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Coping With Injury: How High-Performance Athletes Mitigate the Biopsychosocial Consequences of Sports Injury

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Abstract

In this paper, I examined various coping methods that high-performance athletes use to recover from injury in order to determine if further research is warranted. To meet the research purpose of this paper, literature available on coping mechanisms that injured high-performance athletes use to recover from their injuries was reviewed, with a focus on discussions about sports' injury statistics, stressors, coping theories, intervention, and consequences for not coping with injury properly. Furthermore, conclusions drawn from the review were provided, as well as recommendations for future inquiry on meeting injured athletes' coping needs. Overall, it appears that enough information is not currently available to cover the magnitude of coping mechanisms being used by injured high-performance athletes to recover from their sport related injuries. Additionally, Researchers are still searching for a comprehensive coping theory that will address the coping needs of high- performance injured athletes. Gaining a good understanding of the coping needs of high-performance athletes will aid medical personnel, athletic trainers, and other care givers to provide better care that is germane to the needs of high-performance athletes seeking to recover from their sports' related injuries. Discussions in this paper also help to identify the emerging literature available on coping mechanisms injured athletes use to recover from injuries.

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Introduction

Sports injuries present a significant threat to the athletes seeking to attain their career goals (Santi & Pietrantoni, 2013, O'Connor et al., 2005). Information on coping strategies utilized by athletes recovering from sports injuries have huge implications for the medical personnel, athletic trainers, care givers, and sports psychology practitioners as it provides the foundational basis for intervention (Holt, 2003). The purpose of this paper is to review literature that appear to be relevant to understanding coping needs of injured athletes seeking to recover from their injuries and to determine if further research is warranted. To meet the research purpose of this paper, sports injury statistics, stressors, and coping methods will be reviewed, followed by conclusions drawn from the review, and recommendations for future inquiry on meeting the injured athletes' coping needs.

Sports play an immense role in contemporary society worldwide. From the soccer entrenched towns of Nigeria to the highly revered football towns spanning the United States, sports have become a common denominator amongst nations across the world. Athletics is a socially constructed activity which individuals are surrounded by and encouraged to participate in from a young age all the way into adulthood.

For athletes, their sport becomes an integral part of their identity, because so much of an athlete's time is devoted to play, preparation, and training. For this

reason, when an athlete loses the ability to play because of an accidental injury, it can take a major toll on them emotionally. Hart (2009) states, "when an athlete's self-identity is reliant on success, injury shatters the fragile self-esteem" (p. 45). The loss that they feel is comparable to any other major loss that changes the way that someone would live their life. Because of this, athletes and their caregivers should be given the information and resources to aid in alleviating the athletes' sense of loss in a healthy and productive manner. Emotional counseling, for example, is critical to injured athlete recoveries; however, because emotional counseling is often stigmatized in many athletic communities, there is a lack of information and resources for athletes that are coping with the temporary or permanent loss of their ability to compete in their sport. The first step in resolving this problem is finding a way to identify the coping methods that injured athletes are using, and disseminating that information in a way that is non-stigmatizing.

Injury Statistics

According to the National Collegiate Athletic Association (NCAA) Injury Surveillance data from 2004-2009, there were 41,000 injuries in football, 55,000 injuries in women's soccer, 55,000 injuries in men's soccer, 10,000 injuries in field hockey, and over 26,000 injuries in women's volleyball (National Collegiate Athletic Association, 2012a, 2012b, 2012c, 2012d, 2012d, 2012e). In total, 187,000 athletes were injured within a five-year span in these four sports alone. This means that more than 187,000 athletes suffered through injury and had to cope and rehabilitate properly in order to return to play. It is important to consider the cognitive, behavioral, and emotionally challenging aspects of managing an athletic injury (Bejar, 2013). Because of this, continued efforts must be made to aid athletes during this time of tribulation and uncertainty.

In order for athletes to remain competitive at a high level, it is no longer adequate to train solely in-season. Athletes must exercise, train, diet, and fine-tune their craft year-round, in order to excel during the regular season. Because more women are participating, more sports are being offered, and athletes are generally getting bigger, faster, and stronger, the likelihood and occurrence of injury has significantly increased. High contact sports that involve running, tackling, and jumping tend to induce a higher percentage of injuries in the lower extremities, especially the knee. Knee injuries, including articular damage, are common in football players and have the potential to be career-ending (Scillia et al., 2015).

Thus, this section will pay particular attention to sports related knee injuries. Most players entering the NFL draft are less than 22 years of age and are at the pinnacle of physical condition. Unfortunately, many of these athletes' knees have deteriorated to levels far beyond their chronologic age (Hirshorn et al., 2010). The issue with articular cartilage injuries lies within the limited capability of the cartilage to heal itself (Scillia et al., 2015). Fortunately, there are procedures that aid in restoring the knee's utility. Hirshorn et al., (2010) describes arthroscopic chondroplasty or chondral debridement to be a "minimally invasive technique often utilized to alleviate the pain, mechanical symptoms, and recurrent effusions associated with symptomatic articular cartilage lesions of the knee and has been reported to be efficacious" (p. 664).

According to Kezunović et al., (2013) over 55% of all sports-related injuries are incurred in the knee joint. Scillia et al., (2015) found that an alarming 54% of collegiate athletes who attended the annual NFL Combine held for prospective players had suffered some type of knee injury prior to participating. Scillia et al., (2015) describes that articular cartilage damage accounts for a significant portion of these injuries. Interestingly enough, the prevalence of full-thickness articular cartilage defects of the knee identified by magnetic resonance imaging (MRI) at the NFL Combine has been reported to be 20% (Scillia et al., 2015). This means that nearly 1/5 of elite collegiate athletes selected to participate in the NFL Combine suffer from articular defects of the knee. Athletes who suffer from this problem are more likely to report symptoms such as persistent joint line pain, swelling, and

catching of the knee. Scillia et al., (2015) explains that the cartilage of the knee is at risk of injury during collision and cutting sports such as American Football and tend to be more common as athletes reach the highest level, such as the NFL. Hirshorn, Cates, & Gillogly (2010) also conducted a study on prospective collegiate athletes attending the NFL Combine over a three- year span, 2005-2007, and found that 8% of NFL Combine attendees had multiple chondral lesions in the knee, 4% had isolated lateral femoral chondral lesions, 5% had isolated patellofemoral chondral damage, and 3% had isolated medial femoral condyle lesions (Hirshorn et al., 2010). Their study implies that of the total 980 athletes available for analysis, approximately 327 players per year invited to participate in the NFL Combine, 197 (20. 1%) players had full-thickness chondral injuries evident on MRI, or 38. 2% of players who had the MRI scan (Hirshorn et al., 2010). Of those players, 30 (3. 06%, or 5. 8% of players with MRI scans) had an isolated medial compartment full-thickness chondral injury, 41 (4. 2%, or 7. 9%) had an isolated lateral compartment full-thickness chondral injury, 48 (4. 9% or 9. 3%) had isolated patellofemoral compartment full-thickness chondral damage, and 78 (7. 96%, or 15. 1%) had full-thickness chondral injuries in more than one compartment (Hirshorn et al., 2010).

The knee is not only injured in high contact sports such as football, but also, lower impact sports such as volleyball. Kezunović, (2013) illustrates that due to the anatomical structure of the knee "it is the most frequently injured region not only in acute injuries, but also as a result of overuse" (Kezunović, 2013, p. 29). Volleyball is a game comprised of the art of jumping, setting, hitting, and spiking. For this reason,

jumper's knee as an overuse syndrome is one of the most common injuries that happens in sports such as this which employs a large number of jumps. Jumper's knee occurs because "the strength of the front thigh muscles (quadriceps) is significantly higher than the posterior muscle group (biceps femorisa) which consequently leads to the enthesopathy of proximal and distal insertion of the patella" (Kezunović, 2013, p. 29). In other words, constant jumping, landing, and change of direction causes inflammation and injury to the patellar tendon (cord-like tissue that joins the knee cap to the shin bone). This then leads to pain within the knee joint.

