS), and these activities are frequently prescribed by the sports and exercise therapist. Therefore, in a sports injury context referring to autonomous motivation, controlled motivation and amotivation may have better conceptual fit. Specific forms of controlled motivation include *introjected regulation* (i.e., acting to avoid feelings of guilt and shame) and *external regulation* (i.e., acting to obtain incentives or avoid punishment), whereas, in addition to intrinsic motivation, specific forms of autonomous motivation include integrated (i.e., acting because of value congruence) and identified regulated reasons (i.e., acting to achieve an important personal goal or valued outcome; Deci and Ryan, 1985). In comparison to controlled motivation, autonomous motivation promotes greater behavioural adherence and commitment because behaviours are self-regulated and self-reinforcing. Of the several mini theories of SDT, it is particularly *basic psychological needs theory* (BPNT) (Deci and Ryan, 2000) that has been most frequently applied to the RtS context (Podlog and Eklund, 2007).

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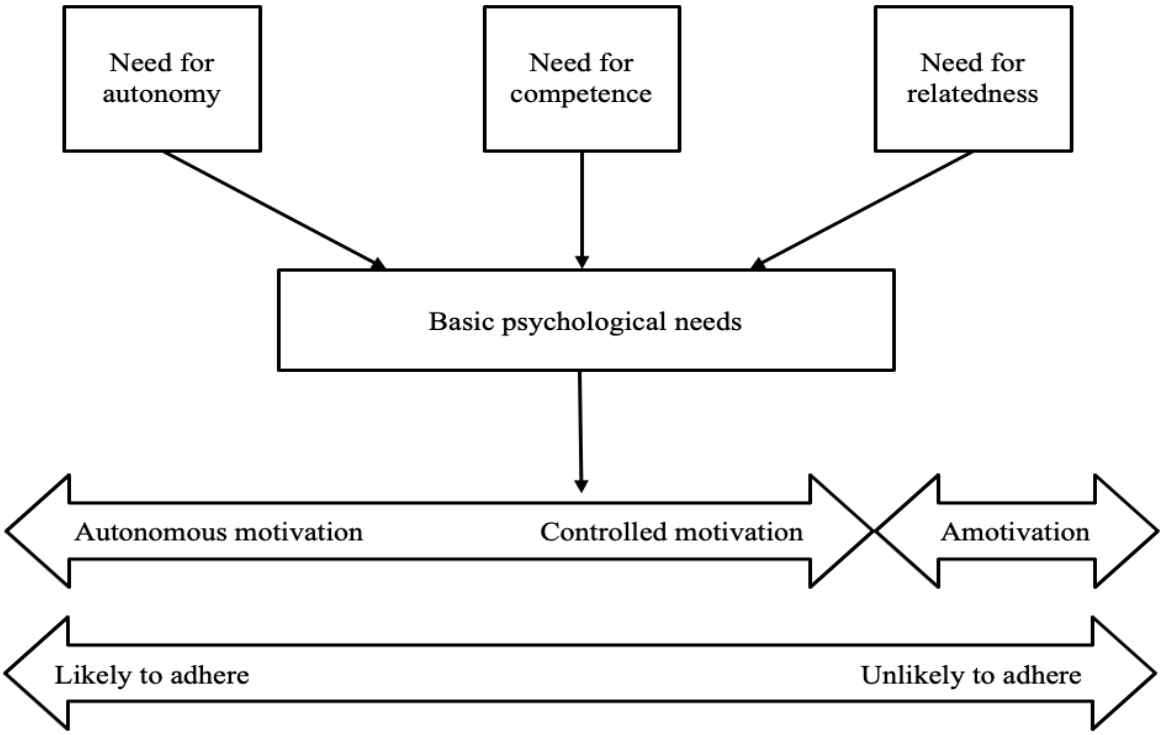

Figure 12.3 Representation of basic psychological needs theory relationship with motivation and rehabilitation adherence (modified from Deci and Ryan, 2007).

According to BPNT, self-motivated behaviour will be enhanced if the correct conditions are perceived. The social environment an athlete finds themselves in serves to either satisfy (i.e., support) or frustrate (i.e., diminish) an athlete's basic psychological needs. Deci and Ryan (2000) refer to three basic psychological needs: *autonomy*, *competence* and *relatedness*. Autonomy explains the athlete's need to feel that their behaviour is their choice, and contingent upon themselves (Chan et al., 2017). It is frequently cited as the most important of the psychological needs across several health domains (Ryan et al., 2008). Competence relates to the athlete's feelings (e.g., anxiety and confidence) that an effective outcome can be achieved, or a particular criterion goal completed based on their own ability and strategies. Finally, relatedness is the athlete's need to feel supported, trusted, respected, understood, and cared for. Evidence suggests that there is a greater chance of a successful RtS when all basic needs are satisfied (Ardern et al., 2013).

