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Operative Techniques in

Sports Medicine

# Athlete Mental Health & Psychological Impact of Sport Injury

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**Athletes may experience mental health concerns at similar rates, and in some instances, higher rates than nonathletes. Two other factors, sleep and substance use, play important roles in athlete mental health and well-being. A variety of nonsport and sport-related factors place athletes at risk for mental health concerns, and one important sport-related factor is injury. Sport injury and mental health appear to have a bidirectional relationship, and the sport injury and rehabilitation process is associated with a wide variety of psychological and mental health concerns. Existing literature suggests understanding of these variables allows the professional to proactively address psychological readiness for return to sport throughout the injury rehabilitation process. The objective of this paper is to present literature related to athlete mental health and address ways in which sport injury can contribute to athlete mental health, well-being, and psychological readiness for return to sport.**


**KEYWORDS** mental health, psychology of sport injury, psychological readiness

## Athlete Mental Health & Psychological Impact of Sport Injury

Approximately 1 in 5 individuals experience mental health difficulties each year with the highest rates found in young adults. In fact, 75% of all lifetime mental health conditions begin by age 24,[1] which corresponds with peak years of athletic performance. Athletes experience a range of stressors that can impact mental health ranging from typical life stress to sport-specific stress, such as performance demands, competitive failure, injury, and retirement from sport. Although nonspecific symptoms, such as fatigue, may be related to training, they can also be signs of an impending or existing mental health concern that is misdiagnosed as physical difficulties (eg, diagnosing depression as overtraining syndrome).[2]

Athlete mental health concerns range in severity from mild impact on functioning to levels that necessitate retirement from sport. It is likely, however, that many mental health concerns exist somewhere in the middle of this continuum. In a study of collegiate student-athletes, 62.6% reported that their mental health symptoms hurt their athletic performance in the previous four weeks.[3] Thus, although symptoms were not enough to consider retirement from sport, they clearly impacted sport-related functioning. This impact on sport performance can also impact an athlete's mental health symptoms, creating a challenging cycle for athletes to navigate.

Athletes seek mental health treatment at lower rates than nonathletes,[4-6] and the biggest barrier to seeking mental health treatment is stigma.[6] This stigma may exist within the sport environment (eg, concern about playing time if mental health status is known to coaching staff) or outside of it (eg, viewing mental health concerns as "weakness"). Some athletes may also experience cultural barriers to seeking mental health treatment.[7] Therefore, it is important for medical professionals to understand not only how mental health concerns manifest in athletes but be ready to help athletes navigate any potential barriers to treatment. These

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conversations can help athletes accept referrals to mental health professionals for timely and effective treatment.

Sport injury and rehabilitation is a time when understanding any psychological impact, including athlete mental health, is important given the bidirectional relationship between mental health and sport injury.[8] A variety of mental health symptoms can increase an athlete's risk for injury and complicate recovery outcomes. Athletes may also experience new onset or exacerbation of mental health concerns throughout the injury rehabilitation process. Addressing psychological factors impacting readiness for return to sport has the potential to improve rehabilitation outcomes, particularly when addressed early in the rehabilitation process.

The purpose of this article is to highlight mental health difficulties experienced by athletes and ways in which psychological aspects of sport injury can contribute to an athlete's mental health, well-being, and psychological readiness for return to sport.

## Athlete Mental Health

Existing research suggests athletes are not immune from mental health concerns, although it is difficult to identify true prevalence rates in the literature due to nearly exclusive focus on the mental health of elite athletes and methodological limitations of previous studies. Few studies evaluate prevalence rates through diagnostic interviews with mental health professionals, and many self-report inventories are not normed using the athlete population.[9] Nevertheless, based upon available information, a sizable number of athletes experience mental health concerns. In a sample of elite athletes in Sweden,[10] researchers found the lifetime prevalence of mental health concerns for these athletes was 51.7%, and 50% of mental health onsets occurred between ages 17 and 21. They also found depression and eating disorders to be the most frequently reported mental health concerns, which is consistent with the existing literature. Although researched less often in athlete populations, other mental health disorders that are important to recognize are suicide and anxiety. Finally, understanding the roles that sleep and substance use play is important, particularly as they relate to the sport injury process.