Kezunović, (2013) states that the knee is the most frequently injured region and that 45% of elite male volleyball players have endured hardships of this type during their careers (Kezunović, 2013). During a five-year research study, Kezunović, (2013) explains that 26. 4% of athletes among 2,762 with knee disorder who were treated in an outpatient unit have had jumper's knee. This is why some believe this injury to have a greater occurrence than any other knee injury like meniscus tear or anterior cruciate ligament (ACL) tear (Kezunović, 2013).

There is excessive data on injuries in male soccer players, but as (Faude, Junge, Kindermann, & Dvorak, 2005) explain, only a few prospective studies have analyzed incidence rates and risk factors in female soccer players (Faude et al., 2005). Hence the birth of their study, *Injuries in Female Soccer Players: A Prospective Study in the German National League.* Comparisons across the sport are different and contradictory results may come about (Faude et al., 2005). For

example, higher injury rates in women compared to men have been reported (Faude et al., 2005). Although this assumption was based on the findings of just one study of elite female players, the author attributed this to "a lower technique and skill level, as well as a lack of physical fitness in women" (Faude et al., 2005, p. 1695). Junge et al., (2004) counter this by citing their findings of greater incidence rates in male soccer players during tournaments (FIFA World Cup and Olympic Games).

The Junge et al. study consists of 165 elite female soccer players (age, 22. 4± 5. 0 years) from 9 teams competing in the German national league, who were followed for one complete outdoor season (Faude et al., 2005). The surveillance of these elite athletes was documented by their respective trainers. Trainers documented each athlete's exposure to soccer on a weekly basis and the team physical therapists reported all injuries with regard to location, type, and circumstances of occurrence (Faude et al., 2005, p. 1694). An injury was defined as any physical complaint associated with soccer that limited a player's participation for at least one day (Faude et al., 2005).

Faude et al., (2005) found on average, each player spent 183 hours in training and 31 hours in matches (Faude et al., 2005). During the 2003-2004 seasons, 241 injuries sustained by 115 players (70%) were reported (Faude et al., 2005). The overall incidence rate was 6. 8 injuries per 1000 hours of soccer exposure. There were 39 injuries (16%) classified as overuse injuries and 202 (84%) as traumatic. Overall, 84 (42%) of the traumatic injuries occurred during training and 118 (58%) during a match (Faude et al., 2005). This finding

corresponds to an incidence rate of 2. 8 per 1000 hours of training and 23. 3 per 1000 match hours (Faude et al., 2005). They also found that 81% of all injuries (n=196) were first-time injuries, whereas the remaining 19% (n=45) were recurrent injuries (Faude et al., 2005). They found most injuries (n= 194, 80%) occurred at the lower extremities in the elite female soccer players, more specifically the thigh (n=44), the knee (n= 45), and the ankle (n= 43) (Faude et al., 2005). Overall, the most frequent types of injuries were sprains (n=80), contusions (n=57), and strains (n=42) (Faude et al., 2005). Ankle sprain (n= 37, including 14 ligament ruptures) was the single most diagnosed injury (Faude et al., 2005). Also, strains (n= 23) of the thigh muscles as well as knee sprains (n= 23, 14 ligament ruptures) were often diagnosed (Faude et al., 2005). Further research found that more than half of the severe injuries in the elite female soccer participants were located at the knee, including 11 anterior cruciate ligament (ACL) ruptures sustained by 10 players (Faude et al., 2005). This statistic corresponds to an incidence rate of 2. 2 ACL ruptures per 1000 match hours.

Coping Theories

Coping with the psychological and emotional aspects of injury is one of the most overlooked aspects of recovery from athletic injury today. At the core of coping and rehabilitation sits the concept of motivation, which motivational theory describes as a psychological mechanism that incites an individual to work towards a desired goal (Graham & Weiner, 1996). Motivational psychologists study the behaviors that people choose to engage in, how long it takes them to start those behaviors, the intensity with which they do the behaviors, and how long they practice the behavior (Graham & Weiner, 1996). One such study, conducted by Brookefield & Wilson (2009), describes how athletes engaged in a six-week exercise program. Those who set goals that they had to meet were more motivated and had better adherence to the program than those who did not set goals. In this sense, they used goal setting to spark a psychological "need" for the athletes to persevere.

In relation to stress and coping theories, Richard Lazarus, in his book *Fifty Years of Research and Theory*, discusses "The Stress and Coping Paradigm. "In this paper, he defines a scientific paradigm as a set of interrelated assumptions about certain classes of phenomena, which contains a closely linked set of methods or procedures for observing and analyzing these phenomena (Lazarus, 1998). Stress is induced by life events. Lazarus illustrates that stress is defined by each individual person and that no two people experience stressful events in exactly the same way (Lazarus, 1998). Each individual has a specific tolerance for stress depending on

his/her general level of adjustment, the internal and external resources available to that person, flexibility of learned coping mechanisms and the degree and type of stress being experienced (Lazarus, 1998). The rise in stress that results from emotionally hazardous situations motivates the individual to bring into play coping mechanisms or problem-solving behaviors (Lazarus, 1998).

Post-Injury Response and Outcome

The Integrated Model of Psychological Response to the Sport Injury and Rehabilitation Process aims to explain and predict how effective the injured athlete will be as they work towards recovery from injury. According to the model, the athletes' cognitions, feelings, and behaviors all influence each other and a successful outcome is dependent on all three of these aspects (Wiese-Bjornstal, 2010). In other words, the athletes' cognitions or thoughts about their injury can be influenced by their emotional state and their behaviors during rehabilitation. Conversely, their cognitions can influence their emotional state and behavior. The reciprocal relationship between all three factors regulates the rehabilitation process. It is most easily explained by a cyclical model (figure 1).

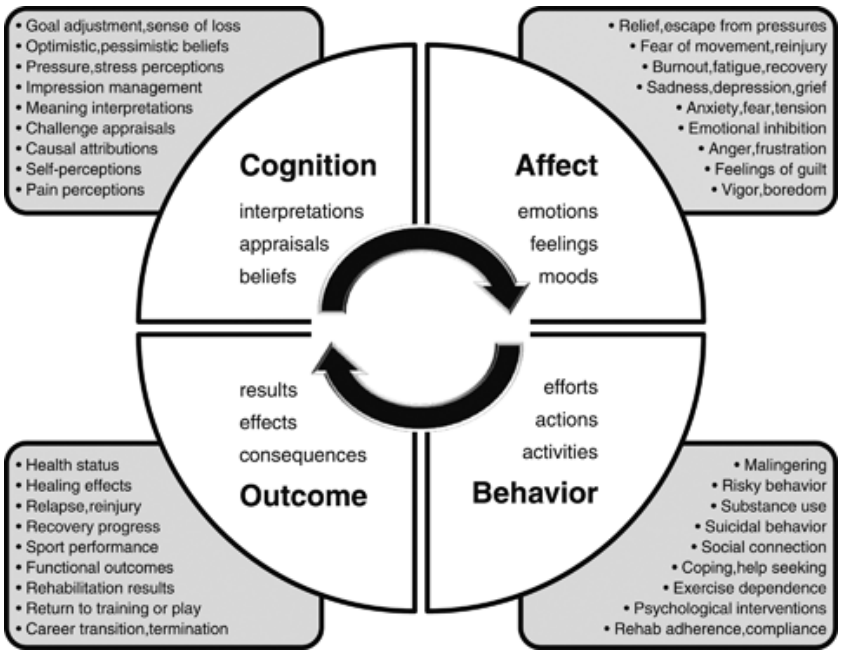

Figure 1. Illustration of The Integrated Model of Psychological Response to the Sport Injury and Rehabilitation Process. Source: Wiese-Bjornstal, D. M. "Psychology and Socioculture Affect Injury Risk, Response, and Recovery in High-intensity Athletes: A Consensus Statement." *Scandinavian Journal of Medicine & Science in Sports* 20 (2010): 103-11.

