

Injury Risk and Rehabilitation: Psychological Considerations

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I knew I was in trouble when I heard snap, crackle and pop, and I wasn't having a bowl of cereal.

—Nick Kyriakos, Toronto Maple Leaf player (in McDonell, 2004, p. 96)

Sport injuries frequently occur and often have a devastating impact on the injured athlete, team performance and revenue, health care costs, and community. Although most causes of injury are undoubtedly physical in nature (e.g., level of conditioning, poor playing surface, faulty biomechanics) or just plain bad luck, psychosocial factors also play a role. This chapter reviews research on psychosocial factors that influence risk of injury and reactions to injury, and it discusses psychological interventions to reduce injury occurrence and to enhance the physical and psychological recovery of the injured athlete. It is beyond the scope of this chapter to discuss the psychological issues involved when injuries are so severe that return to sport is impossible, but the reader is referred to Chapter 24 and to a book on injured athletes edited by Pargman (2007).

Factors That Predispose Athletes to Injury

Research with recreational to elite athletes has found that certain psychosocial factors predispose individuals to injury, whereas other psychosocial factors help protect them from injury. The best understanding of how this influence occurs comes from a theoretical model developed by Andersen and Williams (1988) and its later modification (Williams & Andersen, 1998). They proposed that most psychosocial variables, if they influence injury outcome at all, probably do so through a linkage with stress and a resulting stress response. The central hypothesis of their stress-injury model is that athletes with a history of many stressors, personality characteristics that intensify the stress response,

Case Study 1

Is one of these players more vulnerable to injury?

John is a freshman football player at a California college. He came from New York and is missing his family and friends, plus is worried about his mother who just began treatment for breast cancer. Used to being the star on the team, he's having difficulty accepting his role and is frustrated with the coaches. He feels pressure to perform and is losing his confidence, both on the field and in the classroom. He's become moody and pessimistic.

Manuel, another freshman, has his best friend from high school on the team. He, too, is frustrated with less playing time, but is excited about his teammates and coaches pushing his game to a higher level. His optimistic nature and work with a sport psychology consultant is helping him to stay positive and focused, both on the field and in the classroom.

and few or maladaptive coping resources will, when placed in a stressful situation such as a demanding practice or crucial competition, be more likely to appraise the situation as stressful and then exhibit greater physiological activation and attentional disruptions (see Figure 23-1). The severity of the resulting stress response,

caused by the increased stress reactivity, is what predisposes the athletes to injury. Considerable support exists for all facets of the stress-injury model. For a more thorough review of research testing the model, see Williams and Andersen (1998, 2007) and a recent meta-analysis by Ivarsson et al. (2017).

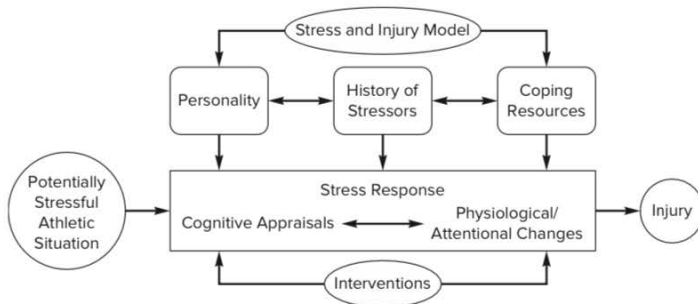


Figure 23-1 Revised version of the stress and injury model

From Williams and Andersen (1998)

The stress response reflects a bidirectional relationship between cognitive appraisal of and physiological and attentional responses to potentially demanding athletic situations. If an athlete views a competitive situation as challenging, exciting, and fun, the resulting "good" stress (eustress) may help the athlete stay focused and his or her play to successfully "flow." Injury risk in this situation is low, but it would be higher when the athlete feels "bad" stress (distress), such as appraising the competition as ego threatening or anxiety producing and becoming too tense and distracted. This latter interpretation most likely occurs when athletes perceive inadequate resources to meet the demands of the situation and potentially dire consequences for failure to meet the demands.

Whether the cognitive appraisal is accurate or distorted by irrational beliefs or other maladaptive thought patterns (see Chapter 14) is irrelevant. Correspondingly, these cognitive appraisals and physiological and attentional responses to stress constantly modify each other. An example is that relaxing the body can help calm the mind, just as stopping anxious thoughts can lower the physical stress response. The resulting individual differences in stress responsivity due to differences in psychosocial variables may either help inoculate the athlete against injury or exacerbate his or her risk.

Of the myriad physiological and attentional changes that occur during the stress response, Andersen and Williams (1988) hypothesized that increases in generalized muscle tension, narrowing of the visual field (the revised model added auditory cues), and increased distractibility were the primary culprits in the stress-injury relationship. Generalized muscle tension can lead to fatigue and reduced flexibility, motor coordination difficulties, and muscle inefficiency, thereby creating a greater risk for incurring injuries such as sprains, strains, and other musculoskeletal injuries. Narrowing of peripheral vision could lead to not picking up or responding in time to dangerous cues in the periphery, such as an outside linebacker rushing the quarterback. Increased distractibility during stress, often

due to attention to task-irrelevant cues, may also result in failure to detect or respond quickly enough to relevant cues in the central field of vision, such as when a batter fails to avoid a pitch coming directly at his head.

Coming into the game my concentration was divided, due to unforeseen incidents . . . before the game started. I recall that I was not in the best mental state for playing. (Quote in study assessing why athletes thought they were injured, Johnson, 2011, p. 106)

Considerable support (seven studies) exists for individuals with a high- versus low-risk psychosocial profile reporting higher state anxiety and experiencing greater peripheral narrowing under stressful laboratory or real-life athletic situations compared to low-stress situations. Even more important, Rogers and Landers (2005) found support for the model's hypothesis that peripheral narrowing during stress is one of the mechanisms by which athletes with high life stress increase their likelihood of athletic injury, as did Andersen and Williams (1999). Only Williams and Andersen (1997) examined central field of vision, and they found a greater susceptibility to attention disruptions (e.g., missed or delayed responses) for athletes with a high injury-risk profile when they performed under higher stress. The one study that examined the connection between psychosocial factors and muscle tension found increased muscle tension during the stress condition for the total group, but failed to support the hypothesis of even greater muscle tension for individuals with a high-risk profile. The results may have been influenced by studying the general population rather than a high-risk subpopulation.

Before addressing the implications of these findings for designing interventions to decrease injury risk, we will discuss how history of stressors, personality factors, and coping resources influence stress and injury. These variables may contribute interactively or in isolation in influencing the stress response and, ultimately, injury occurrence and severity.

The original stress–injury model hypothesized that an athlete’s history of stressors contributes directly to the stress response, whereas personality factors and coping resources act on the stress response either directly or by attenuating the negative effects of the history of stressors. Ten years later, when Williams and Andersen (1998) critiqued and modified their stress–injury model, they proposed bidirectional arrows between each of these three predictor categories.

History of Stressors

This category of injury risk variables includes major life change events, daily hassles, and previous injury.

It was a very chaotic period in life, all the time new things to do and stress everywhere. So much training and obligations and hardly any time to socialize with family and friends outside the team. It really made me feel bad. I think this was the main reason behind my injury. (Johnson, 2011, p. 105)

The most support exists for the detrimental effects of experiencing major life events—typically assessed as the amount of change and upset that athletes experienced in the year prior to a competitive season. Examples of general life events are incidents such as the breakup of a relationship, change in residence, and death of a loved one, whereas major events related to sports include eligibility difficulties, trouble with coaches, and change in playing status. Over 50 studies have examined life-event stress and injuries. Approximately 90 percent of them found a positive relationship between high life stress and injury, with the most frequent association occurring with negative life stressors and/or total life stressors. The most extensive evidence involves football (seven studies), but similar findings have occurred across activities as diverse as Alpine skiing, race walking, figure skating, baseball, gymnastics, soccer, field hockey, tennis, wrestling, track and field, and ballet. Injuries tended to occur two to five times more frequently in athletes with

high compared to low life stress, and risk of injury tended to increase in direct proportion to the level of life stress.

Researchers failed to support daily hassles (e.g., minor daily problems, irritations, or changes) as a contributor to injury risk (e.g., Smith, Smoll, & Ptacek, 1990; Van Mechelen et al., 1996) when they assessed hassles only once pre-season, but the hypothesized relationship was found in better-designed studies that measured hassles weekly and then predicted injury using the score just prior to the time of injury (Fawcner, McMurray, & Summers, 1999; Ivarsson & Johnson, 2010; Ivarsson, Johnson, & Podlog, 2013). Moreover, Ivarsson et al. (2013) found that experiencing more major negative life events led to more frequent daily hassles, which in turn had a direct effect on injury frequency. The meta-analyses and path analyses from Ivarsson et al.’s (2017) review found that history of stressors, particularly the stress associated with negative events (i.e., negative life event stress, hassles, previous injury), and stress responsivity had the strongest relationships with injury occurrence. As hypothesized in the stress–injury model, the stress response mediates the connection between psychological variables (i.e., history of stressors, personality) and injury rates.

Personality and Coping Resources

The presence of desirable personality attributes and coping resources may buffer individuals from stress and injury by helping them to perceive fewer situations and events as stressful or by helping them cope more effectively with their stressors. Conversely, the lack of desirable personality characteristics and coping resources, or the presence of undesirable ones, may leave individuals vulnerable to higher stress (acute and chronic) and, presumably, greater injury risk.

It would be useful to have a specific personality test that predicts injury-prone athletes, but none exists, so researchers examined specific variables of interest. A number of researchers studied some type

of trait anxiety or concept related to it. Trait anxiety is a general disposition or tendency to perceive situations as threatening and to react with an anxiety response. When assessing global trait anxiety, no relationship to injury occurred with nonsport tools (e.g., Kerr & Minden, 1988), but did with sport-specific tools. Athletes scoring higher on competitive trait anxiety (e.g., Hanson, McCullagh, & Tonymon, 1992; Petrie, 1993) incurred more injuries or had more severe injuries. In contrast, similar somatic trait anxiety results occurred with both nonsport (Ivarsson & Johnson, 2010; Johnson & Ivarsson, 2011) and sport-specific assessment (Smith, Ptacek, & Patterson, 2000). The injured athletes in the Ivarsson and Johnson studies also scored higher on stress susceptibility, suggesting that they might experience more athletic situations as stressful or have higher levels of stress in those situations.