## Depression

A meta-analysis[11] found that elite athletes were just as likely to report symptoms of depression than nonathletes. Like nonathletes, the prevalence rate of depression for athletes tends to differ based upon gender identification, ranging up to 26.7% for men[12] and 36.5% for women.[13] Retired athletes may also experience higher rates of depression than current athletes. A recent study found that retired professional hockey players experienced moderate to very severe depression at rates 2 times higher than active athletes (20.6% vs 10.6%),[14] although other studies have found higher rates of depression in current than retired athletes.[15]

Four sport factors relate to symptoms of depression in athletes: type of sport played, performance, injury, and career termination. Adolescent athletes participating in individual sports may be more likely to report symptoms of depression than athletes participating in team sports.[16] Similar results have been found for collegiate athletes. One study[17] found the highest rates of depression were in track and field at 35.4% and the lowest were in lacrosse at 13.5%. Individual sport athletes may also experience sport failures differently, in that they may be inclined to set high personal goals and personalize sport-related failure.[18] In a study of collegiate swimmers,[19] athletes performing in the top 25% were more likely to report symptoms of depression than athletes at other performance levels, particularly when they experienced "competitive failures" (ie, not performing to their perceived potential). Again, the individualized nature of some sports may create additional pressures for athletes to perform and render them vulnerable to mental health conditions when their performance goals are not met.

The relationship between symptoms of depression and injury is also important. One study found the strongest predictor of mental health symptoms after sport-related concussion (SRC) was baseline depression (ie, depression prior to sustaining an SRC). Specifically, athletes reporting symptoms of depression prior to concussion were 4.59 times more likely to experience symptoms of depression and 3.4 times more likely to experience symptoms of anxiety post-SRC than athletes not experiencing depression at baseline.[20] For orthopedic injury, athletes reporting symptoms of depression had a 1.8 chance of injury and were 10% less likely to remain injury free compared to athletes not experiencing symptoms of depression.[21] Therefore, symptoms of depression not only have the potential to contribute to depression post-injury but may also contribute to injury risk.

Career termination (ie, retirement) results in considerable change in routine, relationships, and self-concept. Two main factors appear to be associated with depression symptoms during the transition to retirement for athletes: type of retirement (ie, voluntary vs involuntary) and athletic identity. Voluntary retirement is athlete-initiated whereby athletes retire on their own terms, whereas involuntary retirement (eg, career-ending injury, cut from the team) is when athletes would continue playing if the decision were theirs. Involuntary retirement has a stronger association with impaired mental health compared to voluntary retirement,[22] although some research suggests mental health symptoms may decrease as athletes settle into retirement.[23] Nevertheless, athletes may need assistance navigating expected and unexpected retirement. Esopenko and colleagues[24] outline an algorithm to aid in clinical decision-making about athlete retirement, including points to consider in instances of retirement due to SRC.

Athletic identity is the degree to which one defines themselves through their role as an athlete.[25] Retirement from sport represents a shift away from this athlete role into other roles that athletes may or may not have fostered over time. In a study of professional soccer players, those with a strong athletic identity were 1.2 times more likely to experience

symptoms of depression in retirement, and this rate was highest for those experiencing a career-ending injury (3.4 times).[26] Thus, athletes with a strong athletic identity likely experience considerable loss as they transition into retirement because their existing identity is threatened, and they may not have established additional identities.

## Suicide

Although suicidal ideation and death by suicide can occur within the context of depression, they can also occur within the context of other mental health conditions or in the absence of mental health conditions. Little is known about suicidal ideation or death by suicide in athletes. In a study of college students,[27] nonathletes experienced suicidal ideation at a rate of 11.3%, whereas the rate for student-athletes was lower at 6.4%. However, student-athletes and nonathletes attempted suicide at relatively similar rates (1.3% vs 1.6%, respectively). Similar rates of suicidal ideation were found in a sample of German athletes experiencing nonspecific low back pain (6.9%).[28]

In one of the only athlete studies examining death by suicide, Rao and colleagues[29] found that collegiate athletes have a 92% decrease in risk for death by suicide compared to the general student population. Approximately 7% of all NCAA student-athlete deaths from 2002 to 2012 were accounted for by suicide, which was the fourth highest cause of death. Athletes in men's sports had a significantly higher rate of death by suicide than athletes in women's sports (RR = 3.7), and football athletes died by suicide at a higher rate than all other NCAA athletes (RR = 3.67). Although some studies found a correlational relationship between SRC and death by suicide, there is limited evidence to support a causal relationship between these variables.[30,31] Suicide is a complicated issue, and there is a paucity of research with sound methodological designs examining factors contributing to suicidal ideation and death by suicide for athletes.