A major aspect of this post-injury response becomes the actual injury itself. The injury becomes a major stressor in the athletes' life that dominates their thoughts, emotions, and actions. An injured athlete's rehabilitation process can be physically and mentally stressful. Physically, an athlete must adhere to rehabilitation set forth by a trained professional, properly re-train the muscles which have atrophied due to non-use, and consistently weight train the surgically repaired ligament or muscles far after the rehabilitation or return-to-play period has come to pass. But more importantly, the athlete's cognitive cycles must remain as optimistic as humanly possible to maintain the driving force behind his/her behaviors.

Typically, there are only a small number of exercises dedicated to rehabilitating each injury. While mastering these exercises may be easy, the difficulty lies in repeating them over and over again. As the surgically repaired ligament or muscle becomes stronger, the repetitions increase. As the injured athlete begins to feel "like new" or close to his/her normative state prior to the injury, alternative emotional responses may begin to arise. Fears of re-injury are common as well as fears of pain and movement. This is called kinesiophobia (Wiese-Bjornstal, 2010). Especially after the athlete has endured the traumatic event of having his/her season or exercise activity taken away, but has also traversed the tough path of rehabilitation.

Emotional responses associated with stress, such as anger and depression, negatively affect wound healing by inhibiting the athlete mentally. Mental inhibition can be a major problem in the rehabilitation process, given the ubiquitous effects of socioculture and constant need to demonstrate toughness. Different types of injuries may elicit different types of responses amongst athletes. As Wiese-Bjornstal, (2010) notes, characteristics of the injury are very important. The severity of the injury is often linked to the short- and long-term affective responses. Such is evident in the case of recurrent concussions and long-term risk depression (Wiese-Bjornstal, 2010). Some athletes may utilize social support networks as a means of coping with their injury. The effectiveness of this mechanism of stress and anxiety relief is dependent upon the athlete's perception of availability and comfort with help seeking (Wiese-Bjornstal, 2010). Mental models and itineraries are

correlated to successful outcomes and the restoration of positive self-concepts over the injury lifespan (Wiese-Bjornstal, 2010).

Stressors and Coping Methods

In the context of athletics, stress can be defined as any kind of threat or pressure felt by the athlete. This includes physical and psychological stressors. Researchers have been focusing their efforts on studying sports stress because studies have shown that stress can impede performance by inhibiting vigor, self-efficacy, accuracy, and ability to cope (Nwanko & Onyishi, 2012). While these characteristics are important in sport performance, they are also important for rehabilitation. Often times, psychological stress can have physical manifestations. It has been shown that athletes dealing with psychological stress tend to have increased muscle tension as well as decreased coordination (American College of Sports Medicine 2006). Stress manifested in this way would make rehabilitation significantly more difficult for injured athletes that wish to return to their sports. Fortunately, there is evidence that injury rates are reduced when athletes are taught to implement stress management techniques (American College of Sports Medicine 2006). Because of this, decreasing stress may increase an athlete's ability to cope with injury and make rehabilitation efforts more effective.

Athletes recovering from injury, experience many stressors that can impede them from physically and emotionally healing during the rehabilitation process. The stressors can come from within one's self or stem from external factors such as peers, coaches, family, and/or scouts. In a 2010 study conducted by Rees et al., (2010), the relationship between social support and psychological

responses to injury was examined for low-performance standard and high-performance standard athletes. Stressor level was examined as a moderator pertaining to the relationship between social support and psychological response. For instance; on every team, players understand that there are different roles to be assumed. There are starters, back-ups, practice players, and walk-ons. Let's look more specifically at the composition of a football team. In this case, a high-performance standard athlete would be the preferential starter along with his backup. Low-performance standard athletes would be walk-ons and practice players. In the study, high-performance standard athletes had better psychological responses to injury when they felt that they were getting high levels of social support. This effect was independent of their levels of stressors. Low-performance standard athletes also had better psychological responses to injury when they had higher levels of social support; however this relationship was buffered by the levels of stressors that they experienced (Rees et al., 2010). This is an interesting finding because it seems that as long as high-performance standard athletes have a strong support system, they will be able to cope with the stress that they encounter. This finding makes sense because so much of a high-performance standard athlete's identity is built around the fact that other people regard them as talented and respect their contribution to the team. As long as they continue to be regarded in this way, they will be able to cope with stress in a healthy way. When a high-performance standard athlete becomes seriously injured, this can be extremely problematic because injured players are not regarded as assets to the team. This is

due to the fact that they cannot directly aid the team in reaching its goals. Therefore, stressors related to injury of high-performance standard athletes must be particularly hard to cope with because they do not have the same support system of fans and their teammates that they have grown accustomed to prior to their injuries.

Pain as a Physical Stressor

Athletes that excel at their sport often deal with pain on a regular basis, even when they are not injured. Because of this, it is common for them to try to return to their normal activities more quickly than they usually would following an injury, despite the pain that the injury is causing. This can lead to poor physical and psychological health outcomes for the athlete.

It is important to acknowledge and react to pain appropriately because pain is the body's way of letting us know that something is wrong. However, different people can experience pain differently. Athletes have a higher tolerance for pain than normally active adults (Tesarz et al., 2012). A meta-analysis of studies that examined pain tolerance in athletes and normally active adults concluded that pain threshold or the amount of stimuli needed before pain is felt was not different for athletes and non-athletes. Their ability to withstand pain (pain tolerance) was significantly greater (Tesarz et al., 2012). This is a notable distinction because it's not that athletes feel less pain, they are just able to deal with it better. There is also evidence that athletes in contact sports have a higher pain tolerance than athletes in

non-contact sports (Canter et al., 2012). A research study on pain tolerance of athletes in contact sports found that these athletes were able to withstand a more painful task for much longer than athletes in non-contact sports. In addition, when asked how much pain they would have to be in to discontinue playing, they elected to play through significantly more pain (Canter et al., 2012). Athletes that tend to ignore their pain should be monitored very closely during rehabilitation. If they push themselves too hard and ignore the limits that their injuries place on them, they can cause more damage, which will lead to longer recovery time (Manschreck & O'Connell, 2012).

Coping Methods

When people experience traumatic events or major losses in their lives, they often have intense emotional responses. Some may experience grief and sadness, while others experience anger or seem devoid of any emotion whatsoever. Although it is hard to watch loved ones go through this, most people understand that these reactions are normal and that the person will eventually return to their normal disposition. Generally, the model that is observed after an extremely distressing event is as follows: there is a period of grieving during which the person has a marked change in temperament; next the person works through their grief by using some method of coping to explore their feelings; and finally, the person resolves their feelings and re-adjusts so that they can return to the way they used to be (Wortman & Silver, 1988). There are many different methods of coping and the

coping process can be unique for each individual. While there is not one correct way to cope, there are many coping strategies that hinder people from recovering from their distress and lead to maladaptive behaviors.

Maladaptive Ways of Dealing with Injury

It is not uncommon for people to go through denial when something devastating happens to them. This is the first of two primary maladaptive ways of dealing with injury. Denial is our brain's way of protecting us against extremely hurtful or disturbing situations. Someone going through denial tries to convince him or herself that what they have experienced is not real or that the consequences of the situation aren't as bad as they seem. While most professionals don't encourage people to stay in denial, it can sometimes be a helpful coping method. For example, it can help a terminally ill patient to maintain an optimistic outlook on prolonging his or her life. On the contrary, a football player who has suffered a torn anterior cruciate ligament will be told the opposite. That denial will be detrimental to his timetable of returning to the field of play. Norup, Siert, & Mortensen, (2013) agree that some authors argue that denial might serve as a protective factor in terms of avoiding the pain associated with sudden loss (in this case the suspension of an athlete's return to play), but in the long run denial is considered maladaptive thus creating even more distress (Norup, Siert, & Mortensen, 2013).