In other promising personality research, dispositional optimism and hardiness were examined. Individuals high in optimism anticipate that good rather than bad things will happen to them, whereas individuals high in hardiness feel deeply committed to the activities in their lives, believe they have some control over the events they experience, and consider change an exciting challenge that furthers development. As hypothesized by the stress-injury model, being optimistic and hardy correlated with fewer injury problems and, in some of the studies, moderated the greater injury effects of higher life stress (e.g., Ford, Eklund, & Gordon, 2000; Wadey, Evans, Hanton, & Neil, 2012a, 2013). A follow-up qualitative study sought the mechanisms underlying the hardiness effects and found that high-hardiness athletes possessed a repertoire of problem- and emotion-focused coping strategies that lowered strain and facilitated a plan of action to resolve stressful events/situations, while low-hardiness athletes used avoidance coping strategies such as denial and mental disengagement, which had long-term negative implications (Wadey, et al., 2012b).

In another study, only athletes who scored low in sensation seeking had a significant positive

relationship between major negative life events and subsequent injury time-loss (Smith, Ptacek, & Smoll, 1992). According to Zuckerman (1979), sensation avoiders, unlike sensation seekers, have a lower tolerance for arousal and therefore do not care for change, avoid the unfamiliar, and stay away from risky activities. Also, although they found that sensation avoiders reported poorer stress management coping skills, no support existed for differences in coping skills mediating the injury vulnerability differences. When Van der Sluis et al. (2017) studied risk taking, a construct similar to sensation seeking, they found risk taking significantly predicted both time loss and severity of overuse injuries in boys, but not girls.

I was not in the mood for anything. I was simply depressed and just wanted to quit playing soccer, but something still kept me going. This was obviously a wrong decision. However, it is easy to be wise after an injury happens. (Johnson, 2011, p. 107)

In addition to personality traits, mood states influence injury risk. Findings support the premise that positive states of mind might buffer the effects of potentially stressful sport situations, thereby creating less stress and fewer injuries, just as negative states might do the opposite. For example, intercollegiate football, volleyball, and cross-country athletes who experienced positive states of mind (e.g., ability to stay focused, keep relaxed, share with others) early in the season incurred significantly fewer injuries compared to athletes with less positive states of mind (Williams, Hogan, & Andersen, 1993). Negative states such as tension/anxiety, competitive cognitive and somatic anxiety, and/or total negative mood state correlated with a higher rate of injury and/or severity of injury (Alizadeh, Pashabadi, Hosseini, & Shahbazi, 2012; Lavallee & Flint, 1996). Fawcner (1995) noted significant increases in mood disturbance in the measurement immediately prior to injury, and Kleinert (2007) reported risk of serious injuries with mood disturbance three hours to three days before tournament play.

When it comes to research on coping resources (e.g., general coping behaviors, social support systems, psychological coping skills such as stress management techniques and mental skills), there is sufficient support that coping resources need to be considered when trying to understand injury vulnerability and how to decrease it. Researchers have found that social support influences injury outcome directly and/or by lessening the negative effects of high life-event stress (e.g., Hardy, O'Connor, & Geisler, 1990; Johnson, 2011; Petrie, 1992; Williams, Tonymon, & Wadsworth, 1986). These findings suggest that increasing social support from family, friends, and significant others—a group likely to include coaches and teammates—is one way to reduce injury risk. Richman, Hardy, Rosenfeld, and Callahan (1989) offer an excellent source for a variety of strategies coaches and sport psychology consultants could implement to enhance social support in student athletes.

Although a greater number of supportive relationships is desired, the quality of such relationships is also important. For example, an athlete with fairly strong religious values felt he had to go out, drink, and chase women with his teammates to receive their support and friendship. Although he achieved an external measure of support, the relationships added to his level of stress. It was, in fact, through a classroom discussion of stress that the athlete sought someone with whom to discuss his conflicts. The athlete successfully resolved the conflicts, and may well have been an accident that did not happen.

Findings from studies such as Smith et al. (1990), Rogers and Landers (2005), and Devantier (2011) suggest that increasing psychological coping skills (e.g., the ability to control arousal, think appropriately, and stay focused under pressure) might decrease injury risk. In the best-designed psychology of injury study, Smith et al. (1990) found that the most injuries occurred in athletes who experienced high negative life events and who lacked both social support and psychological coping skills. In contrast, having either moderate to

high social support or psychological coping skills eliminated the relationship between high life stress and injury. Having ineffective coping strategies, such as self-blame, also puts athletes at higher injury risk (Ivarsson & Johnson, 2010).

Exercise 1

In Case Study 1 at the beginning of this chapter, which athlete is more likely to benefit from an intervention to reduce injury vulnerability, and why is that athlete more likely to become injured based upon what you just read? Using the following section, plan an intervention to reduce his injury risk.

Interventions to Reduce Injury Vulnerability

The stress-injury model proposes a two-pronged approach to prevent injuries from increased stress reactivity due to the individual's psychosocial profile. One set of interventions aims to change the cognitive appraisal of potentially stressful events (see Chapter 14 for techniques to eliminate or modify cognitions that cause stress) and the second to modify the physiological/attentional aspects of the stress response (see Chapter 12 for relaxation techniques and Chapter 15 for techniques to decrease distractibility and to keep an appropriate attentional focus). Also included on the cognitive appraisal side of the stress response are interventions for fostering realistic expectations (e.g., goals), a sense of belonging (e.g., team cohesiveness), and optimal coach-athlete communication (see Chapters 6 to 8 and 11 for interventions).

Considerable support exists for the interventions portion of the model. The meta-analysis by Ivarsson et al. (2017) showed all seven studies found fewer injuries in the intervention groups in comparison to the control group, with the greatest reductions occurring when at-risk populations are targeted.

For example, Johnson, Ekengren, and Andersen (2005) provided six intervention sessions and two telephone contacts consisting of treatments such as stress management skills, somatic and cognitive relaxation, goal-setting skills, and attribution and self-confidence training. Findings indicated 10 of 13 in the at-risk experimental group remained injury free, in contrast to only 3 of 16 in the at-risk control group.

Across the studies, the reduction in injury vulnerability occurred in groups as diverse as soccer, gymnastics, rugby, and ballet and with skill levels ranging from high school players to elite athletes. The interventions also varied from psychological skills training to cognitive-behavioral therapy and mindfulness training. The one commonality was that all interventions targeted stress management skills that decrease the magnitude of stress responses; thus, their effectiveness at preventing injury is not surprising considering that stress is the biopsychosocial construct that has the strongest relationship with injury occurrence, and the interventions would have enhanced the athletes' coping resources and ability to control their emotional states.

The obvious conclusion is that psychologically based interventions should be included when designing injury prevention programs, and particularly so with athletes suspected of matching the psychosocial risk profile. Recognize, however, that it would be most egregious to think that all individuals in an at-risk group will experience injury or that none will in a low-risk group. To identify at-risk athletes, coaches and others must be aware of what is happening in athletes' lives and the presence of personal characteristics identified in the at-risk profile. Sport psychology consultants or others trained in the use of psychological tests may even want to employ the questionnaires used in injury research as screening instruments. Coaches also should consider reducing exposure to high-risk activities, such as learning a new and potentially dangerous vault or dive, with athletes who seem to be in a stressed or distracted state. Where levels of stress appear to be extreme and coping skills minimal, professional counseling may be necessary (see Chapter 20).

Athletes' Reactions to Injury

Despite the best efforts of athletes, coaches, and athletic trainers, injuries occur and the consequences are both physical and psychological. Historically, sport medicine specialists have been most concerned with the physical aspects of rehabilitation, assuming that completing physical rehabilitation prepared the athlete for a successful return to competition. But some athletes are not psychologically ready to return. To them the suggestion of returning creates stress from fears of reinjury and embarrassing performance. As a result, optimal injury rehabilitation requires both physical and psychological components. When done well, injuries often heal faster, psychological adjustment is healthier, and higher levels of performance occur. This entails gaining an understanding of the psychology of injury rehabilitation, which is the focus of the remainder of this chapter.

Psychological Reactions to Injury

Athletes perceive injury in various ways. Some view it as a disaster; some an opportunity to display courage; others welcome it as relief from a long season or poor performance; and still others see it as an opportunity to focus on other areas. It is common for injured athletes to worry about whether they will recover and return to their previous form. Understanding the emotional response of injured athletes can lead to more effective interventions. Injured athletes are often uncertain if they will be facing a quick return to action, a long rehabilitation process, or the end of their career. Many of the issues athletes face with severe injury parallel those that occur with career termination or retirement (see Chapter 24). Athletes may also underestimate the seriousness of their injury initially, which may affect their emotional response (de Heredia, Munoz, & Artaza, 2004). Athletes have good reason to be upset when injured, but as one athletic trainer stated, "I know it's frustrating for athletes to be injured, but I found that those who have the

negative attitudes or poor mood state, that they are the ones who are continuously in rehab, and having problems making it to rehab" (Granito, 2001, p. 78). A positive and enthusiastic response will ensure the best possible chance of complete physical and mental rehabilitation.

A study by Mainwaring et al. (2004) sheds some light on athletes' reactions to injury. Following concussion, athletes experienced depression, confusion, and overall mood disturbance. The authors postulate that mood changes are due to the injury itself, not the removal from sport, as they experienced a normalization of mood before their return to sport; this finding has been supported by other research as well (Hutchison, Mainwaring, Comper, Richards, & Bisschop, 2009).