Deci and Ryan (2000) propose that an athlete's experience of competence and autonomy are necessary to facilitate motivated behaviour (e.g., adhering to reconditioning exercises) and that this can only develop in environments where the need for relatedness is supported. In other words, the extent to which the environment is supportive of an athlete's autonomy and competence is important in order to enhance RtS outcomes.

Research Perspectives

While theory has proposed many different psychological factors and processes, empirical research has examined the veracity of these propositions. The psychological factors that research commonly finds to be important include social support, confidence, fear and anxiety over re-injury, adherence and psychological readiness (e.g., Forsdyke et al., 2016; Truong et al., 2020). Each of these will now be discussed.

Social support

Social support can be viewed as an exchange of resources between individuals that are intended to help one another (Bianco and Eklund, 2001). There are *actual* (i.e., amount of social support available and that is received) and *perceived* (i.e., impressions of how social support meets needs and expectations) features of social support. This is important as an athlete may have a lot of social support available to them but may perceive the support negatively, and vice versa. Therefore, it isn't necessarily the amount of support that is important, it is the quality of the support. There are usually many providers of social support to athletes including technical coaches, sports therapists, teammates, doctors, strength and conditioning coaches, sports science staff, family and friends. Sustaining a sports injury changes the social support patterns of athletes (Yang et al., 2010). In other words, injured athletes require more social support and from different providers compared to before injury. For example, following injury, athletes require much more support from sports therapists,

doctors and technical coaches (Yang et al., 2010). Providers of social support can supply different types of support to athletes such as *emotional* (i.e., listening and reassurance), esteem (i.e., providing activities or feedback to boost sense of competence), *informational* (i.e., advice, suggestions and education), and *tangible* support (i.e., day to day assistance). Considering the amount and quality of social support afforded to injured athletes is important as it is positively associated with rehabilitation adherence and negatively associated with injury stress. As such an injured athlete with high-availability and high-quality social support is more likely to adhere to their rehabilitation activities and avoid experiencing high-levels of injury-related stress and anxiety (Ivarrson et al., 2017; Yang et al., 2014). Taken together, this should lead to a less negative rehabilitation experience and more positive RtS outcomes.

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It can be useful to routinely talk to patients or athletes about their perceptions of social support relative to their injury-related needs.

Confidence

Confidence is the belief or degree of conviction that athletes possess about their ability to be successful when taking part in sport (Vealey, 1986). In the context of sports injury, confidence is focussed on the ability to return back into pre-injury training and competition. An injured athlete's confidence is made up of performance-related and injury-related beliefs and is important to consider throughout the injury process as it influences future thoughts, feeling and behaviours. During rehabilitation, athletes require confidence in their rehabilitation plan, in the injured or formally injured body part, and in their capability to perform rehabilitation exercises (Podlog et al., 2015). Additionally, when returning to sport following injury, athlete's need confidence over their ability to perform well in training and

competition, to return to their pre-injury status, and remain injury free (Forsdyke et al., 2016). Therefore, understanding the factors that may develop confidence in injured athletes is important. Research has highlighted confidence may be developed from trust in the sports medicine team, availability and quality of social support, and achievement of physical standards or outcome thresholds (Podlog et al., 2015).

Fear of re-injury and re-injury anxiety

According to research, both fear of re-injury and re-injury anxiety are important considerations when working with injured athletes. Fear of re-injury (also referred to as kinesiophobia) can be seen as an irrational and debilitating fear of movement due to a feeling of vulnerability and certainty of pain or re-injury (Tripp et al., 2007). In contrast, re-injury anxiety is a negatively toned emotion that arises due to the chance of an injury reoccurring after an initial injury (Walker and Thatcher, 2011). Often these terms are used interchangeably however the distinction may be that re-injury anxiety is more of a negative thought or concern over the consequences of injury (e.g., need for further surgery and more time loss from sport), while fear of re-injury is specific to fear of the injury itself (Hsu et al., 2017). As there is rarely a certainty about the risk of re-injury, athletes may be more likely to experience more re-injury anxiety as opposed to fear of re-injury, or alternatively these may occur together. There are cognitive (relating to thoughts) and somatic symptoms (relating to physiological changes) in response to fear and anxiety of re-injury. Cognitive symptoms may include negative thoughts and images, while somatic symptoms may include feeling increased tension and nausea. Together these symptoms will shape rehabilitation and RtS behaviours; such as undertaking compensatory movements, not adhering to prescribed rehabilitation exercises, or holding back and not demonstrating the required intent. There is little surprise then that research has found that experiencing fear or anxiety over re-injury is