The second primary maladaptive way of dealing with injury is depression. Depression is a debilitating mental illness that can have serious implications on an

athlete's life. It is especially important to monitor for symptoms of depression in injured athletes because they are six times more likely to suffer from depression than non-injured athletes (Manschreck & O'Connell, 2012). Research shows that injured athletes follow a five-stage grief response process (Hart, 2009) which includes denial, anger, bargaining, depression, and acceptance/reorganization. Although most injured people typically experience some or all of these emotions, there is no set timeline for how long individuals linger in each stage. An injured athlete may experience a plethora of emotions all at the same time or even revert back to a previous stage of the grief response process (Hart, 2009).

Matthew Pearce, Head Athletic Trainer/Myotherapist at the AFL Richmond Football Club and the AFL Trainers Association President explains in his article, "Being there: Sports Trainers and Depression in Athletes" that the pressures of elite sports affect many top-tier athletes in various ways. Some thrive in this environment, while others seek other pathways to mitigate pressure resulting in suffering (sometimes silently) from the effects of depression (Pearce, 2014). Pearce, (2014) further explains that depression or other mental illnesses are non-discriminatory. They do not merely affect back-up players but also what he refers to as "the weekend warrior" (p. 64), a player or players who are ready to perform at the highest level; giving unrelenting effort during games or competition. On any given sports team, it is probable that at least one player is suffering or has suffered from depression or mental illness (Pearce, 2014).

The first major step in overcoming depression or mental illness is identifying it. Pearce, (2014) explains that signs and symptoms of depression can vary from one person to another and some of the symptoms may be part of a normative 'low' within a person's life. But if a person experiences these symptoms for an extended period of time or they seem to be getting stronger, then the person should seek help (Pearce, 2014). A lack or loss of energy is one of these symptoms. Even completing the smallest task may seem mentally and/or physically exhausting. Irritability is another symptom in which athletes may start displaying a short temper or act as if everything 'gets on their nerves' (Pearce, 2014). Athletes who are suffering mentally may also become extremely critical of their own faults and mistakes. It is normal for elite athletes to criticize their own work, but if an athlete does this more than normal then it may be an indicator of a deeper psychological issue (Pearce, 2014).

During rehabilitation, athletes can be hypercritical of themselves because they are constantly looking for progress to be made towards their goal of returning to normal activity. This may be a partial explanation as to why athletes that require longer rehabilitation periods are more likely to become depressed than athletes with shorter rehabilitation periods (Manschreck & O'Connell, 2012). A more obvious external symptom of mental illness is unexpected weight loss or gain. Psychological issues can cause athletes to venture to the extremes when it comes to weight due to fluctuations in appetite. Athletes may also show a sudden loss of interest in favorite hobbies and pastimes and may also withdraw from social groups

and decline to attend social events or outings (Pearce, 2014). A lack of concentration and display of reckless behavior have also shown to be a public display of a deeper psychological issue taking place within troubled athletes. Finally, Pearce, (2014) describes aches and pains to be an interesting symptom of psychological uneasiness. Although aches and pains are completely normal in sports, some athletes may experience headaches, back pain, stomach pains, and muscular aches and pains that cannot be attributed to any specific injury, play, or physical movements, which could be an indicator for possible undiagnosed clinical depression (Pearce, 2014).

For athletes, coping with injury is important because it is harder to recover physically when in a bad mental state. If distress from the injury is dominating all of their thoughts, then they won't be able to focus on their physical recovery (Hedgpeth & Sowa, 1998). Recovering from a serious injury takes determination and consistency. Hart (2009) adds that recovery is quicker and more complete when athletes maintain a positive mindset But to do this "requires a great deal of strength to overcome sadness, hopelessness, frustration, and fear that threaten all that you are and hope to become. The choice is yours. " (Hart, 2009, p. 44).

Positive Ways of Dealing with Injury

Ultimately, the choice to overcome the injury and return to play, or conversely, to succumb to the injury and quit, lies solely within the athletes mind. Dr. Stoltz states in his book, *The Adversity Advantage: Turning Everyday Struggles*

Into Everyday Greatness, "setbacks are inevitable, but misery is a choice" (Weihenmayer, Stoltz, & Stoltz, 2008, xvii). (Weihenmayer, Stoltz, & Stoltz, 2008) goes on to explain an extremely important and vital dichotomy in which all athletes must understand, "Between stimulus and response, there is a space. In that space lie our freedom and power to choose our response. In those choices lie our growth and our happiness." (Weihenmayer, Stoltz, & Stoltz, 2008, xi). This is an extremely powerful quote that when put into practice, explains Hart (2009), will change not only your attitude towards your sport but also your attitude towards life. This illustrates that if an athlete maintains a positive perspective, when adversity strikes they can emerge from the turmoil faster and stronger than ever. Instead of "enduring an injury with a sigh of despair and resignation, [athletes should] seek a deeper knowledge of the injury, therapy options, and the possible causes" (Hart, 2009). Hart (2009) explains that an athlete should use the injury to their advantage by creating a training regimen around the injury to develop any weakness such as core strength, flexibility, and efficient form. Hart (2009) believes that sometimes injuries are the body's way of forcing athletes to stop- "a sort of built-in protective mechanism" (p. 45). Research shows a strong correlation between injury and high levels of stress (Hart, 2009). Athletes with greater stress levels incur more injuries than athletes with less stress or better coping skills (Hart, 2009). She goes on to explain that if an athlete perceives competition as a threat (typically to ones ego), this increases anxiety, "which results in decreased focus, muscle tension, and subsequently— increased risk of injury" (p. 45).

Social Support

Utilizing social support networks is a great way for athletes to help mitigate the biopsychosocial effects of sports injury. Social support is broadly defined as social interactions aimed at inducing positive outcomes (Abgarov, Jeffery-Tosoni, Baker, & Fraser-Thomas, 2012). Abgarov et al., (2012) conducted an in-depth study on social support experiences during the injury process, with a narrowed concentration on social support networks, exchanges, and appraisals in their work, *Understanding Social Support Throughout the Injury Process Among Interuniversity Swimmers*. In this study, twelve university swimmers who recently experienced swimming-related injuries engaged in semi-structured interviews (Abgarov et al., 2012). Their findings indicated athletes had mixed experiences with their networks of social support (i. e., coaches, medical practitioners, parents, and teammates), with themes regarding exchanges and appraisals emerging in three categories: (a) Don't bring your negative energy to practice, (b) show me that you care, and (c) Provide me with some clear and appropriate direction! (Abgarov et al., 2012, p. 213). Participants in the study reported that their coaches and teammates were in denial of their injuries, thus shunning them from the team, or pushing them to train through their injuries, resulting in athletes feeling uncared for, unsupported, and lacking direction (Abgarov et al., 2012, p. 227).

In regard to support networks, past studies suggest that different individuals within social support networks may play different roles depending on their

closeness to the individual. Abgarov et al., (2012) distinguishes social support exchanges into three main categories: (a) emotional support may include listening and comforting, (b) information support could include discussing and acknowledging an injured athlete's status and timetable for return to play, and (c) tangible support, may come in the form of providing personal or material assistance (Abgarov et al., 2012) All three of these categories are vital to not only the athletes' effectiveness in return to play but also the athlete's overall well-being.

Hart (2009) explains that it is important for the athlete not to withdraw from social support. It can be highly beneficial for injured athletes to converse with athletes who have successfully overcome injuries in their sport. Social support is a beneficial outlet for athletes to tap into and gain necessary emotional encouragement throughout the duration of the rehabilitation process. Not only is this an outlet for emotional support but it can also give the athlete a sense of attachment to others.

Researchers in sports medicine and sports psychology consider social support to be a type of buffering mechanism that helps mitigate the stress-injury relationship (Lu & Hsu, 2013). Lu & Hsu, (2013) allude to another important factor that warrants discussion and that is the athlete's *subjective well-being.* This is defined as an optimal state of human experience (Lu & Hsu, 2013). Many previous studies on athletes during the rehabilitation process focus their attention on the rehabilitation-related outcome variables (e. g., treatment adherence, motivation, recovery rates, and rehabilitation behaviors) (Lu & Hsu, 2013). Conversely, injury

through sport can not only harm the athlete's sport experiences but can also jeopardize the athlete's mental health state as well. When this unfortunate scenario occurs, positive psychological advantages such as hope and social support may help to remedy this and help the athlete maintain a more positive and optimistic mental mindset (Lu & Hsu, 2013).

