Journal of Athletic Training 2023;58(9):687–696
doi: 10.4085/1062-6050-0556.22

www.natajournals.org

Current Clinical Concepts: Integration of Psychologically Informed Practice for Management of Patients With Sport-Related Injuries

Shelby Baez, PhD, ATC*; Kate Jochimsen, PhD, ATC†‡

*Department of Exercise and Sport Science, University of North Carolina at Chapel Hill; †Center for Health Outcomes and Interdisciplinary Research (CHOIR), Department of Psychiatry, Massachusetts General Hospital, Boston; ‡Harvard Medical School, Boston, MA

Psychologically informed practice is an approach to patient management that encourages clinicians to treat patients from a biopsychosocial perspective and can be adopted by athletic trainers to manage sport-related injuries. As described in the domains of athletic training clinical practice, athletic trainers are expected to identify, address, and make appropriate referrals regarding psychosocial responses to injuries and mental health symptoms. Psychologically informed practice suggests addressing physical impairments in addition to screening and intervening for psychosocial responses with patients. In this Current Clinical Concepts paper, we discuss appropriate patient-reported outcome measures used to screen for mental health symptoms and psychosocial responses, provide recommendations on psychological interventions that can be integrated to enhance patient outcomes, and describe how to effectively refer a patient to an appropriate mental health professional.

Key Words: psychological responses, mental health, sport injury, screening intervention

Athletic trainers (ATs) are expected to identify, address, and make appropriate referrals regarding patients' psychosocial responses to injuries and mental health symptoms and disorders.[1] Psychosocial strategies that are in the scope of athletic training clinical practice include integrating positive self-talk, goal setting, relaxation training, and imagery, among many other psychological skills.[1] Although ATs have demonstrated a high level of accuracy in identifying psychosocial responses and mental health symptoms, they still often take a biomedical approach to patient care (ie, focusing on the biological aspects of disease) during rehabilitation because they lack confidence in implementing psychosocial strategies.[2] Therefore, identification and effective descriptions of evidence-based psychosocial strategies that can be implemented into clinical practice are critically needed, as are recommendations on when and how to integrate these psychosocial strategies. Improving confidence through knowledge translation may help shift the current treatment paradigm in athletic training clinical practice away from a biomedical approach and toward a psychologically informed approach.

In 2011, Main and George[3] proposed a new approach to patient treatment that identified a "middle way" between traditional biological approaches that are physical impairment driven and cognitive-behavioral interventions designed to address traditional mental health symptoms. This balance between traditional biomedical approaches and cognitive-behavioral interventions was termed *psychologically informed practice* (Figure 1). The core philosophy of psychologically informed practice is to "incorporate patient beliefs, attitudes, and emotional responses into patient management based on biopsychosocial models."[3(p822)] The biopsychosocial model postulates that biological (eg, disease-specific factors), psychological (eg, fear, confidence, anxiety), and social (eg, family support, health care access) factors affect a patient's response to treatment.[3] Patient-centered care should function at the intersection of these domains, and treatment decisions should be based on the patient's specific needs. Integration of psychological and social factors into routine clinical practice represents an evolution in care to match the latest evidence.

It is important to note that psychologically informed practice does not encourage ATs to perform duties that are outside of the scope of their practice related to mental health, such as attempting to intervene to address a patient's suicidal ideations. It is simply promoting the integration of cognitive-behavioral and psychosocial interventions that are within the scope of athletic training clinical practice into patient management. If a patient is having active suicidal ideation, it is critical for ATs to implement their mental health crisis policy. However, for a patient who is experiencing depressive symptoms or becoming more withdrawn, the AT should follow the normal referral process to connect the patient with a mental health professional (eg, school counselor, sport psychologist, social worker). Adopting a psychologically informed approach to clinical practice could improve outcomes for many patients by addressing relevant psychosocial responses that may negatively impede outcomes after sport-related injuries.