detrimental to a successful RtS, and this can lead to reduced performance and increased injury (Ivarsson et al., 2017; Tripp et al., 2007).

Adherence

Sustaining a sports injury can involve an arduous and lengthy rehabilitation process requiring athletes to modify their usual behaviours based on advice and guidance. Rehabilitation adherence refers to the extent to which an injured or ill patient or athlete's behaviour corresponds with the agreed recommendations from the sports and exercise therapist (Holt et al., 2020). Adherence should be a key consideration as research highlights that up to two thirds of athletes demonstrate some degree of non-adherence during rehabilitation and that being adherent is positively associated with RTS outcomes (Ivarsson et al., 2017; Marshall et al., 2012). In other words, an athlete who adheres to agreed parameters is more likely to have a successful RtS (e.g., frequency, intensity and duration of loading). Sports therapists should also be aware of over-adherence. That is athletes who choose to ignore set recommendations (e.g., undertake excessive loading) or perceive that by doing more they will be able to fast-track their RtS. In this sense both non-adherence and over-adherence are a threat to a successful RtS. Rehabilitation adherence is thought to be influenced by many person-specific (e.g., motivation, social support, emotions) and situation-specific factors (e.g., rehabilitation environment, treatment efficacy, effectiveness of the sports therapist; Goddard et al., 2020). Several strategies have been recommended to improve rehabilitation adherence in a sports injury context including forming a strong collaborative therapeutic relationship with the athlete, maintaining the social side of sport involvement, and the use of multifaceted goal setting (Gledhill et al., 2021).

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Athletes often do not fully complete home-based exercises, so it is essential to consider ways to foster adherence.

Psychological readiness

One factor that is developing traction in the research as being important to a successful RtS is psychological readiness. The characteristics of psychological readiness are multifaceted and include, among others: having realistic expectations, high levels of confidence, high levels of motivation, and low levels of re-injury anxiety (Forsdyke et al., 2017; Podlog et al., 2015). Psychological readiness is developed by several factors including availability and quality of social support, goal setting, achieving physical standards and clinical outcomes, and motivation to return to previous performance standards (Podlog et al., 2015). Psychological readiness is an important consideration for sports therapists because it predicts RtS outcomes in the form of returning to pre-injury competitive sport, risk of sustaining re-injury, and functional performance (Ardern et al., 2015; McPherson et al., 2019; Nagelli et al., 2019). In other words, an athlete with high psychological readiness is more likely to have a successful RtS. Therefore, it is important that sports therapists monitor psychological readiness to inform RtS decisions.

How to make effective return to sport decisions

Best practice suggests that athletes should only RtS when they are biologically, functionally, and psychologically ready (Ardern et al. 2016; Forsdyke et al. 2016). However, many practitioners feel ill-equipped to be able to form impressions of psychological readiness compared to biological and functional readiness to RtS and rarely will athletes be withheld from returning to sport because of psychological reasons (Forsdyke et al., 2017).

One such framework aimed at empowering sports injury practitioners is proposed by Forsdyke et al. (2017). This framework provides three elements to making effective decisions over psychological readiness to RtS. These elements are:

i. that practitioners should use reliable, valid and responsive psychological tools to screen and monitor injured players
ii. that information derived from psychological tools should be combined with a working knowledge of the athlete, which is usually gleaned from hours of meaningful interaction
iii. all clinical decisions should be made from a player-centred interdisciplinary perspective (i.e., not only using biological and functional criteria).

Of note, practitioners are suggested to use all three elements concurrently to form their decisions on psychological readiness rather than rely on just one element of the framework (i.e., the elements are complementary to each other). In this regard, players would be returned to sport when they are deemed *physically* (i.e., biologically and functionally) and *psychologically* ready.