## Anxiety

Anxiety can manifest as a variety of symptoms such as panic attacks, chronic worrying, or fear of negative evaluation/embarrassment. Although symptoms of posttraumatic stress disorder (PTSD) are now categorized as a trauma and stressor-related disorder, athletes may demonstrate vigilance that can mimic anxiety. Surprisingly, little research has examined the presence of anxiety disorders in athletes. Research suggests 14.7%[32] to 33%[20] of athletes experience clinically relevant symptoms of anxiety and 13%-25% can experience symptoms of PTSD.[33] However, given the sport environment is often associated with pressure to perform and high levels of stress,[34] anxiety may be more prevalent in sports than the research suggests, and the sport environment is unlikely to be a protective factor for anxiety at elite levels.[35]

Several sport and nonsport characteristics are associated with higher anxiety levels. Factors such as identifying as a woman, being of younger age, career dissatisfaction, and orthopedic injury may be associated with higher anxiety levels for athletes.[35] From a PTSD perspective, athletes may experience traumatic events associated (eg, significant injury) or not associated (eg, adverse childhood experiences [ACE]) with the sport environment. Like what is found with depression, athletes participating in individual sports report higher levels of anxiety than athletes in team sports.[36] One must recognize, however, that the presence of anxiety in sport settings is not inherently problematic. How athletes interpret anxiety symptoms is critical when considering the impact these symptoms have on athlete functioning, particularly within the performance environment.[37] Specifically, if athletes interpret these symptoms as facilitative to the performance environment, they are often less problematic than if their presence is interpreted to negatively influence performance.

## Eating Disorders/Disordered Eating (ED/DE)

There is a spectrum of ED/DE ranging from optimized nutrition and body image to clinically diagnosed eating disorders. Overall, there is a higher prevalence of ED/DE in athletes than nonathletes.[38] Rates of ED/DE in athlete populations range from 0% to 19% in men and 6% to 45% in women.[39] In collegiate athlete samples, approximately 19% of men[40] to 35% of women[41] report subclinical ED/DE, and similar results were found in adolescent athlete populations.[42] Identification of subclinical symptoms is important because some of these behaviors may progress to a clinical eating disorder over time.[43] Excessive exercise (ie, exercise outside a training program) is the most frequently identified maladaptive weight-loss strategy for men[44] and women[41] athletes. Because many athletes already engage in physical activity at high levels, it can be difficult to determine what would be identified as excessive in athlete populations. Excessive exercise is often motivated by improving appearance, burning calories, or reducing weight, which may be common in athlete samples. For example, one study of women collegiate student-athletes found that 74% exercised to burn calories.[43] Motivation for these behaviors may also vary based upon gender identification. Women-identified athletes may have a drive for thinness, whereas male-identified athletes may have a drive for muscularity.[45]

Some ED/DE risk factors are similar for athlete and nonathlete populations, such as low self-worth and comorbid mental health disorders, particularly anxiety.[46] Athletes also experience a variety of sport-specific risk factors. There may be a bidirectional relationship between involvement in weight-sensitive sports (eg, distance running, rowing) and risk for eating disorders,[37] although athletes from any sport may engage in ED/DE behaviors. Several environmental factors can create pressure to engage in disordered eating behaviors, such as revealing uniforms,[47] actual or perceived pressure from athletic personnel,[48,49] pressure from teammates (eg, maladaptive team norms, appearance

conversations),[50] and sport injury.[51] Athletes transitioning into retirement may also be unsure of "typical" physical activity and eating. A study of retired collegiate athletes found that although 75% of athletes viewed themselves as having a "normal" weight, 60% wanted to lose weight.[52] Although it is beyond the scope of the present paper to discuss all risk-factors for ED/DE in depth, a comprehensive review of risk factors for athlete ED/DE can be found in a 2020 consensus statement.[38]