Others also notice changes in injured athletes. According to a survey of 482 certified athletic trainers, 47 percent believed that every injured athlete suffers negative psychological effects such as stress and anxiety, anger, treatment compliance problems, and depression (Larson, Starkey, & Zaichkowsky, 1996). In addition, 24 percent of the trainers referred an athlete for counseling related to their injury. Athletic trainers are continuing to recognize the psychological impact of injury in athletes;

74 percent of athletic trainers who responded to a survey by Clement, Granquist, and Avrinen-Barrow (2013) reported that athletes experienced psychological effects along with physical injuries, most commonly stress/anxiety, anger, and issues related to treatment adherence. Unfortunately, most athletic trainers in the United States do not have easy access to a sport psychology consultant—only 20 percent in one study (Clement et al., 2013) and 25 percent in a second study (Cramer Roh & Perna, 2000); however, they did use them (i.e., 84 percent who had access made referrals). A different survey of athletic trainers found a similarly high rate of referral (71.6 percent) of athletes for sport psychology services (Zakrajsek, Martin, & Wisberg, 2015), plus higher rate of access to a sport psychology consultant (63 percent). Sports medicine physicians are also aware of the problems that arise from injury—in a survey of 827 practitioners, 80 percent reported discussing psychological issues with injured athletes (Mann, Grana, Indelicato, O'Neill, & George, 2007). These practitioners also noted a lack of sport psychology consultants in their geographic areas, and 75 percent rarely or never referred athletes to sport psychologists (Mann et al., 2007).

Table 23-1 **Models to Explain Reaction to Injury**

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1. **Grief Models:** Injured athletes proceed sequentially through a series of stages (disbelief, denial, and isolation; anger; bargaining; depression; and acceptance and resignation) on the way to recovery (see Kubler-Ross, 1969 and Evans & Hardy, 1995 for a better understanding).
 2. **Cognitive Appraisal Models:** The response to injury comes from how the athlete perceives the injury (see Figure 23-2 and Brewer, 1994 for more information).
 3. **Integrated Model of Response to Sport Injury:** How an individual copes following injury is determined by personality, social, and emotional factors (see Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998 for a more thorough explanation and see Bejar & Butryn, 2016 for an application with athletes of low socioeconomic [SES] backgrounds).
 4. **Biopsychosocial Models:** Reciprocal interaction of psychological factors with biological and social/contextual factors in the rehabilitation process (see Brewer, Andersen, & Van Raalte, 2002 for more detail and see Bejar et al., 2017 for an exploration of the model as applied to South Korean athletes).
 5. **Other Models:** Self-regulation theory (Hagger, Chatzisarantis, & Griffin, 2004), blend of grief model, and cognitive appraisal model (Striegel, Hedgpeth, & Sowa, 1996).
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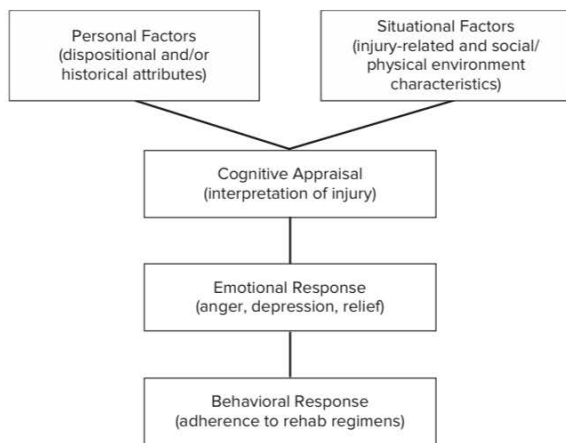


Figure 23-2 Cognitive appraisal models of psychological adjustment to athletic injury

Cognitive Appraisal Models

Many models have been used to explain athletes' reactions to injury (see Table 23-1 for some examples). The cognitive appraisal models have garnered the most empirical support for describing individual differences in response to athletic injury. For this reason, we will only elaborate on them. Brewer (1994) identified five cognitive appraisal models relevant to psychological responses to athletic injury. He explains that each model (Figure 23-2) is rooted in the literature on stress and coping; athletic injury is conceptualized as a stressor to the athlete, who then evaluates, or *appraises*, the stressor in accordance with personal and situational factors. The response to injury comes from how the athlete perceives the injury. This cognitive appraisal determines the emotional response (e.g., anger, depression, relief), which determines the behavioral response to injury rehabilitation (e.g., adherence to rehabilitation).

Personal factors. Personal factors contribute to cognitive appraisal and emotional and behavioral responses to injury. For example, Brewer (1994) reported that Shaffer (1992) found that a history of

successful rehabilitation positively affected assessments of ability to manage a subsequent injury. This rehabilitation self-efficacy, in turn, related positively to physical recovery. Research on hardiness shows that athletes who are higher in hardiness tend to have a lower risk of becoming injured, and when they do, they are more successful at rehabilitation (Wadey et al., 2012a). Brewer (1993) found that physical self-esteem may buffer the negative effects of athletic injury on mood.

It is definitely easier to deal with injuries on the mental side after you've had a few of them, since you are aware of the recovery process.

—Mike Schultz, U.S. Paralympic snowboarder (brainyquote.com, 2018a)

One of the most supported personal factors is the influence an athlete's psychological investment in sport has on their adjustment to athletic injury (e.g., Brewer, 1993; Brewer, Van Raalte, & Linder, 1993). For many athletes, particularly those who are intensely involved with their sport and/or achieve notable success, the primary focus of their identity may be as an athlete (see Case Study 2).

Case Study 2

An Athlete Reacting to Injury

Beth was a two-time all-state performer who had already accepted a full athletic scholarship to a major college soccer powerhouse. During the winter months, Beth was a starter on the varsity basketball team. During the third game of the season she severely injured her right knee diving for a loose ball. The injury required surgery to repair torn ligaments, and the doctors told Beth that with hard work she would be as good as new in a few months.

This was Beth's first major injury. She was afraid, and she was angry at herself for getting injured because she felt it was a stupid play on her part. She also felt that she had let her parents and friends down because of what might happen if she didn't fully recover. She asked herself many of the same questions she heard her friends asking: Would she lose her scholarship? Would she be able to play as well as before? Did she make a mistake by playing basketball this year?

Up to this point, it seemed that the anger, guilt, and other feelings that resulted from the injury caused Beth to doubt herself and her ability to cope with the situation. She found it easier to be alone than to deal with family and friends. Although withdrawing from people brought her temporary relief from her feelings, it also kept her away from the support she needed to get through this unexpected transition.

During her rehabilitation, Beth refused to go to basketball games or social events that she normally attended. She was very moody and seemed to become angry at the smallest thing. Her boyfriend would come over to visit, but these meetings usually ended in a fight because Beth would say he didn't know what she was going through. She was becoming frustrated at her progress in physical therapy, even though she was reaching her therapist's treatment goals. She would be particularly demanding of her therapist if her strength or range of motion had not improved from day to day. Her frustration led her to ignore her therapist's recommendations. She pushed her exercises so hard that she cried from the pain and then became angry at herself for not being tough enough. Instead of getting better, Beth suffered a setback.

Although Beth was trying to deal with her feelings, she found herself pushing away the people who were trying to help her. At the same time her fear caused her to make some poor decisions about her rehabilitation program. Fortunately, Beth was able to get the support she needed to work through her feelings.

Beth's physical therapist introduced her to a counselor who worked in the training room. The counselor listened to Beth's story and tried to understand what she was going through. For the first time Beth was able to voice her anger and sadness. After this, the counselor helped Beth identify the skills that she had used to become a good athlete and showed her how to use them to deal with her injury. Beth had not been prepared for her injury, and her emotions kept her from using the goal-setting and imagery techniques that she used to improve her sport skills.

Beth had also failed to seek help from others. Before her injury, she had always sought out the best coaches for advice and had often talked with players she admired to learn more about game strategies and techniques. She withdrew from this type of support while she was injured. Once Beth learned to use her skills and the support of others, she made better decisions about her rehabilitation and made a quick recovery.

The more narrowly focused an injured athlete's sense of self is, the more threatened the athlete will be. Such a person appears more likely to appraise his or her injury in terms of threat or loss (Brewer et al., 1993) and to experience feelings of anxiety, depression, or hopelessness (Brewer, 1993; Smith, Scott, O'Fallon, & Young, 1990). Athletes who are more involved in sport before injury may be confused during rehabilitation and may perceive a lesser degree of recovery at the end of rehabilitation (Johnston & Carroll, 2000). They might be more motivated to return to sport, possibly prematurely. On the positive side, a strong athletic identity corresponds with greater motivation during rehabilitation following injury (Masten, Strazar, Zilavec, Tusak, & Kandare, 2014).

The coach, athletic trainer, or others involved during rehabilitation should be sensitive to these issues and help the athlete see himself or herself more fully as a person, with many potentials, and to explore other possibilities—not to replace the sport or athlete identity, but to complement it. The development of the NCAA Life Skills program and books to aid athletes in planning for careers help athletes develop in other realms. Highlighting one's athletic success may be helpful in establishing careers both during and after sport. For example, Tim Horton, a former NHL player, opened a doughnut shop that has expanded into one of the most recognized chains in Canada. Other athletes have careers in sport broadcasting (e.g., Bill Walton, Sean Elliot), owning a business (e.g., Venus Williams's V Starr Interiors, Maria Sharapova's Sugarpova), and developing the next generation of athletes (e.g., Justine Henin's tennis academy).

Researchers (Udry, Gould, Bridges, & Beck, 1997; Wadey, Evans, Evans, & Mitchell, 2011) have assessed the benefits perceived by athletes following injury. Udry et al.'s (1997) participants identified four general dimensions: personal growth, psychologically based performance, physical and technical development, and none. Wadey et al. (2011) found that there were multiple benefits at different points (i.e., injury onset, rehabilitation,

return to competitive sport). Some of the benefits were improvements in social networks, increased knowledge of anatomy, and becoming more resilient. Salim and colleagues suggest that practitioners working with injured athletes can help increase the likelihood of their experiencing growth through the recovery process, in part by maximizing use of social network support (Salim, Wadey, & Diss, 2015). Coaches have also noted that the coach-athlete relationship can grow stronger through the injury process (Wadey, Clark, Podlog, & McCullough, 2013).