INSERT NEAR HERE KEY POINT 12.8

Key Point 12.8

As several psychological factors may be important in influencing return to sport following injury, use of more than one tool can be recommended in order to make well-rounded decisions.

SPORT PSYCHOLOGY INTERVENTIONS AND REFERRAL

The negative consequences of injury are significant and potentially long-lasting. Injured athletes are at risk of a number of mental health complaints, including anxiety disorder, disordered eating, depression and suicidal ideations (Putukian, 2016). Sport injury is also a leading cause of athletic career termination (Ristolainen et al., 2012). From a competitive standpoint, more injuries equal fewer competitions won (Hägglund et al., 2013). Finally,

injuries in elite sport are expensive, with recent costs estimated at £45 million per year due to reduced performance success in the English Premier League (Eliakim et al., 2020). Hence, whether most concerned with the athlete's health, competitive advantages, economic health or asset management in sport, sports injuries are a major concern (Gledhill and Ivarsson, 2020; Gledhill et al., 2021b). Not surprisingly, recognition of the aforementioned concerns creates the pointed question: "*shouldn't we be doing EVERYTHING possible to reduce injury burden?*" (Gledhill and Forsdyke, 2018).

Psychological intervention to reduce injury risk

Psychosocial stress and stress response have the greatest links with sports injury risk (Ivarsson et al., 2017). Quite understandably in this respect, the majority of studies focusing on psychological techniques have investigated the role of various stress-management-based interventions (Gledhill et al., 2018; Ivarsson et al., 2017). Logically, it also follows that, particularly in instances where athletes have at-risk profiles for psychosocial stress and stress response, stress-management-based interventions contribute to decreased injury risk (Gledhill et al., 2018; Ivarsson et al., 2017). Primarily, the body of research has focused on mindfulness and acceptance-based interventions, and stress management interventions such as cognitive behavioural stress management (Gledhill et al., 2021b). Table 12.1 summarises psychological interventions to reduce sport injury risk

INSERT NEAR HERE TABLE 12.1

Table 12.1 Psychological interventions to reduce sport injury risk (adapted from Gledhill et al., 2021b).

Study	Participants	N	Intervention	Results

Naderi et al. (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 et al.(2019)	Amateur male soccer players	45	Mindfulness (MAC approach)	Reduced injury rates in mindfulness group
Olmedilla-Zafra et al.(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 et al. (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 et al. (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 et al.(2015)	Male and female junior elite soccer players	41	Mindfulness (MAC approach)	Greater proportion of intervention group players remained injury free
Edvarsson et al. (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 et al.(2007)	Female ballet dancers	35	Autogenic training, broad-based coping skills (AT, imagery, self-talk).	Overall reduction in injury burden in intervention group Broad-based coping skills most effective at reducing injury risk
Johnson et al. (2005)	Male and female soccer players	235	(a) (a) somatic and cognitive relaxation, (b) stress management skills, (c) goal setting skills, (d) attribution and self-confidence training, (e)	Broad-based coping skills most effective at reducing injury risk.

			identification and discussion about critical incidents related to their football participation and situations in everyday life (PST).	
Arnason et al.(2005)	Elite male soccer players	271	Video-based awareness training	No difference in overall injury risk reduction Fewer competition-based injuries in treatment group
Kolt et al.(2004)	Male and female gymnasts	20	Cognitive-behavioural stress management	Fewer injuries in treatment than control group

The interventions used in this body of research over the past thirty years have been conducted in a range of sporting and performance populations that sports and exercise therapists may work with (e.g. ballet dancers, floorball, football, gymnastics and swimming) and a range of skill levels, from elite professional athletes through to high school students (Gledhill et al., 2018). In the majority of intervention studies, where control conditions have been used, the intervention group reports fewer injuries than control groups (Gledhill et al., 2018; Ivarsson et al., 2017). Similarly, in studies without control groups, interventions also demonstrate a reduction in injuries from pre to post intervention (Gledhill et al., 2018). Naturally, when we consider such consistency of evidence, one must question the veracity of the evidence and the challenge of publication bias whereby a study is more likely to be published if it demonstrates statistically significant results. To address this concern, we also have fail-safe calculations that have aimed to negate the impact of publication bias on conclusions (Ivarsson et al., 2017). Drawing on principles of best-evidence synthesis we argue that there is realistic scope to consider intra-individual psychological interventions as part of an interdisciplinary injury risk reduction programmes within sport (Gledhill et al., 2018; Gledhill and Ivarsson, 2020).