Most sports medicine professionals are aware of the Female Athlete Triad (low energy availability, amenorrhea, and osteoporosis),[53] whereas only 35% were aware of Relative Energy Deficiency Syndrome in Sports (RED-S).[54] RED-S is an expanded model highlighting the complexity of ED/DE related to physiological functioning, performance, and athlete health.[55] An important component of both models is low energy availability (LEA), which is defined as caloric intake that does not meet the energy needs required for daily living and any physical activity within or outside of sport. Prevalence of LEA in athletes ranges from 22% to 58%.[56] LEA can occur for three main reasons[57]: 1) inadvertent (eg, being unaware of nutrition requirements, food insecurity); 2) intentional (purposeful modification of fueling or physical activity for weight loss); and 3) psychopathological (intentional modification of fueling or physical activity for appearance). At any point, athletes may engage in behaviors that could put them at-risk for an eating disorder. For example, Stirling & Kerr[58] found nearly 75% of athletes in their sample reported a perceived weight-loss performance advantage was a contributor to developing an eating disorder. Due to the abrupt change in physical activity, injured athletes may benefit from meeting with a registered dietitian to discuss appropriate fueling for their bodies throughout rehabilitation.

Identification of ED/DE in athletes can be challenging for several reasons. First, as discussed, athletes already have high levels of exercise, and it can be difficult to determine what is excessive. Second, athletes may disguise restrictive eating practices as "healthy" eating for performance. Finally, there are several "good athlete" traits (eg, commitment to training, pursuit of excellence) that may be symptoms of eating disorders (eg, excessive exercise, perfectionism) and inadvertently reinforced by coaching and training staff.[59] Given ED/DE symptoms are unlikely to remit on their own, it is imperative that medical personnel identify any athlete along this spectrum, so they can be referred for additional assessment and treatment. A multidisciplinary treatment team is the most effective when addressing concerns on the disordered eating spectrum. An article by Conviser and colleagues[60] outlines the recommended professionals and how to best incorporate them into ED/DE treatment.

## Other Mental Health Factors

There are two additional factors to consider when evaluating an athlete's mental health status: sleep and substance use. Both factors can be symptoms of untreated mental health concerns or contribute to the onset of concerns if not addressed. Sleep and substance use also impact a wide variety of other variables, such as athletic performance and recovery, that can influence athlete mental health.[61,62] Injured athletes may be at particular risk for these two concerns. One study of professional athletes found those experiencing orthopedic injury were two to three times more likely to report sleeping disturbances and problematic alcohol use.[63]

On average, athletes tend to sleep less (approximately <7 hours) and have lower sleep quality than nonathletes.[64] Like mental health conditions, there are several non-sport (eg, family commitments, lifestyle choices) and sport (eg, high training loads, travel) factors that can impact an athlete's sleep; for a full discussion of these variables review the Walsh et al.[64] consensus statement. Sleep also plays an important role in sport injury. Poor sleep may be an indirect predictor of orthopedic injury[61] and concussions. One study found that moderate to severe insomnia and excessive daytime sleepiness were predictive of concussions more than traditional risk factors, such as history of concussions.[65]

Athletes use substances for a variety of reasons that include social (eg, "bonding" time with teammates"), performance enhancement (eg, pain management), or psychological (eg, coping with emotions).[9] Research suggests collegiate athletes involved in team sports were more likely to use substances than those involved in individual sports.[66,67] For adolescent athletes, participation in team sports was associated with a lower chance of using cannabis at a younger age but a higher rate of alcohol use over time.[68] Athletes can be more likely to use when they perceive teammates or coaches as approving of substance use,[69] and some teams may have cultures where substance use is encouraged or expected. Athletes may also use substances such as alcohol[70] or cannabis to improve sleep.[67] However, using these substances as a sleep aid is unlikely to be effective; both alcohol[71] and cannabis[72] can interfere with time spent in REM sleep, which contributes to daytime fatigue and a variety of mental health symptoms.