Athletic trainers are a great resource when an athlete is experiencing psychological distress—most view it as their responsibility to refer athletes to counseling when they experience personal distress (Cormier & Zizzi, 2015). However, not all sport psychology consultants are trained counselors, and not all counselors are aware of the issues confronting athletes. One alternative is to have athletic trainers take a more active role in providing sport psychology in the athletic training room. Several authors have suggested that athletic trainers are perfectly positioned to train athletes to use psychological skills (e.g., goal-setting, imagery), as they frequently see injured athletes and possess a wealth of knowledge about injuries (e.g., Cramer Roh & Perna, 2000; Misasi, Redmond, & Kemler, 1998). Tracey (2008) found that physical therapists and athletic trainers see themselves as filling the role of building rapport, educating, and communicating with injured athletes, which supports Misasi et al. (1998), who point out that “the athletic therapist cannot avoid the need to be an effective counselor or helper” (p. 36). Scherzer and Williams (2008) found that when athletic trainers have additional training in sport psychology, they perceive themselves as more skilled at using the techniques and they think they use the skills more. Additional training does not have to be extensive to be effective, either. Clement and Shannon (2009) found that athletic training students increased their sport psychology behaviors following a 75-minute workshop.

Situational factors. Many potential situational factors influence cognitive appraisal and emotional and behavioral responses to injury. For example, Wiese-Bjornstal and colleagues (1998) enumerated three types of situational factors: (a) sport factors (e.g., time in season, playing status); (b) social factors (e.g., coach and medical team influences); and (c) environmental factors (e.g., accessibility to rehabilitation). Granito (2001) conducted focus groups with injured athletes and found that athletes' reactions to injury fell into seven categories: (a) personal factors (e.g., athlete's personality, role on team); (b) effects on relationships (e.g., with coaches, parents, teammates); (c) sociological aspects (i.e., gender differences, athletic subculture); (d) physical factors (e.g., pain and use of painkillers); (e) daily hassles (i.e., stress); (f) feelings associated with injury (e.g., frustration, depression, tension); and (g) rehabilitation (i.e., adherence, ease of receiving treatment). Granito's investigation provides support that many factors contribute to an athlete's response to injury. When Evans, Wadey, Hanton, and Mitchell (2012) examined situational factors at different points in the injury process, they found that athletes are affected by medical/physical, sport-related, social, and financial demands at the time of injury and during rehabilitation. However, only medical/physical and sport-related demands affected return to competitive sport.

Potentially Dangerous Attitudes

While developing athletes into successful competitors, many coaches and athletic trainers have unknowingly fostered erroneous attitudes concerning successful injury rehabilitation. Understanding these potentially dangerous attitudes is crucial to appreciating the psychological aspects of injury and rehabilitation.

Act tough and always give 110 percent. Athletes have been systematically taught that mental toughness and giving 110 percent are necessary for success. Although mental toughness and giving one's best are important, we must realize that when taken

to *extremes* these actions can foster injury and failure. Curt Schilling's performance in the 2004 World Series epitomizes these beliefs. Schilling suffered an ankle injury during the Division Series that affected his performance in Game 1 of the league's championship series against the New York Yankees. Rather than succumbing to his injury, the Boston Red Sox medical team devised a method to stabilize his tendon that allowed him to pitch again in Game 6 of the series, which he won. On the morning of his scheduled start in Game 2 of the World Series, Schilling was prepared to tell the team he couldn't pitch. Again, the medical staff found a solution that enabled Schilling to take to the mound (MacMullan, 2004). In both outings in which his tendon was stabilized by stitches, Schilling truly wore a red sock for the Red Sox—his socks turned red from blood oozing from his injury. Schilling needed ankle surgery during the off-season and in 2005 began the season on the disabled list. He rebounded and helped lead the Red Sox to a second World Championship in 2007 ("Curt Schilling," 2007).

Athletes must be capable of "playing through" some pain. Seldom do we educate athletes about which kinds of pain to ignore and which kinds of pain to respond to. Both the Schilling example and research findings indicate that sports medicine practitioners can be complicit in this culture of risk. Safai (2003) interviewed physicians, physiotherapists, and intercollegiate athletes at a Canadian university and found that sports medicine practitioners seem to understand why athletes endorse the sport ethic of playing through pain, and they help them play again as quickly as possible, even before an injury is healed.

You may get skinned knees and elbows, but it's worth it if you score a spectacular goal.

Mia Hamm, U.S. Women's Soccer Team
(1987-2004) ("Mia Hamm," 2013b;
Searchquotes.com, 2013)

How is this sport ethic learned, and is it pervasive at all levels of sport? Malcom (2006) observed girls aged 11 to 16 in a softball league. Most of

the injuries tended to be minor, but how the girls learned to react was fascinating. Some girls would initially react to injuries to gain attention, while others would try to move out of harm's way to avoid injury. As time wore on, coaches and other players taught the girls to play through the injuries by ignoring complaints of injuries, teasing girls about injuries, or modeling acting tough (e.g., a coach would catch a line drive without a glove and not react). Malcom demonstrated that the sport ethic is learned through participation in sport, though it is not directly taught. Other researchers (Liston, Reacher, Smith, & Waddington, 2006) were curious whether the sport ethic would be found in nonelite rugby, reasoning that professional athletes might be more willing to play through pain due to financial and commercial pressures. They found that the sport ethic was present and identified two codes in rugby: (1) a willingness to be hurt and (2) playing when hurt for the good of the team. It seems the sport ethic of playing in pain permeates every strata of athletics.

Injured athletes are worthless. Coaches play an important role in the lives of athletes—both when they are healthy and when injured. While it is easy for coaches to invest time and energy in healthy athletes, it's important to do the same when athletes are not able to compete. Leaders must help injured athletes realize that attitudes such as desire, pride, and commitment are beneficial at the right time, but these attitudes may be hazardous to present and future health if taken to the extreme. Athletes become extremely vulnerable and totally unprepared for the incapacitating injury or lifelong pain that may follow inappropriate reactions to pain and injury. Attitude change is required to ensure adaptation to injury and life. Sport professionals must realize the hazards of these mistaken attitudes before they can fully use the psychological strategies presented later in this chapter. Leaders have to do what is in the *best interest* of injured athletes. With this approach, athletes, coaches, and teams will have the best possible chance of attaining their fullest potential.

Whole-Person Philosophy

Reacting to an injured athlete from a whole-person philosophy deals with short- and long-term aspects of an injury in a way that increases the chances of an athlete's return to sport participation. Reactions to Kevin Ware's injury, the Louisville guard who experienced a serious fracture during a 2013 Elite Eight round of the NCAA Men's Basketball tournament, exemplify this. Ware's injury was one of the most gruesome in sport, but it didn't stop him from being part of the team. Ware had surgery on his leg and was with the team when they won the semi-final and championship games one week later.

The bone's 6 inches out of his leg and all he's yelling is, "Win the game, win the game," I've not seen that in my life. . . . Pretty special young man.
(Rick Pitino, coach of Kevin Ware, ESPN.com, 2013).

Ware did recover and resumed his playing career in college and as a professional in Europe ("Kevin Ware," 2018).

An athlete with an injury is no less of an athlete, no less of a person, than before the injury. While athletes may not expect their sports medicine professionals (e.g., physiotherapists, athletic trainers) to be able to address the psychosocial challenges that arise with injury (Arvinen-Barrow, Massey, & Hemmings, 2014), researchers (e.g., Cramer Roh & Perna, 2000; Misasi et al., 1998) have suggested that these professionals are perfectly positioned to offer such support.

Social support. Social support is critical in the rehabilitation process, particularly with moderate to severe injuries. Having the support of others can contribute to injured athletes having a better sense of well-being, particularly for those athletes who report having less hope (Lu & Hsu, 2013). Family and friends may respond to the athletes primarily as athletes, and in many cases friendships are based along these lines, particularly with teammates or other athletes. Suddenly these important ties may be ruptured—the hockey players interviewed

by Ronkainen and Ryba (2017) found being cut off from their teammates incredibly difficult. Too often, when athletes are kept away because of injury, they feel that their teammates and time have marched on. One injured athlete interviewed by Von Rosen and colleagues said "Everybody should see the ones who are injured. See them. Talk to them. Acknowledge their training. And try to talk to them about something other than their injury" (Van Rosen, Kottorp, Friden, Frohm, & Heijne, 2018, p. 736), highlighting the importance of continued social connections between teammates. Interestingly, teammates have been found to be an even greater source of social support for athletes with orthopedic injuries than athletes with concussions (Covassin, Crutcher, Bleecker, Heiden, Dailey, & Yang, 2014).

I used to keep injuries to myself. It would just make it worse and worse. Now I'm having none of that.

-Katarina Johnson-Thompson, British track and field athlete (brainyquote.com, 2018b)

Giving athletes the option to rejoin the team when injured might be a good starting point. We would go so far as to say that as soon as athletes can rejoin a team, they should do so, as coaches and teammates continue to be important sources of social support for injured athletes through the rehabilitation process (Clement, Arvinen-Barrow, & Fetty, 2015). Asking an injured athlete to help the coaching staff or to mentor younger players provide ways in which an injured athlete can still be a contributing member. But it is important to consider that attending practice while injured may have a negative impact on an athlete's emotional state. Some of the athletes Tracey (2003) interviewed explained that it was really difficult to be at practice while injured; in fact, six of the ten participants chose not to attend practice.

Coaches and sport psychology consultants must help ensure that normal contacts are maintained. They should be reassuring about recovery of past abilities and encourage injured athletes to

discover other bases of support. Some athletes note a lack of support from their coaches, and even say that coaches can be pushy when athletes are injured (Ruddock-Hudson, O'Halloran, & Murphy, 2012), which underscores that athletes need support from their coaches as they move toward recovery (Peterson, 2001). Athletic trainers can also be good sources of social support (Clement & Shannon, 2011). In particular, athletes will benefit from informational support (i.e., information about the injury) and emotional support (i.e., helping the athlete express emotions and feel understood) throughout the injury and recovery processes. Athletes who are satisfied with the social support they receive from their athletic trainers may be less likely to be depressed or anxious upon their return to sport (Yang et al., 2014).