Limitations and future directions

Whilst the body of evidence supporting the use of psychological interventions for injury risk reduction, rehabilitation, and RtS are extremely positive (Gledhill et al., 2018; Gledhill et al., 2021a; Goddard et al., 2020; Gledhill and Forsdyke, 2021), most empirical studies to date have focused on intra-individual psychological skills use. Hence, this body of research is arguably limited by such a narrow focus, especially given that many psychosocial factors contributing to elevated injury risk or poorer RtS outcomes might be more of a product of organisational stressors, cultures or other relational considerations (Gledhill et al., 2021). Future research should examine the impact of interventions that include the athlete's environment, organisation, or culture, and how such interventions might reduce injury risk or improve RtS outcomes.

Sport Psychology Referrals

An important professional consideration for sports and exercise therapists within this context is limitations of practice. Whilst it is important to develop relationships with athletes and understand some of the warning signs for negative psychological consequences of sports injury, it might not always be within an individual's scope of practice to then seek to address these consequences through direct intervention. In recognising these limitations, it is important that sports and exercise therapists understand when it is appropriate to refer on to a specialised professional. There are a range of international sport psychology organisations where further information and details of such practitioners can be found (see Key Point 12.9).

INSERT NEAR HERE KEY POINT 12.9

Key Point 12.9 International Sport Psychology Organisations

- Association for Applied Sport Psychology (AASP): http://www.appliedsportpsych.org
- Australian Psychological Society (APS): http://www.psychology.org.au
- British Psychological Society (BPS): http://www.bps.org.uk
- British Association of Sport and Exercise Sciences (BASES): http://www.bases.org.uk
- European Federation of Sport Psychology (EFSP): https://fepsac.com
- International Society of Sport Psychology (ISSP): https://www.issponline.org

CONCLUSION

Both theory and research informs us that psychological factors (along with physical factors and healing time) are important for sports and exercise therapists to consider when working with athletes. By recognising the importance of psychological factors, sports therapists may be able to reduce the risk of injury and re-injury, and improve the RtS prognosis for injured athletes. This chapter does not make a sports therapist become a sports psychologist, but it does aim to generate knowledge and understanding to inform the approaches that can best assist in injury prevention and in returning athletes back to sport following injury. In other words, complex questions such as '*How to prevent sports injury?'* and *'How to effectively return athletes back to sport?'* can only be answered by adopting an interdisciplinary approach.

REFERENCES

Appaneal R.N. and Perna F.M. (2014) Biopsychosocial model of injury. In, R.C Eklund and G Tenenbaum (eds). *Encyclopaedia of Sport and Exercise Psychology*. Sage Publications. Thousand Oaks, CA, USA

Ardern, C.L., Glasgow, P., Schneiders, A., Witvrouw, E., Clarsen, B., Cools, A., Gojanovic, B., Griffin, S., Khan, K.M., Moksnes, H., et al. (2016) 2016 Consensus statement on return to sport from the First World Congress in Sports Physical Therapy, Bern. *British Journal of Sports Medicine.* 50(14): 853-864

Ardern, C.L., Taylor, N.F., Feller, J.A., Whitehead, T.S. and Webster, K.E. (2015) Sports participation 2 years after anterior cruciate ligament reconstruction in athletes who had not returned to sport at 1-year: a prospective follow-up of physical function and psychological factors in 122 athletes. *American Journal of Sports Medicine.* 43(4): 848–856

Ardern, C.L., Taylor, N.F., Feller, J.A. and Webster, K.E. (2013) A systematic review of the psychological factors associated with returning to sport following injury. *British Journal of Sports Medicine.* 47(17): 1120-1126

Arnason, A., Engebretsen, L. and Bahr, R. (2005) No effect of a video-based awareness program on the rate of soccer injuries. *American Journal of Sports Medicine.* 33(1): 77-84

Bianco, T. and Eklund, R.C. (2001) Conceptual considerations for social support research in sport and exercise settings: The case of sport injury. *Journal of Sport and Exercise Psychology.* 23(2): 85-107

Brewer, B.W. (2010) The role of psychological factors in sport injury rehabilitation outcomes. *International Review of Sport and Exercise Psychology.* 3(1): 40-61