Interestingly enough, Lu & Hsu, (2013) praise the works of Wiese-Bjornstal et al., (2010), in particular their integrated model of psychological response to the sport-injury and rehabilitation process. In this, Wiese-Bjornstal et al., (2010) propose that personal and situational factors continuously exert their effects on psychological responses and rehabilitation processes (Lu & Hsu, 2013). Based upon this model, Lu & Hsu, (2013) consider hope as a personal factor and social support as a situational factor in predicting injured athletes' thoughts, feelings and behaviors throughout the duration of the rehabilitation process (Lu & Hsu, 2013). Understanding this, they were baffled as to why no current authors have explored Wiese-Bjornstal et al.'s (2010) suggestion that personal and situational factors interactively influence the thoughts and feelings of injured athletes.

Hope

Another important and beneficial coping mechanism is hope. Hope is a theorized as an individual's cognitive perception that entails belief in his or her ability to reach a desired goal (Lu & Hsu, 2013). Researchers in the field of medicine and health psychology consider hope to be an important factor in helping individuals to persevere when faced with major challenging or threatening health

events (Lu & Hsu, 2013). They describe two vital components of the hope model which help mold one's hope perception: the ability to initiate and sustain the actions necessary to reach his or her goals, and the positive belief that one is able to generate routes or pathways to those goals (Lu & Hsu, 2013). In sports, studies have shown that positive self-thought and maintaining a hopeful outlook on one's situation has proven to be very important in an athlete's recovery stages from injury. Therefore, the association of hope with injured athletes' cognition, behavior, and emotion during the rehabilitation process is worthy of further exploration (Lu & Hsu, 2013).

Lu & Hsu, (2013) later conducted a study on Taiwanese injured athletes. This study aimed to build upon the insightful framework set forth by Wiese-Bjornstal et al., (2010). For their study, demographic information consisted of sex, age, sport, years of competition, and competitive skill level. A total of 224 injured Taiwanese collegiate student-athletes were utilized for the population of this study. These 224 Taiwanese athletes stemmed from four different sports-injury rehabilitation centers of local universities throughout Taiwan (Lu & Hsu, 2013). Participants were then asked to provide injury information, such as duration of the injury, the location of the injury, and their perceptions of the severity of their injury (e. g. mild, moderate, and severe) (Lu & Hsu, 2013). One of the questions asked each participant to rate their perceived rehabilitation compliance on a 10-point Likert scale (1= did not follow the prescribed regiment at all, 10= completely followed the prescribed regiment) (Lu & Hsu, 2013). This score illustrated the

athlete's rehabilitation behavior. The main outcome measures used throughout this study consisted of the Trait Hope Scale, the Sports Injury Rehabilitation Beliefs Survey, the Satisfaction with Life Scale, the Multidimensional Scale of Perceived Social Support Scale, along with the Satisfaction with Life Scale which were all administered to the athletes after they received their regular rehabilitation treatment (Lu & Hsu, 2013). As a result, Lu & Hsu, (2013) found that social support and two types of hope in injured athletes determined their rehabilitation beliefs and subjective well-being. Hope and social support had an interactive effect on the prediction of subjective well-being (Lu & Hsu, 2013). For athletes with low hope pathways, the inclusion of higher levels of social support was associated with higher levels of well-being, whereas social support had a relatively low relationship with the subjective well-being of athletes with higher hope pathways (Lu & Hsu, 2013).

A separate but supplemental research study was conducted by Ross Wadey termed, *An Examination of Hardiness throughout the Sport Injury Process*. This article is a research study on the direct effect of the character trait hardiness on the prediction of sports injury as well as the mediating effects of hardiness on athletes' response to injury. This study defines hardiness as "a pattern of attitudes and actions that helps in transforming stressors from potential disasters into growth opportunities" (Wadey, 2012, p. 4). Hardiness can also be seen as the unification of resilience and optimism. Wadey (2012) further explains that this trait can be broken down into the three c's of hardiness: commitment, control, and challenge.

To Wadey (2012), it appears that people who possess hardiness tend to be committed and fully involved in the activities in their life, feel that they can influence the outcomes of whatever circumstances they are in, and are excited and inspired by change rather than afraid of it (Wadey, 2012). Hardiness was the chosen variable because it has been described as a "pathway to resilience," and resilience has been shown to greatly influence a person's ability to bounce back from adversity (Wadey, 2012). The structure of this study included 694 participants, all of whom were competitive athletes, of which 104 became injured during the two year study. Athletes were asked to fill out a questionnaire that measured their level of hardiness before any injury. Once injured, they filled out questionnaires that monitored their coping mechanisms (COPE) and psychological response to injury (PRSII) within the first week of the injury, halfway through rehabilitation, and during their first week of their return to full training (Wadey, 2012). The results of this study went as follows: negative major life events increased with the prevalence of injury, as hardiness increased. Hardiness moderated this relationship in that possessing more hardiness decreased the likeliness that an athlete with increased negative major life events would become injured (Wadey, 2012). Post injury, hardiness was associated with higher emotion-focused coping and lower avoidance coping. Meaning, athletes did not withdraw from their respective teams and social support networks but in turn utilized them. Problem focused coping was found to mediate the relationship between hardiness and athletes' psychological response to injury (Wadey, 2012).

Consequences of Not Coping with Loss

Sports injuries can vary in severity, ranging from minor cuts and bruises to broken bones, ligament tears, and even spinal cord injury. According to Smith et al., (1990), the psychosocial dynamics that accompany sport injury should be acknowledged in order to guarantee proper psychological recovery, which is an integral part of the rehabilitation of an injured athlete. For non-athletes, it may be difficult to understand the depth of the impact that a career ending or stalling injury can have on athletes' emotional and physical well-being, but as Smith et al., (1990) explains, the loss of athletic ability an athlete suffers after a severe injury parallels the loss a non-athlete endures after the loss of bodily function or a loved one. People who aren't deeply involved or specialized in one area in life (like athletics) tend to have interests and talents that span multiple activities or interests. Elite athletes tend to focus solely on their sport and are less likely to develop significant interests in other careers, hobbies, or ways of life (Manschreck & O'Connell, 2012).

To better illustrate this concept, Smith et al. (1990) denotes this concept via what they have coined *Loss-of-Health Models.* According to Smith et al., (1990), individuals who participate in sport and exercise have been reported to enjoy such benefits as fun, competence, and a positive self-concept, while levels of anxiety and depression were substantially lowered. That being said, when an injury occurs causing an abrupt termination of these perceived positive benefits, individuals may

experience post-injury emotional disturbance (Smith et al., 1990). Smith et al., (1990) goes on to note that some authors have suggested that injured athletes progress through a grief cycle similar to that experienced by the terminally ill. Granted, persons who are terminally ill are in a far more serious, life-threatening situation than those who have torn their anterior cruciate ligaments or have broken their femurs, but the grief cycles still maintain striking similarities. In the terminally ill loss of health model, psychiatrist Kuebler-Ross explained that individuals preparing for death experience various stages of anger, denial, bargaining, depression, and ultimately, acceptance (Smith et al., 1990).