With athletes whose rehabilitation will take longer than two weeks, Striegel et al. (1996) suggest two additional forms of social support: peer mentors and injury support groups. Peer mentor relationships are opportunities for an injured athlete to talk with an athlete who has successfully rehabilitated a similar injury. Injury support groups provide injured athletes with a forum to talk about their injury, rehabilitation, and anything else with others who are in the same position. Both these forms of support may help motivate injured athletes during rehabilitation and give athletes a sense of community.

Although social support and the reintegration of the injured athlete are important parts of the rehabilitation process, there are two problems with this "double-edged crutch." First, an injured athlete may present a conscious or unconscious threat to others: "If it could happen to them, it could happen to me." This fear may evoke anything from a mild feeling of discomfort to an almost phobic avoidance of the injured player. When this type of situation develops, it is important for sport personnel to show that the injured person should not be feared and relay the message that the injured athlete will recover and rejoin the team.

Second, although cooperation and cohesion are part of teamwork, so is competition. An athlete's

injury may present an opportunity to another person. The second-string player, for example, may have a chance for glory. This is what happened in the New England Patriots organization. Early in the 2000–2001 football season, the Patriots' starting quarterback, Drew Bledsoe, was injured. The starting job was turned over to an unknown, Tom Brady. With Brady as quarterback, the Patriots won seven games and were in contention for the playoffs. Even when Bledsoe was cleared to play, Coach Bill Belichick started Brady. When Brady got hurt in the AFC Championship game, Bledsoe stepped in and got the win. Belichick had to decide who to start in the Super Bowl—should he start his high-profile, high-salary quarterback or his young breakout star? Brady was healthy, got the start, and the Patriots won the first of what would be three NFL championships in four years, all with Brady as quarterback (“New England Patriots,” 2007). This type of competition should be focused on the athletic situation and not personalized. One cannot ignore the realities of competition; however, one can try to maintain as positive a climate as possible.

To treat a knee and ignore the brain and emotions that direct the choreography of that knee is not consistent with total care of the patient.
(G. J. Faris, “Psychological Aspects of Athletic Rehabilitation,” *Clinics in Sports Medicine*, 4, 1985, p. 546)

Addressing the whole person. When dealing with an injured athlete, one of the most crucial aspects entails understanding what the athlete is experiencing before trying to “fix” them (Petitpas & Danish, 1995). An injured athlete may experience all, some, or none of a range of effects, including grief, identity loss, separation and loneliness, fear, loss of confidence, and performance decrements. If you try to address all of these issues, or some of them, without assessing what the individual athlete is experiencing, you risk frustrating the athlete. It can sometimes be difficult to remember that the

injured athlete is a person and not just a broken leg. It is important to talk to the athlete about himself or herself, not just the injury.

Petitpas and Danish suggest a series of steps to follow when working with an injured athlete. First, build rapport with the athlete. This allows you to understand what the athlete is experiencing with their injury. Education is next, when the athlete learns about the injury and rehabilitation process. The phases of skill development and practice and evaluation follow the general education phase. The opportunity to learn and use skills (e.g., goal-setting, imagery) helps athletes with rehabilitation and with performance once they are “back in the game.”

A case study highlights the importance of treating the whole person. Davis and Sime (2005) documented their work with a collegiate baseball player struggling to regain his form following an eye injury. He had lingering effects after his injury had healed medically; he was not hitting effectively, reported feeling anxious when he had two strikes during an at-bat, and felt as though his vision was not 100 percent. Davis and Sime used a mix of traditional (e.g., breathing and relaxation training, imagery) and nontraditional strategies (i.e., electroencephalograph biofeedback) to great success—the athlete had his most successful season following the interventions. This blended intervention demonstrates the possibilities created when considering the whole picture and the whole person (i.e., his psychological fears and perceived visual losses). Heil, Wakefield, and Reed (1998) suggest that conceptualizing rehabilitation as an athletic challenge may help athletes through the rehabilitation process. By using this metaphor, the rehabilitation process encompasses familiar skills, and rehabilitation becomes part of training for excellence rather than a setback. Another approach gaining support is utilizing acceptance and commitment therapy, which incorporates mindfulness (e.g., Bennett & Lindsay, 2016; Shortway, Wolanin, Block-Lerner, & Marks, 2018).

Teaching Specific Psychological Rehabilitation Strategies

The same mental skills and techniques that help athletes in sport (e.g., goal-setting, mental imagery) can play a role in rehabilitation from injury. In a large cross-cultural study of athletes' use of mental skills during rehabilitation, 72 percent of the athletes who used mental skills during their rehabilitations thought it helped them rehabilitate faster (Arvinen-Barrow et al., 2015). Coaches, sport psychology consultants, and athletic trainers may need to teach athletes that it is reasonable to think the injury is unfortunate, untimely, and inconvenient and to feel irritated, frustrated, and disappointed when one occurs. It is *unreasonable* for athletes to convince themselves that the situation is hopeless, that injuries are a sign of weakness and should be hidden, or that their season or career is over.

Part of the learning is about the injury itself and the rehabilitation process. It is difficult for intelligent athletes to be positive and relaxed if they lack knowledge, are anxious, and wonder about what they are doing in the athletic training room. Athletes who realize the purpose of rehabilitation are more likely to work hard and to provide useful information about their progress.

Two studies that examined psychosocial factors related to sports injury rehabilitation found that athletes who possess certain mental attributes and who use certain mental skills may recover faster from injury. In the first study by Ievleva and Orlick (1991), athletes who used more goal-setting, healing mental imagery, and positive self-talk recovered faster than athletes who did not. A follow-up study by Loundagin and Fisher (1993) revealed a similar pattern of results and also that focus of attention and stress reduction significantly enhanced recovery time. In contrast, a study by Scherzer (1999) failed to find any correlation between using mental skills and recovery from knee surgery except for goal-setting predicting one outcome measure. In a review of research on both preventive and rehabilitative

psychological interventions for sport injury, Cupal (1998) concluded that psychological interventions significantly altered the rehabilitation outcome for injured athletes in terms of earlier gains in strength; increases in functional ability; and reduction of pain, state anxiety, and reinjury anxiety. A more recent review by Schwab Reese, Pittsinger, and Yang (2012) concluded that imagery and relaxation were associated with better psychological coping during rehabilitation. Both research and extensive anecdotal information from consulting experiences offer support for teaching the following psychological interventions to injured athletes.

Thought stoppage and cognitive restructuring. What athletes say to themselves following an injury helps determine their subsequent behavior. Athletes can be taught coping skills to control their inner thoughts. Then, when self-defeating internal dialogues occur, they can use an intervention strategy such as thought stoppage or cognitive restructuring. (See Chapter 14 for more information on these and other techniques for controlling thoughts.) Thought stoppage and cognitive restructuring can be conceptualized as "self-talk," or how we speak to ourselves. Positive self-talk is thought to contribute to personal well-being and the enhancement of healing (Ievleva & Orlick, 1991). Self-talk can also help with physical skill development in rehabilitation (Beneka et al., 2013).

Injuries are not only a physical question, which is the most important thing, of course, but also a question of your mind. If you're thinking: "I'm not going to make it," "I can't cope," "it hurts," "it's never going to get better," then it won't.

*-Luis Suarez, soccer player (Uruguay
brainyquote.com, 2018c)*

As an example of the importance of inner dialogue, consider a situation in which an athlete is going through rehabilitation exercises while experiencing pain and little apparent improvement in the injured area. If her inner dialogue becomes

self-defeating, the athlete worries and questions the benefit of treatment and exercise:

This is awful. This hurts too much. These exercises will probably make things worse. Besides, I've been doing this for three days now and I can't see any progress. It would be a lot easier to let the injury heal on its own. I'm not coming tomorrow. It really doesn't matter if I get treatment.

The athlete does not get much out of today's treatment and begins to develop excuses for not continuing therapy.

On the other hand, if the athlete's inner dialogue is self-enhancing, she worries and questions the benefits of treatment and exercise but then thinks:

Stop. These exercises hurt, but it's okay—they'll pay off. I'm lucky to have knowledgeable people helping me. I'll be competing soon because I'm doing these exercises. If the pain gets too severe, I'll ask my trainer if I am doing it right and, if I am, I'll live with it and think about how happy I'll be to be competing again.

The athlete has a good treatment session and prepares herself to continue. By using cognitive techniques that promote positive self-talk, athletes can often reduce the time they need to rehabilitate from injury (Ievleva & Orlick, 1991; Loundagin & Fisher, 1993).

Imagery

Athletes can learn to control their visual images and to direct them productively to reduce anxiety and to aid in rehabilitation and successful return to sport. Imagery tends to be helpful for reducing pain and increasing athletes' sense of self-efficacy for rehabilitation (Zach, Dobersek, Filho, Inglis, & Tenenbaum, 2018). See Chapter 13 for more detailed information on what imagery is and techniques that can be used to teach and enhance imagery skills.

Mastery imagery: visual rehearsal of successfully completing tasks

Emotive imagery: rehearsal of scenes that produce positive self-enhancing feelings such as enthusiasm, self-pride, and confidence

Healing imagery: envisioning what is happening to the injury internally during the rehabilitation process

All three types of imagery can help athletes when they are rehabilitating an injury. Mastery imagery can help foster motivation for rehabilitation and confidence on return to competition. Injured athletes also can use coping rehearsal to visually rehearse anticipated problematic situations that may stand in the way of their successful return to competition and then rehearse overcoming these obstacles. Such visual rehearsal methods can prepare injured athletes for any number of competitive or practice situations, helping them maintain physical skills, retain confidence in their ability, and dissipate any lingering fears they may have of reinjury (Ievleva & Orlick, 1993). Injured athletes can use emotive imagery to help feel secure and confident that rehabilitation will be successful. In order to successfully use healing imagery, athletes must receive a detailed explanation of their injury and how it will heal physiologically. After visualizing the healing process, athletes are asked to imagine in vivid color the healing occurring during treatment sessions and at intervals during the day. For example, athletes can imagine increased blood flow and warmth going to the injured area, or they can imagine the stretching necessary for enhancing range of motion. Research also supports the effectiveness of using imagery for pain management (Wesch, Callow, Hall, & Pope, 2016).