Brewer, B.W., Andersen, M.B., and Van Raalte, J.L. (2002) Psychological aspects of sport injury rehabilitation: toward a biopsychological approach. In Mostofsky, D. and Zaichkowsky, L. (eds). *Medical Aspects of Sport and Exercise*. Fitness Information Technology. Morgantown, WV, USA

Burgi, C.R., Peters, S., Ardern, C.L., Magill, J.R., Gomez, C.D., Sylvain, J. and Reiman, M.P. (2019) Which criteria are used to clear patients to return to sport after primary ACL reconstruction? A scoping review. *British Journal of Sports Medicine.* 53(18): 1154-1161

Deci, E.L. and Ryan, R.M. (2000) The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Enquiry.* 11(4): 227-268

Deci, E.L. and Ryan, R.M. (1985) *Intrinsic Motivation and Self-Determination in Human Behavior*. Springer Science and Business Media. Berlin

Dijkstra, H.P, Pollock, N., Chakraverty, R. and Alonso, J.M. (2014) Managing the health of the elite athlete: a new integrated performance health management and coaching model. *British Journal of Sports Medicine.* 48: 523-531

Edvardsson, A., Ivarsson, A., and Johnson, U. (2012) Is a cognitive-behavioural biofeedback intervention useful to reduce injury risk in junior football players? *Journal of Sports Science and Medicine.* 11(2): 331-338

Ekstrand, J., Krutsch, W., Spreco, A., van Zoest, W., Roberts, C., Meyer, T. and Bengtsson, H. (2020) Time before return to play for the most common injuries in professional football: a

16-year follow-up of the UEFA Elite Club Injury Study. *British Journal of Sports Medicine.* 54: 421-426

Ekstrand J., Lundqvist, D., Davison, M., D'Hooghe, M. and Pensgaard, A.M. (2019) Communication quality between the medical team and the head coach/manager is associated with injury burden and player availability in elite football clubs. *British Journal of Sports Medicine.* 53: 304-308

Engel G. L. (1977) The need for a new medical model: a challenge for biomedicine. *Science.* 196(4286): 129-136

Forsdyke, D., Gledhill, A. and Ardern, C.L. (2017) Psychological readiness to return to sport: three key elements to help the practitioner decide whether the athlete is REALLY ready? *British Journal of Sports Medicine.* 51(7): 555-556

Forsdyke, D., Smith, A., Jones, M. and Gledhill, A. (2016) Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: A mixed studies systematic review. *British Journal of Sports Medicine.* 50: 537-544

Gledhill, A., Forsdyke, D. and Goom, T. (2021a) I'm asking you to believe-not in my ability to create change, but in yours': four strategies to enhance patients' rehabilitation adherence. *British Journal of Sports Medicine.* 55(9): 464–465

Gledhill, A., Forsdyke, D. and Murray, E. (2018) Psychological interventions used to reduce sports injuries: a systematic review of real-world effectiveness. *British Journal of Sports Medicine. 52*(15): 967-971

Gledhill, A. and Ivarsson, A. (2020) Reducing sports injury risk: making a case for psychological interventions. *The Sport and Exercise Scientist.* 65: 26-27

Gledhill, A., Ivarrson, I., Johnson, U., Tranaeus, U., Hill, D. and Davidson, C.L. (2021b) The BASES expert statement on psychological considerations for injury risk reduction in competitive sport. *The Sport and Exercise Scientist.* 69: 8-9

Goddard, K., Roberts, C., Byron-Daniel, J., and Woodford, L. (2020) Psychological factors involved in adherence to sport injury rehabilitation: a systematic review. *International Review of Sport and Exercise Psychology.* 14:1: 51-73

Hägglund, M. *et al.* (2013) Injuries affect team performance negatively in professional football: an 11-year follow-up of the UEFA Champions League injury study. *British Journal of Sports Medicine*. 47: 738-742

Heaney, C.A, Walker, N., Green, A. and Rostron, C. (2015) Sport psychology education for sport injury rehabilitation professionals: a systematic review. *Physical Therapy in Sport.* 16: 72-79

Holt, C.J., McKay, C.D., Truong, L.K., Le, C.Y., Gross, D.P. and Whittaker, J.L. (2020) Sticking to It: A Scoping Review of Adherence to Exercise Therapy Interventions in Children and Adolescents With Musculoskeletal Conditions. *Journal of Orthopaedic and Sports Physical Therapy.* 50(9): 503-515

Hsu, C.J., Meierbachtol, A., George, S.Z. and Chmielewski, T.L. (2017) Fear of Reinjury in Athletes. *Sports Health.* 9(2): 162-167