Until recently, there have not been many documented reports on the psychological effects surrounding athletes recovering from injury. A pilot study was conducted utilizing 72 injured recreational athletes (49 males and 23 females, involved in both exercise and sport) which determined the presence, type, magnitude, and time course of emotions from the onset of the injury to the athletes' return to their sport or respective exercises (Smith et al., 1990). While employing an Emotional Response to Injury Questionnaire (ERAIQ) and the Profile of Mood States (POMS), elevated levels of depression, frustration, and anger were initially recorded (Smith et al., 1990). In this study, 23 of the most seriously injured athletes were recorded as having simultaneous elevations in depression, anger, and tension (Smith et al., 1990). This was all in relation to normal levels among college athletes. These elevated levels of emotions were sustained for approximately one month following injury. It was noted that there was no pre-injury data to compare to, but

the athletes themselves served as their own controls and significant changes toward a more positive mood state occurred over time (Smith et al., 1990). Smith et al., (1990) describe that the severity of the athletes' injury coupled with the athletes' cognitive perception of his/her situation appeared to influence the athletes' emotional response either positively or negatively. Smith et al., (1990) furthers their point by illustrating that these factors, combined with the loss of fulfillment of the athletes' reasons for participating in sport and exercise were the probable cause for the post-injury mood disturbances (Smith et al., 1990).

A different study was conducted by Weiss and Troxel (1986) which interviewed a smaller population of 10 injured athletes of collegiate or elite status in sports ranging from basketball to wrestling. Common response to injury ranged from disbelief, rage, fear, depression, tension and fatigue, to upset stomach, insomnia, and loss of appetite (Smith et al., 1990). Many of these participants voiced their inability to cope, not only with injury, but also with the activity restriction, prolonged rehabilitation, and the feeling of being externally controlled by the injury (Smith et al., 1990). Disbelief was noted as being a symptom of injury by some athletes but this stigma was not present in the Smith et al., (1990) study. Smith et al., (1990) profoundly describes this situation by explaining that while disbelief and denial are not synonymous, it is indicative that disbelief was present in one study of injured athletes but denial was absent in the other study (Smith et al., 1990). One explanation for this might be that this is a case of situation bias. Injured athletes interviewed by Smith et al., (1990) were in a sports medicine clinic, which would

induce situational bias. The athletes' presence in the clinic may have signified that something was wrong and mitigated against denial (Smith et al., 1990).

It is critically important to study the impact that severe injuries have on lives of athletes. Wiese-Bjornstal, (2010) focused on this very dilemma by focusing their research on understanding the psychology and socioculture of sport injury. Wiese-Bjornstal, (2010) focuses their population study to high-intensity sports in which elite athlete training and performance efforts are characterized by explosive physical speed and strength, mental toughness to push far past normal physical limits, and maximum effort and commitment to highly challenging goals (Wiese-Bjornstal, 2010). By focusing on elite status athletes, Wiese-Bjornstal, (2010) is able to garner individuals in which a severe injury impediment would serve as an adverse and stressful health event that would be associated with a multitude of risks, consequences and outcomes (Wiese-Bjornstal, 2010). Emotional responses common in injured athletes post-injury include mood disturbances such as depression, anxiety, grief, and burnout (Wiese-Bjornstal, 2010). Burnout is a dangerous and unfortunate emotional response that numerous athletes encounter, which can be understandable due to the mundane and repetitive nature of rehabilitation.

Interventions

Athletes need a way to communicate their feelings about injury and recovery to coaches without compromising their relationship with the coaching staff or their reputation with teammates. A survey of college athletes involved in Division I programs revealed that about 50% of athletes that had experienced a significant injury at some point in their careers felt pressured by their coaches to play while they were still hurt (Nixon, 1996). Having that added pressure from the coaching staff makes it increasingly difficult for the player to reveal that they are struggling emotionally. Also, if an athlete expresses that they are dealing with emotional issues related to their injury, it can affect how much their teammates respect them. Team captains are often elected by their teammates so, for a player that desires to have a leadership role on the team, it is important for them to be liked and respected by their teammates.

In 2009, Crust and Azadi conducted a study that aimed to discover what qualities serious athletes looked for in a team leader or coach. To distinguish serious or more skilled athletes from more casual athletes, they measured the degree of mental toughness that each athlete possessed (Crust & Azadi, 2009). To Crust & Azadi (2009), mental toughness is defined as an athlete's ability or inability to be affected by competition or adversity. They chose to measure mental toughness because earlier studies have shown that mentally tough athletes control their own fate and that they are much less affected by competition or adversity than athletes

who are not mentally tough. Because of this, mentally tough athletes tend to be the more skilled athletes. The study showed that mentally tough athletes prefer leaders that emphasize strength and skill development. Athletes know that if they want to be leaders on the team, they have to downplay their own emotional turmoil and focus on showing their skill and strength. This is even more important after an injury because they are not able to physically show how tough and strong they are while they are still recovering. To make up for this, they may try to mask their physical and emotional pain by overexerting themselves during rehabilitation and pretending that the injury is not taking an emotional toll on them. Even players that don't have specific leadership aspirations may feel the need to hide their physical and psychological pain from teammates. When researchers looked at the psychological implications of injury on confidence, athletic self-esteem, and likeliness to quit playing the sport, they found that the relationships with teammates had a much greater influence on all of these factors than the relationships with the coaches did (Charles, Purdie, & Thomas, 2003). This means that if their teammates treated them differently after getting hurt by not including them in team activities, making fun of them, or criticizing them on their rehabilitation process, then they were less likely to feel good about their athletic ability and more likely to quit playing altogether.

Because many athletes, especially males, are very concerned about the way that their teammates and coaches view them, they may be less likely to share the struggles that they are going through during the rehabilitation process from a

serious injury. For this reason, it would be helpful for every team to have a system in place that allows the athletes to share their feelings with the coaching staff without feeling pressured to talk to them about it in person. Implementing an online questionnaire that ascertains the coping methods that each athlete is using and their general disposition about the likelihood of their recovery or ability to cope with the changes that may occur in their lives due to the injury would be a great solution. Information on coping strategies utilized by athletes recovering from sports injuries have huge implications for the medical personnel, athletic trainers, other care givers, and sports psychology practitioners as it provides the foundational basis for interventions (Holt, 2003).

There are many measures of coping methods and self-efficacy in literature today. For the purposes of assessing the coping methods of injured athletes, Charles S. Carver's COPE inventory would be the ideal measure to give because it was developed to assess a broad range of coping responses. Additionally, the General Self-Efficacy Scale (GSE) is a very effective measure of self-efficacy. For the purposes of the online resource, this measure should be given with some adaptations to make it more specific to self-efficacy in rehabilitation.

The COPE Inventory includes responses that are expected to be dysfunctional, as well as some that are expected to be functional. This inventory also includes at least two pairs of polar-opposite tendencies (Carver et al., 1989). These were included because each scale is unipolar (the absence of a particular response does not imply the presence of the other), and because Carver et al.,

(1989) believed that individuals engage in a multitude of coping mechanisms within a given period, including both of each pair of opposites. This questionnaire (See Appendix A) goes on to ask the participants what they generally do and feel when they experience stressful events. These questions are scored from 1-4 using a likert scale (1= *I usually don't do this at all, 2= I usually do this a little bit, 3= I usually do this a medium amount, 4= I usually do this a lot).* The questions addressed in this questionnaire range tremendously, which can help researchers gauge numerous ways in which athletes cope with stress.

Questions range from inquiries of depression and anger, to religion and social support, and even alcohol and drug use. For example, question 9 states "I admit to myself that I can't deal with it, and quit trying" (Carver et al., 1989). This question is gauging depression levels within the participant. Another example, question 26 states "I try to lose myself for a while by drinking alcohol or taking drugs" (Carver et al., 1989). This question is gauging the participants' dependence upon drugs and alcohol to cope with their internal and external stressors. Carver et al., (1989) provide a vital scoring method and key for researchers to assess the athletes after they complete the study. Scoring goes as follows: Carver et al., (1989) provides a set of 15 different categories in which he lists the numbers of the questions correlated to that sub section. Take a sum of the scores and then match it with the Cope scale, which ranks the individuals according to their scores. For example, questions 9, 24, 37, 51 all reside under *Behavioral disengagement,* while questions 26, 12, 35, 53 reside under *substance use* (Carver et al., 1989).