Despite research findings that imagery can help with recovery (e.g., Ievleva & Orlick, 1991), many athletes in the past did not use imagery extensively during rehabilitation (Driediger, Hall, & Callow, 2006; Sordoni, Hall, & Forwell, 2000). In another study, 68 percent of the participants reported using imagery during rehabilitation (Monsma, Mensch, & Farroll, 2009); however, those who were injured the

longest were less likely to use imagery. When Milne, Hall, and Forwell (2005) sought to extend Sordoni et al.'s results (2000), they found that injured athletes used more motivational and cognitive imagery than healing imagery while rehabilitating. They suggest that athletes may need instruction in healing imagery if they are to use it. This concern is echoed by Evans, Hare, and Mullen (2006), who found that the athletes used imagery to control pain and enhance healing, but were more familiar with performance-related imagery.

Goal-setting. It is helpful for the rehabilitation team to work with the injured athlete at setting specific short- and long-term goals for recovery, return to practice and competition, and day-to-day rehabilitation throughout the rehabilitation process (DePalma & DePalma, 1989). Athletes should be actively involved in this process. (See Chapter 11 for specific suggestions on how to effectively set goals and implement a goal-setting program.)

The following example of a college pitcher who needed surgery on his throwing arm highlights the effective use of goals in a rehabilitation process designed to physically and psychologically prepare him for return to practice the following spring. He was reminded of how excited he would be on the first day of practice to be back on the field with his teammates and to see if he still "had it." He was also told that he would feel great and have an almost overpowering urge to try all his pitches and overthrow on the first day his arm felt good, but he would overcome the urges by being smart, disciplined, and emotionally controlled. The desire to help his teammates be successful and the thrill of getting back on stage and becoming a star again would be highly motivating.

Together, this athlete, his coaches, and his athletic trainers outlined a specific goal plan. They decided on a set number of throws each day, the distance of the throws, the approximate speed of the throws, and the kinds of throws. For the first three weeks the athlete's catcher and a coach would help

make sure that the plan was adhered to on a daily basis. Short- and long-term goals were detailed so that by the fifth game of the year the athlete would be ready to return to the pitching mound for three innings of relief pitching. While rehabilitating an injury, athletes have noted the importance of having reasonable goals (Johnson et al., 2016).

As with many other athletes, the process from injury to return to competition was a challenge to this athlete's mind and body. Because the process was managed properly, it allowed for a positive and bright future. Research by Filby, Maynard, and Graydon (1999) found support for the notion that setting multiple goals (e.g., outcome, process, and performance goals) improved task performance. Wayda, Armenth-Brothers, and Boyce (1998) further explain that if the injured athlete feels that he or she is part of the process (i.e., by taking an active role in goal-setting), he or she is more likely to be committed to the rehabilitation program.

Exercise 2 Goal-Setting

For help with goal-setting, try the WOOP app. It helps you plan to achieve a goal by identifying your goal (or Wish), as well as the desired Outcome, potential Obstacle(s), and Plan to overcome (<http://woopmylife.org/>).

Relaxation

Practicing any of the relaxation techniques (see Chapter 12) can play a role in reducing stress and speeding injury rehabilitation (Loundagin & Fisher, 1993). These results may occur for a number of reasons. Relaxation helps open the mind-body channels that regulate the body, enabling inner control over the body (Botterill, Flint, & Ievleva, 1996). Tension levels often increase in the injured area due to the stress of being injured (Brewer, Van Raalte, & Linder, 1991). This tension can increase pain and work against the effectiveness of the rehabilitation exercises by, for example, reducing blood flow and

range of motion. Practicing a relaxation routine can relieve the tension and enhance blood circulation. Injured athletes who participated in stress inoculation training (i.e., deep breathing, progressive muscular relaxation, imagery) experienced less anxiety,

less pain, and fewer days to recovery than counterparts who received only physical therapy, demonstrating the effectiveness of adding relaxation training to physical rehabilitation protocols (Ross & Berger, 1996).

Summary

Sport psychology consultants have made great advances in understanding the psychological rehabilitation of athletes and the psychological factors that put athletes at risk of injury. Although some athletes have effective psychological responses, others do not. This chapter focuses on factors that may predispose athletes to injuries, patterns of negative reactions to injuries, and ways in which coaches and sport psychology consultants can help athletes respond psychologically to injuries in positive, growth-oriented ways.

Although no clear injury-prone personality has been identified, some factors such as high life stress and low social support and psychological coping skills are predictive of injury. Effective preventive interventions are available for these and other factors related to injury. Athletes can respond to injury in more and less adaptive ways. Using a cognitive appraisal model, we identify personal and situational factors that might influence an athlete's cognitive appraisal of the injury and his or her resulting emotional and behavioral responses to both the injury and injury rehabilitation. We continue to agree with Brewer's (1994) earlier conclusion that cognitive appraisal models offer a useful framework to guide both future empirical efforts and rehabilitation practice. Systems of social support, treatment of the whole person, and cognitive-behavioral interventions are ways to help injured athletes respond to injury in a more positive way.

Study Questions

1. What are key factors that may predispose some athletes to injury, and how does this occur?
2. Describe interventions that can be used to modify risk factors and enhance buffering factors, thereby reducing injury risk.
3. List five responses that may occur as a result of anxiety and tension associated with an injury on an athlete's initial return to competition.
4. How and why might personal growth possibilities become an important part of the psychological rehabilitation of the injured athlete?
5. List five problematic results of an athlete returning to competition following an injury if not psychologically prepared.
6. Diagram the cognitive appraisal model of psychological adjustment to athletic injury and discuss the different components.

7. Explain the differences between mastery imagery, emotive imagery, and healing imagery.
8. Describe what other psychological strategies might be used to hasten rehabilitation and to prepare for returning to competition.

References

- Alizadeh, M. H., Pashabadi, A., Hosseini, S. M., & Shahbazi, M. (2012). Injury occurrence and psychological risk factors in junior football players. *World Journal of Sport Sciences*, *6*, 401-405.
- Andersen, M. B., & Williams, J. M. (1988). A model of stress and athletic injury: Prediction and prevention. *Journal of Sport and Exercise Psychology*, *10*, 294-306.
- Andersen, M. B., & Williams, J. M. (1999). Athletic injury, psychosocial factors, and perceptual changes during stress. *Journal of Sports Sciences*, *17*, 735-741.
- Arvinen-Barrow, M., Clement, D., Hamson-Utley, J. J., Zakrajsek, R. A., Lee, S. M., Kamphoff, C.,...Martin, S. B. (2015). Athletes' use of mental skills during sport injury rehabilitation. *Journal of Sport Rehabilitation*, *24*, 189-197.
- Arvinen-Barrow, M., Massey, W. V., & Hemmings, B. (2014). Role of sport medicine professionals in addressing psychosocial aspects of sport-injury rehabilitation: Professional athletes' views. *Journal of Athletic Training*, *49*, 764-772.
- Bejar, M. P., & Butryn, T. M. (2016). Experiences of coping with injury in NCAA Division I athletes from low-to-middle socioeconomic status backgrounds. *Journal of Sport Behavior*, *39*, 345-371.
- Bejar, M. P., Fisher, L. A., Nam, B. H., Larsen, L. K., Fynes, J. M., & Zakrajsek, R. A. (2017). High-level South Korean athletes' experiences of injury and rehabilitation. *The Sport Psychologist*, *31*, 16-29.
- Beneka, A., Malliou, P., Gioftsidou, A., Kofotolis, N., Rokka, S., Mavromoustakos, S., & Godolias, G. (2013). Effects of instructional and motivational self-talk on balance performance in knee injured. *European Journal of Physiotherapy*, *15*, 56-63.
- Bennett, J., & Lindsay, P. (2016). Case study 3: An acceptance commitment and mindfulness based intervention for a female hockey player experiencing post injury performance anxiety. *Sport & Exercise Psychology Review*, *12*, 36-45.
- Botterill, C., Flint, F. A., & Ievleva, L. (1996). Psychology of the injured athlete. In J. E. Zachazewski, D. J. Magee, & W. S. Quillen (Eds.), *Athletic injuries and rehabilitation* (pp. 791-805). Philadelphia, PA: W. B. Saunders.
- Brainyquote.com. (2018a). Retrieved from https://www.brainyquote.com/quotes/mike_schultz_903722
- Brainyquote.com. (2018b). Retrieved from https://www.brainyquote.com/quotes/katarina_johnsonthompson_772777
- Brainyquote.com. (2018c). Retrieved from https://www.brainyquote.com/quotes/luis_suarez_701092
- Brewer, B. W. (1993). Self-identity and specific vulnerability to depressed mood. *Journal of Personality*, *61*, 343-364.