The substance most frequently used in athlete samples is alcohol. Sport participation is associated with greater alcohol use during adolescence and into early adulthood in both short-term and longitudinal studies.[73] Elite athletes may use alcohol at higher rates than the general population,[37] particularly when rates of binge drinking or alcohol consumption during the off-season is considered. Approximately 49% (NAIA)[67] to 77% (NCAA)[66] of collegiate athletes reported consuming alcohol in the past year, and the higher rate is similar to nonathlete collegiate students.[74] NCAA athletes also binge drink at higher rates than the national average with rates ranging from 55% to 69% of men and 49%-57% of women in lacrosse, ice hockey, and swimming.[66,74] High rates of binge drinking may also occur at the professional level and into sport retirement.[75]

Competitive athletes often undergo drug testing, and overall rates of illicit drug use tend to be relatively low at 8%[73] in comparison to the general population.[74] The most frequently used illicit substance for athletes is cannabis, and rates of cannabis use tend to be higher in areas where cannabis use is

legal.[75] A recent review[62] identified a cannabis prevalence rate of 23.4% for athletes. Although this rate is lower than what is found in the general population,[74] the authors noted this may be an underestimate given studies typically rely upon athlete self-report. Cocaine is the second most frequently used illicit substance for NCAA student-athletes at 4%,[66] whereas it is LSD for NAIA student-athletes at 3%.[67] Both rates are consistent with what is found for nonathlete college students.[74] Several collegiate athletes also use nonprescribed opioids when injured, with 10.6% of women and 17.9% of men reporting using non-prescription opioids,[76] which is higher than rates for non-injured collegiate athletes (2%).[66]

Substance use has a variety of negative impacts ranging from impaired athletic performance to poor mental health and well-being. Depending upon the context in which an athlete is using substances, it may be difficult to illuminate ways in which the use is negatively impacting an athlete's functioning.[70] Athletes may not see their use of substances as problematic or be fearful about potential consequences of seeking substance use treatment based upon organizational policies. The effectiveness of various substance use interventions in athlete populations has not been studied extensively.[75] Therefore, considerable research is needed in this area to identify ways in which substance use concerns can be best addressed.

## Psychology of Sport Injury

Across mental health disorders, injury is frequently identified as a sport-specific risk factor for mental health conditions, and it is one of the most frequently researched risk factors for mental health concerns in elite athletes.[77] In many ways, this is intuitive, as injury is often associated with significant changes in activity level and loss of a potential outlet to cope with stress. Although mental health concerns can happen any time before or during the injury recovery process, sudden retirement (ie, career-ending injuries) can contribute to an athlete having a more difficult transition experience.

A variety of models exist to explain the relationship between mental health symptoms and sport injury, which include the multifactorial model of sport injury etiology,[78] the stress-injury model,[79] and the integrated model of psychological response to the sport injury and rehabilitation process.[80,81] These models propose relationships between biological, psychological, and social factors as they relate to the sport injury process. Specifically, the relationship between stressors and cognitive appraisals are thought to contribute to a variety of emotional, behavioral, and cognitive responses for the athlete that can also be influenced by several personal and situational factors that impact rehabilitation outcomes.

When working with injured athletes, it is important to also consider bias in healthcare as it relates to factors such as access, pain perception, and pain management, as these factors have the potential to impact rehabilitation outcomes. In a study of medical staff for collegiate athletes,[82] medical personnel assumed Black athletes felt less pain than white athletes, which was mediated by socioeconomic status (SES). Other studies found Black high school athletes and athletes attending high schools in poor areas (ie, under resourced schools) had worse attitudes about concussions and were more likely to continue play postconcussion.[83] Athletes in under resourced schools are likely to have fewer sports medicine resources (ie, athletic trainers) that assist with concussion education and identification. Transgender collegiate athletes viewed athletic trainers lacking education about transgender needs and did not experience the environment as safe and respecting.[84] Therefore, it is imperative that healthcare professionals combat bias in healthcare and create safe, respecting environments for all.