Ishøi, L., Thorborg, K., Kraemer, O. and Hölmich, P. (2018) Return to Sport and Performance After Hip Arthroscopy for Femoroacetabular Impingement in 18- to 30-Year-Old Athletes: A Cross-sectional Cohort Study of 189 Athletes. *American Journal of Sports Medicine.* 46(11): 2578–2587

Ivarsson, A., Tranaeus, U., Johnson, U. and Stenling, A. (2017) Negative psychological responses of injury and rehabilitation adherence effects on return to play in competitive athletes: a systematic review and meta-analysis. *Open Access Journal of Sports Medicine.* 8: 27-32

Ivarsson, A., Johnson, U., Andersen, M.B., Tranaeus, U., Stenling, A. and Lindwall, M. (2017) Psychosocial Factors and Sport Injuries: Meta-analyses for Prediction and Prevention. *Sports Medicine. 47*(2): 353-365

Ivarsson, A., Johnson, U., Andersen, M.B., Fallby, J. and Altemyr, M. (2015) It pays to pay attention: a mindfulness-based programme for injury prevention with soccer players. *Journal of Applied Sport Psychology.* 27(3): 319-334

Johnson, U. and Ivarsson, A. (2011) Psychological predictors of sport injuries among junior soccer players. *Scandinavian Journal of Medicine and Science in Sports.* 21(1): 129-136

Johnson, U., Ekengren, J. and Andersen, M.B. (2005) Injury prevention in Sweden: helping soccer players at risk. *Journal of Sport and Exercise Psychology.* 27(1): 32-38

Kolt, G.S., Hume, P.A., Smith, P. and Williams, M.M. (2004) Effects of a stress-management program on injury and stress of competitive gymnasts. *Perceptual and Motor Skills.* 99(1): 195-207

Lazarus, R.S. and Folkman, S. (1984) Coping and adaptations. In Gentry, W.D. (ed.) *Handbook of Behavioural Medicine.* The Guildford Press. New York, USA

Marshall, A., Donovan-Hall, M. and Ryall, S. (2012) An exploration of athletes' views on their adherence to physiotherapy rehabilitation after sport injury. *Journal of Sport Rehabilitation.* 21(1): 18-25

McPherson, A.L., Feller, J.A., Hewett, T.E. and Webster, K.E. (2019) Psychological Readiness to Return to Sport is Associated with Second Anterior Cruciate Ligament Injuries. *American Journal of Sports Medicine.* 47(4): 857-862

Naderi, A., Shaabani, F., Gharayagh Zandi, H., Calmeiro, L. and Brewer, B.W. (2020) The effects of a mindfulness-based program on the incidence of injuries in young male soccer players. *Journal of Sport and Exercise Psychology.* 42(2): 161-171

Nagelli, C.V., Webster, K.E., Di Stasi, S., Wordeman, S.C. and Hewett, T.E. (2019) The association of psychological readiness to return to sport after anterior cruciate ligament reconstruction and hip and knee landing kinematics. *Clinical Biomechanics.* 68: 104-108

Noh, Y., Morris, T. and Andersen, M.B. (2007) Psychological intervention programs for reduction of injury in ballet dancers. *Research in Sports Medicine.* 15(1): 13-32

Olmedilla-Zafra, A., Rubio, V.J., Ortega, E. and García-Mas, A. (2017) Effectiveness of a stress management pilot program aimed at reducing the incidence of sports injuries in young football (soccer) players. *Physical Therapy in Sport.* 24: 53–59

Pensgaard, A.M., Ivarsson, A., Nilstad, A., Solstad, B.E. and Steffen, K. (2018) Psychosocial stress factors, including the relationship with the coach, and their influence on acute and overuse injury risk in elite female football players. *BMJ Open Sport and Exercise Medicine.* 12;4(1): e000317

Podlog, L., Banham, S.M., Wadey, R. and Hannon, J.C. (2015) Psychological readiness to return to competitive sport following injury: A qualitative study. *The Sport Psychologist.* 29(1): 1-14

Podlog, L., Dimmock, J. and Miller, J. (2011) A review of return to sport concerns following injury rehabilitation: practitioner strategies for enhancing recovery outcomes. *Physical Therapy in Sport.* 12(1): 36-42