- Brewer, B. W. (1994). Review and critique of models of psychological adjustment to athletic injury. *Journal of Applied Sport Psychology, 6*, 87-100.
- Brewer, B. W., Andersen, M. B., & Van Raalte, J. L. (2002). Psychological aspects of sport injury rehabilitation: Toward a biopsychosocial approach. In D. L. Mostofsky & L. D. Zaichkowsky (Eds.), *Medical and psychological aspects of sport and exercise* (pp. 41-54). Morgantown, WV: Fitness Information Technology.
- Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1991). Role of the sport psychologist in treating injured athletes: A survey of sport medicine providers. *Journal of Applied Sport Psychology, 3*, 183-190.
- Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1993). Athletic identity: Hercules' muscles or Achilles heel? *International Journal of Sport Psychology, 24*, 237-254.
- Clement, D., Arvinen-Barrow, M., & Fetty, T. (2015). Psychosocial responses during different phases of sport-injury rehabilitation: A qualitative study. *Journal of Athletic Training, 50*, 95-104.
- Clement, D., Granquist, M. D., & Arvinen-Barrow, M. M. (2013). Psychosocial aspects of athletic injuries as perceived by athletic trainers. *Journal of Athletic Training, 48*, 512-521.
- Clement, D., & Shannon, V. (2009). The impact of a workshop on athletic training students' sport psychology behaviors. *The Sport Psychologist, 23*, 504-522.
- Clement, D., & Shannon, V. (2011). Injured athletes' perceptions about social support. *Journal of Sport Rehabilitation, 20*, 457-470.
- Cormier, M. L., & Zizzi, S. J. (2015). Athletic trainers' skills in identifying and managing athletes experiencing psychological distress. *Journal of Athletic Training, 50*, 1267-1276.
- Covassin, T., Crutcher, B., Bleecker, A., Heiden, E. O., Dailey, A., & Yang, J. (2014). Postinjury anxiety and social support among collegiate athletes: A comparison between orthopaedic injuries and concussions. *Journal of Athletic Training, 49*, 462-468.
- Cramer Roh, J. L., & Perna, F. M. (2000). Psychology/counseling: A universal competency in athletic training. *Journal of Athletic Training, 35*, 458-465.
- Cupal, D. D. (1998). Psychological interventions in sport injury prevention and rehabilitation. *Journal of Applied Sport Psychology, 10*, 103-123.
- Curt Schilling. (2007). Retrieved from http://en.wikipedia.org/wiki/Curt_Schilling
- Davis, P. A., & Sime, W. E. (2005). Toward a psychophysiology of performance: Sport psychology principles dealing with anxiety. *International Journal of Stress Management, 12*, 363-378.
- de Heredia, R. A. S., Munoz, A. R., & Artaza, J. L. (2004). The effect of psychological response on recovery of sport injury. *Research in Sports Medicine, 12*, 15-31.
- DePalma, M. T., & DePalma, B. (1989). The use of instruction and the behavioral approach to facilitate injury rehabilitation. *Athletic Training, 24*, 217-219.
- Devantier, C. (2011). Psychological predictors of injury among professional soccer players. *Sport Science Review, 20*, 5-36.

- Driediger, M., Hall, C., & Callow, N. (2006). Imagery use by injured athletes: A qualitative analysis. *Journal of Sport Sciences, 24*, 261-271.
- ESPN.com (2013). Kevin Ware breaks bone in leg. Retrieved from http://espn.go.com/mens-college-basketball/tournament/2013/story/_/id/9118319/2013-ncaa-tournament-kevin-ware-louisville-cardinals-breaks-bone-leg-duke-blue-devils
- Evans, L., & Hardy, L. (1995). Sport injury and grief responses. A review. *Journal of Sport & Exercise Psychology, 17*, 227-245.
- Evans, L., Hare, R., & Mullen, R. (2006). Imagery use during rehabilitation from injury. *Journal of Imagery Research in Sport and Physical Activity, 1*, 1-19.
- Evans, L., Wadey, R., Hanton, S., & Mitchell, I. (2012). Stressors experienced by injured athletes. *Journal of Sport Sciences, 30*, 917-927.
- Faris, G. J. (1985). Psychologic aspects of athletic rehabilitation. *Clinics in Sports Medicine, 4*, 545-551.
- Fawkner, H. J. (1995). *Predisposition to injury in athletes: The role of psychosocial factors*. Unpublished master's thesis, University of Melbourne, Australia.
- Fawkner, H. J., McMurray, N. E., & Summers, J. J. (1999). Athletic injury and minor life events: A prospective study. *Journal of Science and Medicine in Sport, 2*, 117-124.
- Filby, W. C. D., Maynard, I. W., & Graydon, J. K. (1999). The effect of multiple-goal strategies on performance outcomes in training and competition. *Journal of Applied Sport Psychology, 11*, 230-246.
- Ford, I. A., Eklund, R. C., & Gordon, S. (2000). An examination of psychosocial variables moderating the relationship between life stress and injury time-loss among athletes of a high standard. *Journal of Sports Sciences, 18*, 301-312.
- Granito, V. J. (2001). Athletic injury experience: A qualitative focus group approach. *Journal of Sport Behavior, 24*, 63-82.
- Hagger, M. S., Chatzisarantis, N. L. D., & Griffin, M. (2004). Coping with sports injury: Testing a model of self-regulation in a sports setting. In D. Lavallee, J. Thatcher, & M. V. Jones (Eds.), *Coping and emotion in sport* (pp. 105-130). Hauppauge, NY: Nova Science Publishers.
- Hanson, S. J., McCullagh, P., & Tonymon, P. (1992). The relationship of personality characteristics, life stress, and coping resources to athletic injury. *Journal of Sport and Exercise Psychology, 14*, 262-272.
- Hardy, C. J., O'Connor, K. A., & Geisler, P. R. (1990). The role of gender and social support in the life stress injury relationship. *Proceedings of the Association for the Advancement of Applied Sport Psychology, Fifth Annual Conference (Abstract)*, 51.
- Heil, J., Wakefield, C., & Reed, C. (1998). Patient as athlete: A metaphor for injury rehabilitation. In K. F. Hays (Ed.), *Integrating exercise, sports, movement and mind: Therapeutic unity* (pp. 21-39). Binghamton, NY: Haworth Press.

- Hutchison, M., Mainwaring, L. M., Comper, P., Richards, D. W., & Bisschop, S. M. (2009). Differential emotional responses of varsity athletes to concussion and musculoskeletal injuries. *Clinical Journal of Sports Medicine, 19*, 13–19.
- Ievleva, L., & Orlick, T. (1991). Mental links to enhanced healing: An exploratory study. *Sport Psychologist, 5*, 25–40.
- Ievleva, L., & Orlick, T. (1993). Mental paths to enhanced recovery from a sports injury. In D. Pargman (Ed.), *Psychological bases of sport injuries* (pp. 219–245). Morgantown, WV: Fitness Information Technology.
- Ivarsson, A., & Johnson, U. (2010). Psychological factors as predictors of injuries among senior soccer players. A prospective study. *Journal of Sports Science and Medicine, 9*, 347–352.
- Ivarsson, A., Johnson, U., Andersen, M.B., Tranaeus, R., Stenling, A., & Lindwall, M. (2017). Psychosocial factors and sport injuries: Meta-analysis for prediction and prevention. *Sports Medicine, 47*, 353–365. doi:10.1007/s40279-016-0578-x
- Ivarsson, A., Johnson, U., & Podlog, L. (2013). Psychological predictors of injury occurrence: A prospective investigation of professional Swedish soccer players. *Journal of Sport Rehabilitation, 22*, 19–26.
- Johnson, U. (2011). Athletes' experiences of psychosocial risk factors preceding injury. *Qualitative Research in Sport, Exercise and Health, 3*, 99–115.
- Johnson, U., Ekengren, J., & Andersen, M. B. (2005). Injury prevention in Sweden: Helping soccer players at risk. *Journal of Sport and Exercise Psychology, 27*, 32–38.
- Johnson, U., & Ivarsson, A. (2011). Psychological predictors of sport injuries among junior soccer players. *Scandinavian Journal of Medicine & Science in Sports, 21*, 129–136.
- Johnson, U., Ivarsson, A., Karlsson, J., Hagglund, M., Walden, M., & Borjesson, M. (2016). Rehabilitation after first-time anterior cruciate ligament injury and reconstruction in female football players: A study of resilience factors. *BMC Sports Science, Medicine and Rehabilitation, 8*. doi: 10.1186/s13102-016-0046-9
- Johnston, L. H., & Carroll, D. (2000). The psychological impact of injury: Effects of prior sport and exercise involvement. *British Journal of Sports Medicine, 34*, 436–439.
- Kerr, G., & Minden, H. (1988). Psychological factors related to the occurrence of athletic injuries. *Journal of Sport and Exercise Physiology, 37*, 1–11.
- Kevin Ware. (2018). Retrieved from https://en.wikipedia.org/wiki/Kevin_Ware
- Kleinert, J. (2007). Mood states and perceived physical states as short term predictors of sport injuries: Two prospective studies. *International Journal of Sport and Exercise Psychology, 5*, 340–351.
- Kubler-Ross, E. (1969). *On death and dying*. New York, NY: Macmillan.
- Larson, G. A., Starkey, C., & Zaichkowsky, L. D. (1996). Psychological aspects of athletic injuries as perceived by athletic trainers. *Sport Psychologist, 10*, 37–47.
- Lavalley, L., & Flint, F. (1996). The relationship of stress, competitive anxiety, mood state, and social support to athletic injury. *Journal of Athletic Training, 31*, 296–299.

- Liston, K., Reacher, D., Smith, A., & Waddington, I. (2006). Managing pain and injury in nonelite rugby union and rugby league: A case study of players at a British university. *Sport in Society*, 9, 388-402.
- Loundagin, C., & Fisher, L. (1993, October). *The relationship between mental skills and enhanced injury rehabilitation*. Paper presented at the annual meeting of the Association for the Advancement of Applied Sport Psychology, Montreal, Quebec.
- Lu, F. J. H., & Hsu, Y. (2013). Injured athletes' rehabilitation beliefs and subjective well-being: The contribution of hope and social support. *Journal of Athletic Training*, 48, 92-98.
- MacMullen, J. (2004, October 31). Schilling talked a good game—and was a man of his word. *Boston Globe*. Retrieved from <http://www.boston.com>
- Mainwaring, L. M., Bisschop, S. M., Green, R. E. A., Antoniazzi, M., Comper, P., Kristman, V.,...Richards, D. W. (2004). Emotional reaction of varsity athletes to sport-related concussion. *Journal of Sport and Exercise Psychology*, 26, 119-135.
- Malcom, N. L. (2006). "Shaking it off" and "toughing it out." Socialization to pain and injury in girls' softball. *Journal of Contemporary Ethnography*, 35, 495-525.
- Mann, B. J., Grana, W. A., Indelicato, P. A., O'Neill, D. F., & George, S. Z. (2007). A survey of sports medicine physicians regarding psychological issues in patient-athletes. *The American Journal of Sports Medicine*, 35, 2140-2147.
- Masten, R., Strazar, K., Zilavec, I., Tusak, M., & Kandare, M. (2014). Psychological response of athletes to injury. *Kinesiology*, 46, 127-134.
- McDonald, S. A., & Hardy, C. J. (1990). Affective response patterns of the injured athlete: An exploratory analysis. *Sport Psychologist*, 4, 261-274.
- McDonell, C. (2004). *Shooting from the lip*. Buffalo, NY: Firefly Books.
- Mia Hamm. (2013a). Retrieved from http://en.wikipedia.org/wiki/Mia_Hamm
- Mia Hamm. (2013b). Retrieved from http://www.searchquotes.com/search/Mia_Hamm/
- Milne, M., Hall, C., & Forwell, L. (2005). Self-efficacy, imagery use, and adherence to rehabilitation by injured athletes. *Journal of Sport Rehabilitation*, 14, 150-167.
- Misasi, S. P., Redmond, C. J., & Kemler, D. S. (1998). Counseling skills and the athletic therapist. *Athletic Therapy Today*, 3, 35-38.
- Monsma, E., Mensch, J., & Farroll, J. (2009). Keeping your head in the game: Sport-specific imagery and anxiety among injured athletes. *Journal of Athletic Training*, 44, 410-417.
- New England Patriots. (2007). Retrieved from http://en.wikipedia.org/wiki/New_England_Patriots
- Pargman, D., (Ed.). (2007). *Psychological bases of sports injuries* (3rd ed.). Morgantown, WV: Fitness Information Technology.
- Peterson, K. (2001). Supporting athletes during injury rehab. *Olympic Coach*, 11, 7-9.
- Petitpas, A., & Danish, S. J. (1995). Caring for injured athletes. In S. M. Murphy (Ed.), *Sport psychology interventions* (pp. 255-281). Champaign, IL: Human Kinetics.