## Preinjury Factors

Research clearly suggests that stress has a strong association with sport injury, which is reflected in the various psychological response to sport injury models. One meta-analysis[85] found that negative life event stress had the strongest association with injury rates. The authors posited that part of this relationship was due to negative life events being associated with emotional distress, which may reduce one's cognitive capacity for attending to the environment effectively. Other types of stress, such as academic stress, may also increase one's risk for injury.[86] Although it has not been examined directly, it is reasonable to conclude that stress related to experiences of oppression and marginalization could also impact injury risk.

Trait anxiety is also consistently associated with sport injury occurrence[8] and nearly 66% of studies found a relationship between trait anxiety and orthopedic injury.[87] Other forms of anxiety that may be associated with injury risk is fear of reinjury/perceived susceptibility to sport injury[34] or somatic anxiety.[88] The idea behind anxiety contributing to increased risk for sport injury is threefold[8]: 1) increased muscle tension; 2) impaired attentional processes (narrowing) in the sport environment; and 3) increased distractibility. In one longitudinal study, collegiate athletes experiencing anxiety symptoms in the preseason were over 2 times more likely to become injured during the season (during competition and practice) than athletes not experiencing anxiety during the preseason.[89] Although few studies examine effects of psychological prevention interventions on sport injuries, preliminary research suggests that psychological interventions to reduce stress and anxiety may produce a positive impact on reducing injury frequency among athletes.[90]

## Postinjury & Rehabilitation Factors

The time immediately postinjury is associated with the poorest mood states and heightened anxiety, although anxiety may decrease over time regardless of injury type.[91] Many

unknowns exist for athletes, such as injury severity, timing of surgery, rehabilitation plan, or process of returning to pre-injury level of functioning. Emotions that athletes experience after injury and throughout rehabilitation can range from temporary emotional difficulties (eg, fear, frustration, sadness) to a diagnosable mental health condition. Athletes may experience emergence of new mental health concerns or exacerbation of pre-existing mental health concerns post-injury, and this may be particularly likely for athletes with a strong athletic identity.[26] Trauma-like symptoms may occur after injury for 23%-45% of athletes.[33]

Numerous personal factors can impact an athlete's psychological response to sport injury, such as injury factors (eg, history, severity), psychological factors (eg, coping styles, mood states), sociodemographic factors (eg, gender, SES, and physical factors (eg, genetics).[92] Athletes may demonstrate cognitive appraisals that are related to injury severity (ie, perception of more severe injury associated with more negative appraisals) that may shift more positively once injury status is known.[93] Existing research suggests the first month is associated with greater emotional variability, particularly for athletes experiencing concussions. Approximately 30% of athletes report at least one mental health symptom following SRC,[94] and a SRC clinical profile associated with anxiety and mood symptoms appears to exist.[30] Some emergence of depression symptoms may be due to the overlap in symptomatology between depression and sport-related concussion (SRC)[95] Athletes experiencing concussion symptoms longer than 1 month may be at an increased risk for mental health symptoms, particularly depression, and may benefit from an evaluation with a licensed mental health professional.[91] Research suggests the presence of higher anxiety levels for athletes with current orthopedic injury or history of concussion than athletes without these concerns.[35]

During the initial injury phase, athletes benefit from information about their injury, assistance managing their psychological responses, and social support. Athletes may seek social support from family members, friends, teammates, and athletic trainers.[93] Sports medicine personnel play important roles throughout the injury recovery process. Physicians, physical therapists, and athletic trainers can be helpful by providing information about the injury and what athletes can do to improve recovery outcomes. Given many athletes use their sport as a coping skill for stress and other emotions, they may be unsure how they can cope with emotions post-injury. Therefore, education about normative emotional responses, effective coping strategies, and knowing when to seek mental health treatment can assist athletes navigating this process. As rehabilitation begins, athletes enter the phase with the widest range of functioning that is dependent upon injury severity and type. The functioning of athletes is still impaired, and athletes progressing through recovery see gains in strength and fitness. This phase can become challenging because athletes see progress but may not have the end of rehabilitation in site, which may negatively impact rehabilitation motivation.