As for Ralf Schwarzer and Matthias Jerusalem's General Self-Efficacy Scale (GSE), I believe this to be a highly valuable assessment tool as well because of its duality (See Appendix B). What I mean by this is that the GSE aims to predict coping with daily hassles as well as adaptation after experiencing various stressful life occurrences. Just as the COPE Inventory, the GSE is administered via questionnaire but includes far fewer questions than the COPE inventory. Ten items are mixed at random into a slightly larger pool of items that are within the same format (Schwarzer & Jerusalem, 1995). Scoring responses are made on a four-point scale. The responses to all ten items are summed and will yield a composite score with a range from 10 to 40 (Schwarzer & Jerusalem, 1995). The belief that one can perform novel or difficult tasks or cope with adversity is the essence of Perceived Self-Efficacy, an overall optimistic self-belief (Schwarzer & Jerusalem, 1995). This facilitates goal setting, perseverance in the face of adversity, recovery from setbacks, and effort investment. Ten items in this evaluative tool are designed to explore this construct. Response scoring goes as follows: (*1= Not at all true, 2= Hardly true, 3= Moderately true, 4= Exactly true*). For example, question 3, "It is easy for me to stick to my aims and accomplish my goals" (Schwarzer & Jerusalem, 1995). Another example is question 4, "I am confident that I could deal efficiently with unexpected events" (Schwarzer & Jerusalem, 1995). One minor adaptation I would make to this questionnaire would be to question 6, "I can solve most problems if I invest the necessary effort" (Schwarzer & Jerusalem, 1995). I would augment this to say, "I can regain my abilities if I invest necessary effort"; a simple but effective change. The

COPE inventory and a modified version of the General Self-Efficacy Scale would effectively assess the cognitive processes of injured athletes and could easily be utilized by coaches and staff as an online resource for injured athletes.

Sociocultural Influence

Athletes learn the accepted and deviant behaviors that comprise the normative culture surrounding high-intensity sports via social interaction with their teammates. Athletes, especially elite athletes, follow a nation-wide standard that they must be "hard," tough, mentally and physically unbreakable, and able to play through injury. This standard is not limited to high-intensity men's sports but applies to women's sports as well. Athletes who deviate from this standard and refuse to participate in their sport due to injury may be called names such as *soft,* cowardly, and even weak. Some may wonder why athletes prefer to participate in sports, specifically sports where injuries are prevalent. Some researches hypothesize the motivation to participate in such sports stems from societal influence, while others may state it's simply voluntary. Wiese-Bjornstal, (2010) describe how writings on ethics of sports and sports medicine question whether participation and risk in sports related to injury and other negative health outcomes is voluntary or via coerced pressure mechanisms imposed through societal pressure mechanisms (Wiese-Bjornstal, 2010).

The willingness to sacrifice one's well-being, ethics, and common sense all in the pursuit of high-achieving goals is evident in athletes who take pain killers by the

hour and play through severe health-concerning injuries such as concussions or torn ligaments. By no means is this acceptable, but unfortunately this is the standard that society has set to separate the amateurs from the great, and the great from the elite.

Sociocultural influence serves an immense role in the mentality driving elite athletes, but carries along with it major negative health implications if an injury were to cripple these athletes. Wiese-Bjornstal, (2010) illustrates this double effect that sociocultural pressures have on athletes by telling the story of the unfortunate achilles tendon injury that forced the withdrawal of national track and field hero Liu Xiang of the host Chinese team from the 2008 Beijing Olympics. Here we witnessed not only the hopes and dreams of one athlete diminished, but also the entire nation of China as well. This demonstrates the dire need for the inclusion of sociocultural influences, which is necessary in the understanding of sport injury risks, consequences, rehabilitation, and recoveries. (Wiese-Bjornstal, 2010).

What is being done to help athletes?

Organizations such as the NCAA, U. S. Department of Defense, Centers for Disease Control and Prevention (CDC), and the National Athletic Trainers' Association (NATA) have invested a great deal of time and money into the protection and well-being of athletes. Recently, the NCAA has partnered with the U. S. Department of Defense to launch a $30 million initiative to enhance the safety of student-athletes and service members. Announced at the White House Healthy

Kids Safe Sports Concussion Summit, the NCAA-Department of Defense joint initiative will include the most comprehensive study of concussion and head impact exposure ever conducted.

The study will go as follows: Approximately 75 percent of the money will fund the study, which will enroll an estimated 37,000 male and female NCAA student-athletes over a three-year period. These participants will then undergo a comprehensive preseason evaluation for concussion and will be monitored in the event of an injury. Interestingly enough, the investigation will be the largest ever of its kind, offering critical insight to the risks, treatment, and management of concussions (National Collegiate Athletic Association, 2014).

The remaining 25 percent of the program's funding will finance an educational grand challenge in an effort to revolutionize concussion safety behaviors and the culture of concussion reporting and management (National Collegiate Athletic Association, 2014). The research will be managed by the Concussion Assessment, Research and Education Consortium (CARE), co-chaired by principal investigators at three research institutions: Indiana University, The University of Michigan, and The Medical College of Wisconsin. These three universities were selected due to the unique resources each could provide for the study. Indiana University will serve as the Administrative and Operations Core and will be the Central coordination center for the CARE Consortium. The University Of Michigan will lead the Longitudinal Clinical Study Core, a prospective, multi-institution clinical research protocol; whose aim will be to study the natural history

of concussion among NCAA student-athletes (National Collegiate Athletic Association, 2014). Lastly, The Medical College of Wisconsin will head the Advanced Research Core. This effort will include "cutting-edge studies that incorporate head impact sensor technologies, advanced neuroimaging, biological markers and detailed clinical studies to examine the acute effects and early pattern of recovery from sport–related concussion" (National Collegiate Athletic Association, 2014, p. 1).

Ultimately, this project is aimed to more fully inform a comprehensive understanding of sport-related concussion and traumatic brain injury (National Collegiate Athletic Association, 2014). The NCAA went on to publish this statement in regards to this ground-breaking study:

> The consortium's work will expand upon the NCAA National Sport Concussion Outcomes Study, an existing multi-site, longitudinal investigation of concussive and repetitive head impacts in NCAA student-athletes. The Advanced Research Core also will leverage existing collaborative research networks, such as the National Institutes of Health TRACK-TBI and the DoD's Project Head to Head. (p. 1)

Initiatives such as the DoD Concussion study are necessary for the safety and well-being of athletes around the world. This is just one example of many of the

efforts that are being made to enable athletes and allow them to continue to play their sports. The NFL has also made major strides towards helping athletes mitigate crises and also provide support for the family members of its players. The NFL Life Line is a free hub loaded with a large network of resources. The helpline can be used for issues concerning financial or legal issues, health problems, relationship stress, or career indecision. These resources are even now available to the public. Support lines include: National Suicide Prevention Lifeline, Veterans Crisis Line, Substance Abuse and Mental Health Services Administration (SAMHSA), Network of Care, National Alliance on Mental Illness, National Institute of Mental Health (NIMH), Psychology Today Therapist Locator, NFL Total Wellness, NFL Player Assistance and Counseling Service, and the NFL Player Care Foundation (NFL Life Line. n. d.).

Conclusion

Athletes sacrifice tremendous amounts of time, effort, and also endanger their mental and physical health all for their sport. As a result, their sport becomes an integral part of their identity. When an athlete suffers an injury, it can have major implications on the individual's overall well-being. For this reason, I believe that more coaches, advisors, athletic trainers, and medical personnel for athletes should better understand the implications that injuries present (which are not purely physical but also mental). Questionnaires such as Charles Carver's *COPE Inventory* and Schwarzer and Jerusalem's *General Self-Efficacy Scale* should be implemented in the rehabilitation process along with the mandated physical rehabilitation regime.

Granted, no two individuals experience the same event in the same way. For example, even if two athletes experience the same injury (e. g., a broken right ankle), psychologically they will experience stressors and recover from the injury differently and independently from one another. This scenario exemplifies why these questionnaires, or other questionnaires similar to them, are important because they can reveal how athletes perceive their injury and also can predict how the athlete will most likely cope with their injury.