Common postinjury psychosocial responses include decreased confidence, increased injury-related fear (eg, fear of movement, pain, reinjury), increased pain catastrophizing,

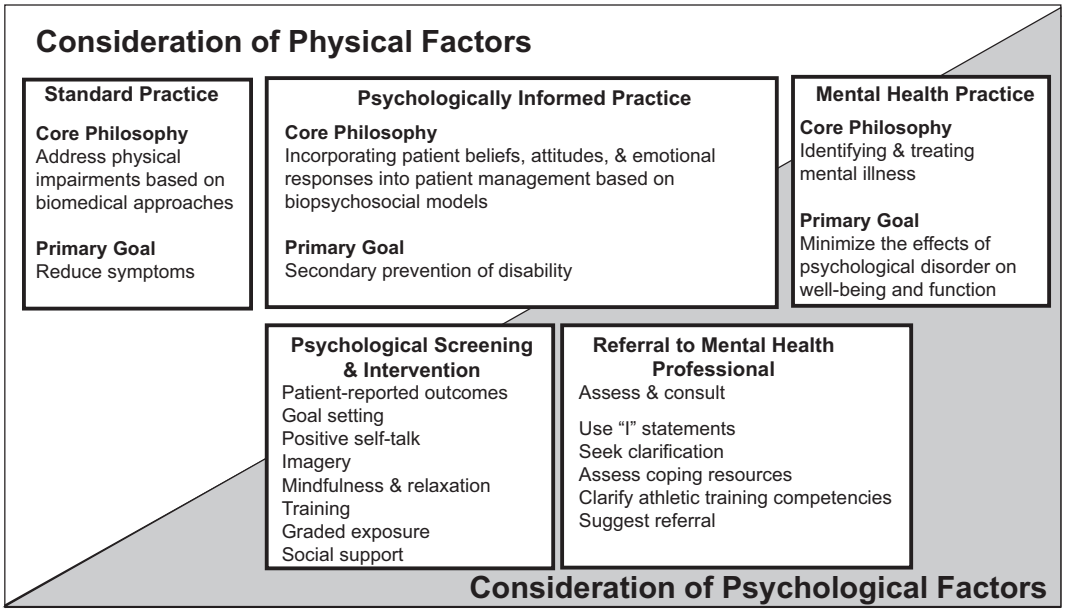

Figure 1. Psychologically informed practice for athletic training. Adapted from Main CJ, George SZ. Psychologically informed practice for management of low back pain: future directions in practice and research. *Phys Ther*. 2011;91(5):820–824, by permission of Oxford University Press.[3]

decreased motivation, and social withdrawal, among many others.[4] A high prevalence of mental health symptoms and disorders, such as depression, anxiety, adverse alcohol use, and disordered eating, has also been observed in collegiate and elite athletes.[4] Therefore, a critical need exists to effectively assess, intervene, and refer in order to improve patient care for individuals with sport-related injuries. The purpose of our Current Clinical Concepts paper was to define psychologically informed practice as a critical component to athletic training clinical practice and provide recommendations for specific evidence-based psychologically informed strategies to address common psychosocial responses to injury and facilitate referrals to mental health providers. The Strength of Recommendation Taxonomy[5] was used to identify the quality and consistency of the evidence that supports each recommendation. Evidence graded *A* is based on outcomes that can be reproduced and observed across multiple patient-centered, well-controlled studies. Evidence graded *B* is based on patient-centered outcomes but is from studies with reduced quality or that exhibited conflicting results. Evidence graded *C* is based on disease-oriented or clinician-oriented data (Table 1).[5]

SCREENING FOR MENTAL HEALTH SYMPTOMS AND PSYCHOSOCIAL RESPONSES AFTER INJURY

Psychosocial Screening Tools

Adopting a psychologically informed practice requires appropriately recognizing opportunities to integrate cognitive-behavioral and psychosocial interventions and having the confidence and skills to deliver these interventions. Clinicians can identify patients who are appropriate for psychological interventions using a variety of techniques, including patient-reported outcomes measures, patient conversations, and observation of patient behavior (eg, movement, hesitancy, rehabilitation adherence). In this paper, we chose to narrow our focus to the patient-reported tools most supported by the literature related to musculoskeletal sport injuries. In doing so, we tried to strike a balance between collecting clinically meaningful data and minimizing the patient burden during baseline screening. The psychosocial screening tools we recommend that are strongly supported in the literature include the Pain Catastrophizing Scale,[6] the Pain Self-Efficacy Questionnaire,[7] and the Tampa Scale for Kinesiophobia.[8] The reliability and validity of these measures are reported in Table 2. *Pain catastrophizing* is a patient's magnification and rumination on current or potential painful experiences as well as a feeling of helplessness in overcoming the pain.[6] *Self-efficacy*, a patient's confidence in the ability to complete tasks, is a construct that is both task and situation specific.[9] As such, various self-efficacy scales are available. Relative to musculoskeletal injury, we opted to focus on *pain self-efficacy*, or a patient's confidence in the ability to complete daily tasks despite the current pain. *Kinesiophobia* is a fear of painful movement or reinjury. Although certain cutoff scores for these tools have been established, we do not advise using them to determine who should receive an intervention. Cutoff scores can be helpful, particularly in researching the effect of poor psychosocial health on clinical outcomes. However, the difference between a 19 and a 20 is likely not clinically meaningful and may even be the result of measurement error. We suggest using these questionnaires to (1) facilitate a conversation with the patient regarding the mental health symptoms and psychosocial responses to injury and (2) examine changes over time to assess the effectiveness of psychological interventions.