As expected, athlete engagement in rehabilitation is associated with a variety of personal, cognitive, and emotional variables.[8] For example, doubts about the rehabilitation program may surface that may influence adherence to the rehabilitation protocol. On the other hand, athletes can have positive appraisals of the process that may facilitate rehabilitation motivation, such as experiencing confidence in ability to deal with the injury and complete the rehabilitation program.[96] Overall, there is generally a trend toward more positive emotions and fewer negative emotions as rehabilitation progresses[97,98] as athletes progress toward their goal of returning to sport. It is also important to regularly evaluate the presence of mental health symptoms throughout this phase, particularly when athletes are not progressing through rehabilitation as expected. The concussion literature suggests a possible association between mental health symptoms and worse symptomatology or longer recovery from SRC.[99]

During the beginning and middle of rehabilitation it is beneficial to manage athlete expectations, normalize their experiences, and revisit their goals and progress in rehabilitation. As athletes improve in rehabilitation, they may begin to compare themselves to their preinjury selves and establish unrealistic goals.[100] Therefore, revisiting goals and progress provides an opportunity for athletes to objectively view data and understand what is needed to for continued rehabilitation progression. Tools such as performance profiling[100] may be helpful as athletes reflect on their progress. Toward the end of rehabilitation, it is helpful to review progress, manage athlete misperceptions, and emphasize patience and precision with the rehabilitation plan. Because athletes are nearly ready to return to sport, they may want to rush the process, which may compromise progress in rehabilitation. Comparison to pre-injury functioning may intensify and influence pressure to return to sport prematurely. For SRC, the end of rehabilitation likely includes return to learn protocols, and there may be some regression (eg, increase in symptoms, increase in difficult emotions). Social support continues to be important, although sports medicine professionals may serve as the primary providers of social support followed by teammates and coaches.[93]

## Return to Sport Factors

Psychological readiness for return to sport is defined as absence or low levels of anxiety and high confidence, self-efficacy, and motivation.[8] Essentially, psychological readiness functions as one's appraisal of their ability to return to sport effectively, which has the potential to impact rehabilitation outcomes. One study[101] found after ACL reconstruction, 45% of athletes did not return to competitive play, and psychological readiness for return to sport was cited as the primary barrier. Fortunately, many variables contributing to psychological readiness are modifiable. Therefore, if an athlete is experiencing difficulties in these domains, a referral to a mental health professional with expertise in sport injury may be beneficial.

Anxiety can manifest in two primary ways: fear of reinjury and fear of performance. Fear of reinjury the most frequently reported source of anxiety and one of the most cited reasons

**Table 1** Athletes Questions for Return to Sport Readiness

| Question type | Question |
|---|---|
| Rating scale | On a scale from 1 to 100, how ready do you feel to return to sport? |
| Rating scale | On a scale from 1 to 100, how would you rate your level of (confidence, anxiety, motivation)? What would you rate your typical level of (confidence, anxiety, motivation)? |
| Rating scale/ open-ended | On a scale from 1 to 100, how pressured do you feel to return to sport? What are the sources of this pressure? |
| Open-ended | What are the benefits to returning to sport for you? What about the drawbacks? |
| Open-ended | What do you believe you can handle when you return to sport? What are you less confident in handling? |
| Open-ended | What would make you feel more ready to return to sport? What would make you feel less ready to return to sport? |

athletes do not return to sport either at all[102] or return at a level that is lower than preinjury levels of functioning.[103] One study[104] found athletes reporting increased injury-related fear after ACL reconstruction were 13 times more likely to sustain a secondary ACL injury within 24 months of reconstruction. Improving confidence may be associated with reduced return to play anxiety because athletes are able to trust the injured body part and perceive their body as able to perform when they ask it to do so. Athletes may also experience fear of performance (eg, unable to perform specific skills, loss of physical fitness) and engage in impression management throughout the rehabilitation process to compensate for these fears. In a study of junior soccer players, performance anxiety, along with athletic identity and amotivation, were the variables most related to intense symptom reports and slower recovery from SRC.[105] Based upon the existing research, it is unclear what specific level of anxiety is considered problematic during return to sport, although athletes likely benefit from learning tools to manage any anxiety throughout the rehabilitation process.