In addition, I propose that there should be an anonymous online questionnaire that injured athletes can fill out that identifies their state of mind and the methods that they are using to cope with their injury during the rehabilitation

period. The anonymity of the questionnaire would remove any inhibitions due to pride, guilt, or embarrassment the injured athlete may be feeling towards asking for help. The athlete can converse with a trained professional for as long or as brief a time as they feel comfortable. Once the athlete feels he/she is comfortable enough to go into more depth and share their name, he/she can do so. The athlete can also set dates to meet with the health care professional face-to-face for more accurate help and guidance with his/her injury. This would help coaches and trainers to gain a better understanding of the needs of their team and be able to provide the appropriate resources for them. In addition, this could ultimately unlock an athlete's potential to receive the resources necessary to have an accurate recovery and return to playing the sport of their choice efficiently and effectively.

Overall, the results of this paper provide the following insights into various coping mechanism issues concerning high performance athletes striving to recover from their sports-related injuries: (1) there is not yet sufficient information available to address the complex and varying coping needs of high-performance injured athletes attempting to recover from their sports-related injuries; (2) researchers have not been able to develop a comprehensive and unifying theory that fully explains how injured high-performance athletes cope with sports related injuries; (3) researchers are still fervently looking for the elusive unifying and comprehensive theory that will aid in gaining a better understanding of how high-performance athletes mitigate injuries they sustain through their sporting activities; and (4) the implications for sports injury not only has a devastating effect on the

injured athletes, but can also have serious negative social and psychological consequences for the injured athletes.

Finally, the results of this paper adds to the body of literature currently in existence on coping mechanisms that aid high-performance athletes to cope with sports-related injuries. It also provides valuable information to medical personnel, coaches, athletic trainers, and those taking care of injured athletes on the coping needs of high-performance injured athletes. Truly, it seems that the ability for an injured high-performance athlete to quickly and fully recover from a sports related injury appears to depend largely on how well, medical personnel and other care givers of injured athletes are able to ascertain and use injury coping methods that are specifically conducive to the injured athlete. Thus, gaining a good understanding of the specific coping needs of injured high-performance athletes will help medical staff, athletic trainers, and care givers to offer better care to injured, high-performance athletes seeking to recover from their sports-related injuries.

Future research aimed at exploration of the specific findings of this paper is highly recommended, particularly how injured high-performance athletes respond to various biopsychosocial coping mechanisms currently offered to the injured athletes by the medical personnel, athletic trainers, and others who care for them.

APPENDIX A.

Source:

Carver, C. S., Scheier, M. F., & Weintraub, J. K. "Assessing coping strategies: A theoretically based approach." *Journal of Personality and Social Psychology*. (1989): 56, 267-283.

Reason for Inclusion:

This appendix was included because it is the most thorough questionnaire that I could find that assesses the different coping mechanisms that people use after experiencing a significantly troubling life event. Because athletic injuries are very troubling to high-performance athletes, this questionnaire should be utilized by athletic teams to identify how their players are coping with injury throughout the rehabilitation process.

The COPE Inventory:

Respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do.

Indicate what YOU usually do when YOU experience a stressful event.

1 = I usually don't do this at all

2 = I usually do this a little bit

3 = I usually do this a medium amount

4 = I usually do this a lot

1. I try to grow as a person as a result of the experience.
2. I turn to work or other substitute activities to take my mind off things.
3. I get upset and let my emotions out.
4. I try to get advice from someone about what to do.
5. I concentrate my efforts on doing something about it.
6. I say to myself "this isn't real."
7. I put my trust in God.
8. I laugh about the situation.
9. I admit to myself that I can't deal with it, and quit trying.
10. I restrain myself from doing anything too quickly.
11. I discuss my feelings with someone.
12. I use alcohol or drugs to make myself feel better.
13. I get used to the idea that it happened.
14. I talk to someone to find out more about the situation.

15. I keep myself from getting distracted by other thoughts or activities.
16. I daydream about things other than this.
17. I get upset and am really aware of it.
18. I seek God's help.
19. I make a plan of action.
20. I make jokes about it.
21. I accept that this has happened and that it can't be changed.
22. I hold off doing anything about it until the situation permits.
23. I try to get emotional support from friends or relatives.
24. I just give up trying to reach my goal.
25. I take additional action to try to get rid of the problem.
26. I try to lose myself for a while by drinking alcohol or taking drugs.
27. I refuse to believe that it has happened.
28. I let my feelings out.
29. I try to see it in a different light, to make it seem more positive.
30. I talk to someone who could do something concrete about the problem.
31. I sleep more than usual.
32. I try to come up with a strategy about what to do.
33. I focus on dealing with this problem, and if necessary let other things slide a little.
34. I get sympathy and understanding from someone.

35. I drink alcohol or take drugs, in order to think about it less.

36. I kid around about it.

37. I give up the attempt to get what I want.

38. I look for something good in what is happening.

39. I think about how I might best handle the problem.

40. I pretend that it hasn't really happened.

41. I make sure not to make matters worse by acting too soon.

42. I try hard to prevent other things from interfering with my efforts at dealing with this.

43. I go to movies or watch TV, to think about it less.

44. I accept the reality of the fact that it happened.

45. I ask people who have had similar experiences what they did.

46. I feel a lot of emotional distress and I find myself expressing those feelings a lot.

47. I take direct action to get around the problem.

48. I try to find comfort in my religion.

49. I force myself to wait for the right time to do something.

50. I make fun of the situation.

51. I reduce the amount of effort I'm putting into solving the problem.

52. I talk to someone about how I feel.

53. I use alcohol or drugs to help me get through it.

54. I learn to live with it.

55. I put aside other activities in order to concentrate on this.

56. I think hard about what steps to take.

57. I act as though it hasn't even happened.

58. I do what has to be done, one step at a time.

59. I learn something from the experience.

60. I pray more than usual.

Scales (sum items listed, with no reversals of coding):

Positive reinterpretation and growth: 1, 29, 38, 59

Mental disengagement: 2, 16, 31, 43

Focus on and venting of emotions: 3, 17, 28, 46

Use of instrumental social support: 4, 14, 30, 45

Active coping: 5, 25, 47, 58

Denial: 6, 27, 40, 57

Religious coping: 7, 18, 48, 60

Humor: 8, 20, 36, 50

Behavioral disengagement: 9, 24, 37, 51

Restraint: 10, 22, 41, 49

Use of emotional social support: 11, 23, 34, 52

Substance use: 12, 26, 35, 53

Acceptance: 13, 21, 44, 54

Suppression of competing activities: 15, 33, 42, 55

Planning: 19, 32, 39, 56

APPENDIX B.

Source:

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, Measures in health psychology: A user's portfolio. Causal and control beliefs (pp. 35-37).

Reason for Inclusion:

This appendix was included because an injured athlete's level of perceived self-efficacy during rehabilitation impacts their ability to recover physically and mentally. This survey would be an effective way for coaches and staff to assess an injured athlete's beliefs about the likeliness that they will be able to make a successful comeback. If an athlete's perceived self-efficacy is extremely low despite assurance from trainers and/or physicians that recovery is possible, this would suggest that the athlete is using dysfunctional coping methods. A modified version of the GSE would also be a helpful tool to include in an online survey for injured athletes.

Generalized Self-Efficacy Scale:

	English version by Ralf Schwarzer & Matthias Jerusalem, 1995
	1 I can always manage to solve difficult problems if I try hard enough. 2 If someone opposes me, I can find the means and ways to get what I want. 3 It is easy for me to stick to my aims and accomplish my goals. 4 I am confident that I could deal efficiently with unexpected events. 5 Thanks to my resourcefulness, I know how to handle unforeseen situations. 6 I can solve most problems if I invest the necessary effort. 7 I can remain calm when facing difficulties because I can rely on my coping abilities. 8 When I am confronted with a problem, I can usually find several solutions. 9 If I am in trouble, I can usually think of a solution. 10 I can usually handle whatever comes my way.
Response Format	1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true

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