Podlog, L., and Eklund, R.C. (2007) The psychosocial aspects of a return to sport following serious injury: A review of the literature from a self-determination perspective. *Psychology of Sport and Exercise.* 8(4): 535-566

Putukian, M. (2016). The psychological response to injury in student athletes: A narrative review with a focus on mental health. *British Journal of Sports Medicine.* 50: 145-148

Richardson, S.O., Andersen, M.B. and Morris, T (2008) *Overtraining athletes: personal journeys in sport*. Human Kinetics. Champaign, IL, USA

Ristolainen, L. *et al*. (2012. Sports injuries as the main cause of sports career termination among Finnish top-level athletes. *European Journal of Sport Science.* 12: 274-282

Rogers, T.J. and Landers, D.M. (2005) Mediating effects of peripheral vision in the life event stress/athletic injury relationship. *Journal of Sport and Exercise Psychology.* 27(3): 271-288

Ryan, R.M., Patrick, H., Deci, E.L. and Williams, G.C. (2008) Facilitating health behaviour change and its maintenance: Interventions based on Self-Determination Theory. *The European Health Psychologist.* 10: 2-5

Santi, G. and Pietrantoni, L. (2013) Psychology of sport injury rehabilitation: a review of models and interventions. *Journal of Human Sport and Exercise.* 8(4): 1029-1044

Tranaeus, U., Johnson, U., Ivarsson, A., Engström, B., Skillgate, E. and Werner, S. (2015a) Sports injury prevention in Swedish elite floorball players: evaluation of two consecutive floorball seasons. *Knee Surgery, Sports Traumatology, Arthroscopy.* 23(3): 899-905

Tranaeus, U., Johnson, U., Engström, B., Skillgate, E. and Werner, S. (2015b) A psychological injury prevention group intervention in Swedish floorball. *Knee Surgery, Sports Traumatology, Arthroscopy.* 23(11): 3414-3420

Tranaeus, U., Johnson, U., Engstrom, B., Skillgate, E. and Werner, S. (2014) Psychological antecedents of overuse injuries in Swedish elite floorball players. *Athletic Insight.* 6(2): 155 - 172

Tripp, D.A., Stanish, W., Ebel-Lam, A., Brewer, B.W. and Birchard, J. (2007) Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes

with anterior cruciate ligament injuries at 1 year post surgery. *Rehabilitation Psychology.* 52: 74-81

Truong, L.K., Mosewich, A.D., Holt, C.J., Le, C.Y., Miciak, M. and Whittaker, J.L. (2020) Psychological, social and contextual factors across recovery stages following a sport-related knee injury: a scoping review. *British Journal of Sports Medicine.* 54: 1149-1156

Vealey, R.S. (1986) Conceptualization of sport-confidence and competitive orientation: Preliminary investigation and instrument development. *Journal of Sport Psychology.* 8(3): 221-246

Walker, N. and Thatcher, J. (2011) The emotional response to athletic injury: Re-injury anxiety. In Thatcher, J., Jones, M. and Lavallee, D. (eds) *Coping and Emotion in Sport* 2nd ed. Routledge. New York, USA

Walker, N., Thatcher, J. and Lavallee, D. (2007) Review: Psychological responses to injury in competitive sport: a critical review. *Journal of the Royal Society for the Promotion of Health.* 127(4): 174-180

Wiese-Bjornstal, D.M., Smith, A.M., Shaffer, S.M. and Morrey, M.A. (1998) An integrated model of response to sport injury: Psychological and sociological dimensions. *Journal of Applied Sport Psychology.* 10: 46-69

Williams, J.M. and Andersen, M.B. (1998) Psychosocial antecedents of sport injury: review and critique of the stress and injury model. *Journal of Applied Sport Psychology.* 10(1): 5-25

Yang, J., Schaefer, J.T., Zhang, N., Covassin, T., Ding, K. and Heiden, E. (2014) Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *Journal of Athletic Training. 49*(6): 773-779

Yang, J., Peek-Asa, C., Lowe, J.B., Heiden, E. and Foster, D.T. (2010) Social support patterns of collegiate athletes before and after injury. *Journal of Athletic Training.* 45(4): 372-379

Zadeh, M.M., Ajilchi, B., Salman, Z. and Kisely, S. (2019) Effect of a mindfulness programme training to prevent the sport injury and improve the performance of semi-professional soccer players. *Australasian Psychiatry: bulletin of Royal Australian and New Zealand College of Psychiatrists.* 27(6): 589-595