Because psychological readiness for return to sport is crucial for successful sport return, it is necessary that this is addressed throughout the rehabilitation process, not just as return to sport approaches. This allows ample time for athletes to build necessary skills to navigate any psychological responses. Attending to psychological readiness throughout the rehabilitation process can also improve an athlete's experience of social support, which may also improve rehabilitation outcomes. In a sample of collegiate athletes with orthopedic injury, athletes satisfied with athletic trainer social support were 70% less likely to report depressive symptoms and 78% less likely to report anxiety symptoms at return to sport than athletes dissatisfied with athletic trainer social support.[106] Social support from others may also be a stronger predictor of anxiety at return to sport for athletes experiencing a concussion compared to those experiencing an orthopedic injury.[107] Negative affective experiences are associated with a longer return to sport process,[108] which is further evidence that addressing psychological aspects of sport injury throughout rehabilitation is helpful.

There are three primary ways professionals can evaluate psychological readiness throughout rehabilitation. First, this can be done through behavioral observation, which involves watching the athletes for behaviors that suggest one is not ready to return to sport.[8] For example, bracing or hesitation when completing movements may suggest fear or anxiety, or moving tentatively may suggest lack of confidence in the injured area. Second, one can assess readiness by asking athletes questions about athletes' experience of return to sport. Table 1 includes examples of such questions. The final way to evaluate psychological readiness for return to sport is using self-report inventories. The ACL Return to Sport After Injury (ACL-RSI)-Short Version[109] is a well-validated five-item inventory that is easy to administer. Other inventories, such as the Tampa Scale of Kinesiophobia[110] or the Re-Injury Anxiety Inventory (RIAI)[111] may be helpful when examining fear of movement and re-injury, respectively.

## Conclusion

As a recent consensus statement indicated,[112] "mental health is a core component of a culture of excellence" (pp. 2) and must be centered throughout an athlete's career. Existing research clearly suggests athletes experience wide ranging mental health symptoms at a variety of competitive levels, and if we are asking them to perform at their best, we must appropriately identify and address mental health and substance use concerns. Although we need large-scale, well-controlled studies to better understand nuances of athlete mental health, the importance of prioritizing athlete mental health and well-being is clear. At the same time, not all athletes experience mental health when navigating various stressors. For example, some athletes experience relief or reduction of stress upon retirement, and some athletes use perceived competitive failures to focus and drive them toward their goals. Given the correlational nature of existing work, it can be difficult to identify causal relationships between these variables. Factors contributing to mental health symptoms are complex, and additional well-designed studies in athlete populations are needed to better understand the athlete experience. Specifically identifying athlete subgroups and developmental periods that place athletes at-risk for mental health concerns are important.[31]

Addressing psychological readiness for return to sport throughout rehabilitation has the potential to positively impact recovery outcomes and allow ample time for athletes to build psychological skills necessary for performance.

However, high psychological readiness for return to sport does not necessarily mean an athlete is safe to return to their sport,[113] so psychological readiness should be one of several factors that are considered during the return to sport process. In some ways, it may be easier for athletes to discuss mental health concerns within the context of injury, as it may feel "acceptable" to them that they are struggling psychologically given removal from play.[114] Therefore, it is important for medical professionals to be aware of the psychological and mental health factors that are present throughout the injury and rehabilitation process. Knowledge and preparation to have conversations with athletes about mental health and psychological responses to injury can increase the likelihood of a successful referral to a qualified mental health professional. There is value in systematically incorporating tools to evaluate mental health and substance use concerns (eg, self-report inventories) throughout rehabilitation, and Haugen and colleagues[9] provide a comprehensive review of such inventories.

Finally, it is important for medical professionals to understand how experiences of marginalization and oppression impact an athlete's mental health status and injury rehabilitation. For example, an athlete may be reluctant to share their experience of pain due to previous experiences of not being taken seriously. An athlete who may seem "noncompliant" with rehabilitation, may be having trouble trusting medical staff and is unsure or afraid to address this with them given the power differential. Professionals must work to eliminate disparities in the healthcare setting and provide culturally informed care. This can be done by understanding and acting against biases as they exist related to multiple identities including but not limited to race, gender identification, SES, ability status, sexual orientation, religious status, and national origin. Doing this not only has the potential to improve one's relationship with athletes they serve as patients but also the potential to improve injury outcomes.

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