- Petrie, T. A. (1992). Psychosocial antecedents of athletic injury: The effects of life stress and social support on female collegiate gymnasts. *Behavioral Medicine, 18*, 127-138.
- Petrie, T. A. (1993). Coping skills, competitive trait anxiety, and playing status: Moderating effects of the life stress-injury relationship. *Journal of Sport and Exercise Psychology, 15*, 261-274.
- Richman, J. M., Hardy, C. J., Rosenfeld, L. B., & Callahan, A. E. (1989). Strategies for enhancing social support networks in sport: A brainstorming experience. *Journal of Applied Sport Psychology, 1*, 150-159.
- Rogers, T. J., & Landers, D. M. (2005). Mediating effects of peripheral vision in the life event stress/athletic injury relationship. *Journal of Sport and Exercise Psychology, 27*, 271-288.
- Ronkainen, N. J., & Ryba, T. V. (2017). Is hockey just a game? Contesting meanings of the ice hockey life projects through a career-threatening injury. *Journal of Sports Sciences, 35*, 923-928.
- Ross, M. J., & Berger, R. S. (1996). Effects of stress inoculation training on athletes' postsurgical pain and rehabilitation after orthopedic injury. *Journal of Consulting and Clinical Psychology, 64*, 406-410.
- Ruddock-Hudson, M., O'Halloran, P., & Murphy, G. (2012). Exploring psychological reactions to injury in the Australian Football League (AFL). *Journal of Applied Sport Psychology, 24*, 375-390.
- Safai, P. (2003). Healing the body in the "Culture of Risk": Examining the negotiation of treatment between sport medicine clinicians and injured athletes from Canadian intercollegiate sport. *Sociology of Sport Journal, 20*, 127-146.
- Salim, J., Wadey, R., & Diss, C. (2015). Examining the relationship between hardiness and perceived stress-related growth in a sport injury context. *Psychology of Sport and Exercise, 19*, 10-17.
- Scherzer, C. B. (1999). *Using psychological skills in rehabilitation following knee surgery*. Unpublished master's thesis, Springfield College, Springfield, MA.
- Scherzer, C. B., & Williams, J. M. (2008). Bringing sport psychology into the athletic training room. *Athletic Therapy Today, 13*, 15-17.
- Schwab Reese, L. M., Pittsinger, R., & Yang, J. (2012). Effectiveness of psychological intervention following sport injury. *Journal of Sport and Health Science, 1*, 71-79.
- Shaffer, S. M. (1992). *Attributions and self-efficacy as predictors of rehabilitative success*. Unpublished master's thesis, University of Illinois, Champaign, IL.
- Shortway, K. M., Wolanin, A., Block-Lerner, J., & Marks, D. (2018). Acceptance and Commitment therapy for injured athletes: Development and preliminary feasibility of the return to ACTION protocol. *Journal of Clinical Sport Psychology, 12*, 4-26.
- Smith, A. M., Scott, S. G., O'Fallon, W. M., & Young, M. L. (1990). Emotional responses of athletes to injury. *Mayo Clinic Proceedings, 65*, 38-50.
- Smith, R. E., Ptacek, J. T., & Patterson, E. (2000). Moderator effects of cognitive and somatic trait anxiety on the relation between life stress and physical injuries. *Anxiety, Stress & Coping, 13*, 269-288.

- Smith, R. E., Ptacek, J. T., & Smoll, F. L. (1992). Sensation seeking, stress, and adolescent injuries: A test of stress-buffering, risk-taking, and coping skills hypotheses. *Journal of Personality and Social Psychology, 62*, 1016-1024.
- Smith, R. E., Smoll, F. L., & Ptacek, J. T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support and coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology, 58*, 360-369.
- Sordoni, C., Hall, C., & Forwell, L. (2000). The use of imagery by athletes during injury rehabilitation. *Journal of Sport Rehabilitation, 9*, 329-338.
- Striegel, D. A., Hedgpeth, E. G., & Sowa, C. J. (1996). Differential psychological treatment of injured athletes based on length of rehabilitation. *Journal of Sport Rehabilitation, 5*, 330-335.
- Tracey, J. (2003). The emotional response to the injury and rehabilitation process. *Journal of Applied Sport Psychology, 15*, 279-293.
- Tracey, J. (2008). Inside the clinic: Health professionals' role in their clients' psychological rehabilitation. *Journal of Sport Rehabilitation, 17*, 413-431.
- Udry, E., Gould, D., Bridges, D., & Beck, L. (1997). Down but not out: Athlete responses to season-ending injuries. *Journal of Sport and Exercise Psychology, 19*, 229-248.
- Van der Sluis, A., Brink, M. S., Plum, B., Verhagen, E. A., Elferink-Gernser, M. T., & Visscher, C. (2017). Is risk-taking in talented junior tennis players related to overuse injuries? *Scandinavian Journal of Medicine & Science in Sports, 27*, 1347-1355. doi:10.1111/sms.12729
- Van Mechelen, W., Twisk, J., Molendijk, A., Blom, B., Snel, J., & Kemper, H. C. G. (1996). Subject-related risk factors for sports injuries: A 1-yr prospective study in young adults. *Medicine and Science in Sports and Exercise, 28*, 1171-1179.
- Van Rosen, P., Kottorp, A., Friden, C., Frohm, A., & Heijne, A. (2018). Young, talented, and injured: Injury perceptions, experiences, and consequences in adolescent elite athletes. *European Journal of Sport Science, 18*, 731-740.
- Wadey, R., Clark, S., Podlog, L., & McCullough, D. (2013). Coaches' perceptions of athletes' stress-related growth following sport injury. *Psychology of Sport and Exercise, 14*, 125-135.
- Wadey, R., Evans, L., Evans, K., & Mitchell, I. (2011). Perceived benefits following sport injury: A qualitative examination of their antecedents and underlying mechanisms. *Journal of Applied Sport Psychology, 23*, 142-158.
- Wadey, R., Evans, L., Hanton, S., & Neil, R. (2012a). An examination of hardiness throughout the sport injury process. *British Journal of Health Psychology, 17*, 103-128.
- Wadey, R., Evans, L., Hanton, S., & Neil, R. (2012b). An examination of hardiness throughout the sport-injury process: A qualitative follow-up study. *British Journal of Health Psychology, 17*, 872-893.
- Wadey, R., Evans, L., Hanton, S., & Neil, R. (2013). Effect of dispositional optimism before and after injury. *Medicine and Science in Sports and Exercise, 45*, 387-394.

- Wayda, V. K., Armenth-Brothers, F., & Boyce, B. A. (1998). Goal-setting: A key to injury rehabilitation. *Athletic Therapy Today*, 3, 21-25.
- Wesch, N., Callow, N., Hall, C., & Pope, J. P. (2016). Imagery and self-efficacy in the injury context. *Psychology of Sport and Exercise*, 24, 72-81.
- Wiese-Bjornstal, D. M., Smith, A. M., Shaffer, S. M., & Morrey, M. A. (1998). An integrated model of response to sport injury: Psychological and sociological dynamics. *Journal of Applied Sport Psychology*, 10, 46-69.
- Williams, J. M., & Andersen, M. B. (1997). Psychosocial influences on central and peripheral vision and reaction time during demanding tasks. *Behavioral Medicine*, 26, 160-167.
- Williams, J. M., & Andersen, M. B. (1998). Psychosocial antecedents of sport injury: Review and critique of the stress and injury model. *Journal of Applied Sport Psychology*, 10, 5-25.
- Williams, J. M., & Andersen, M. B. (2007). Psychosocial antecedents of sport injury and interventions for risk reduction. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of research in sport psychology* (3rd ed., pp. 379-403), Hoboken, NJ: John Wiley & Sons.
- Williams, J. M., Hogan, T. D., & Andersen, M. B. (1993). Positive states of mind and athletic injury risk. *Psychosomatic Medicine*, 55, 468-472.
- Williams, J., Tonymon, P., & Wadsworth, W. A. (1986). Relationship of stress to injury in intercollegiate volleyball. *Journal of Human Stress*, 12, 38-43.
- Woop my life. (n. d.). Retrieved from <http://woopmylife.org/>
- Yang, J., Schaefer, J. T., Zhang, N., Covassin, T., Ding, K., & Heiden, E. (2014). Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *Journal of Athletic Training*, 49, 773-779.
- Zach, S., Dobersek, U., Filho, E., Inglis, V., & Tenenbaum, G. (2018). A meta-analysis of mental imagery effects on post-injury functional mobility, perceived pain, and self-efficacy. *Psychology of Sport and Exercise*, 34, 79-87.
- Zakrajsek, R. A., Martin, S. B., & Wisberg, C. A. (2015). Sport psychology services in performance settings: NCAA D-I certified athletic trainers' perceptions. *Sport, Exercise, and Performance Psychology*, 4, 280-292.
- Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Erlbaum.