Mental Health Symptom Screening Tools

In addition to these psychosocial patient-reported outcome tools, ATs may consider screening for mental health symptoms (eg, symptoms of anxiety, depression, or substance abuse). We recommend 2 general mental health screening tools: the Sport Mental Health Assessment Tool 1,[10] which

Table 1. Strength of Recommendation Taxonomy for Psychological Interventions Within the Scope of Athletic Training[a]

Psychological Intervention	Brief Description	Strength of Recommendation	Rationale for Use After Sport-Related Injury
Screening for mental health symptoms and psychosocial responses after injury	Using patient-reported outcome tools to identify patients appropriate for psychological interventions or referrals to mental health professionals.	A	Several systematic reviews have identified poor mental health and psychosocial responses after injury as risk factors for poor clinical outcomes. Therefore, screening for both is highly recommended.
Communication strategies	The "4Es" (engaging, empathizing, educating, and enlisting), emphasizing impairments instead of pathoanatomy, and motivational interviewing are examples of effective communication strategies.	B	Limited-quality evidence supports effective patient-provider communication as a method to improve outcomes.
Goal setting	*Goal setting* uses motivation and instruction to assist patients in setting and achieving objective goals. Three types of goals exist: process, performance, and outcome goals.	A	Consistent evidence to suggests that goal setting is an effective intervention to improve self-efficacy.
Self-talk	*Self-talk* is what individuals say to themselves internally or out loud. Positive self-talk can include affirmations, cue words, or mantras.	B	Limited-quality evidence supports self-talk as an intervention to improve self-efficacy and motivation.
Graded-exposure therapy	*Graded exposure* addresses a patient's injury-related fear via direct exposure to fear-eliciting tasks.	B	Inconsistent evidence supports the use of graded-exposure therapy to reduce injury-related fears.
Mindfulness and relaxation training	*Mindfulness* is the ability to stay present in the moment without becoming overly reactive to thoughts, emotions, or feelings. This can include focused-attention mindfulness, diaphragmatic breathing, and open-monitoring mindfulness.	B	Limited-quality evidence indicates that mindfulness can reduce pain and kinesiophobia.
Imagery	*Imagery* refers to the internal representations generated by an individual that allow for perception without sensory input. This can include healing, soothing, and performance imagery.	A	Imagery improves clinical outcomes (pain and function) after sport injuries, such as anterior cruciate ligament injury.
Social support	*Social support* is the perception and actuality that one has assistance and is cared for by individuals in one's network. Social support can come from the athletic trainer, coaches, sport psychologists or school counselors/social workers, family, friends, and teammates.	C	Currently limited evidence indicates the effectiveness of integrating social support as an intervention to improve outcomes.
Pain education	Pain education uses metaphors and imagery to describe complex pain concepts and helps patients reconceptualize their pain experience.	A	Pain education is effective in reducing pain catastrophizing and kinesiophobia.
Facilitating referrals	A patient who displays "red flags" warrants a referral to an appropriate mental health provider. The Brewer and Redmond[4] 5-step process should be followed and soft handoff strategies used. Red flags include excessive worry or stress, any talk of hopelessness or suicide, self-harm, flat affect, inability to concentrate or focus, or disclosure of anything concerning (eg, thoughts of harming others, history of trauma).	B	Evidence supporting the effectiveness of specific proposed referral techniques is currently lacking.

[a] Strength of Recommendation Taxonomy grades: grade *A* evidence is based on outcomes that can be reproduced and observed across multiple patient-centered, well-controlled studies. Grade *B* evidence is based on patient-centered outcomes but is from studies with reduced quality or that exhibited conflicting results. Grade *C* evidence is based on disease-oriented or clinician-oriented data[5].

assesses anxiety, depression, sleep disturbance, alcohol misuse, drug use, and disordered eating, and the Patient-Reported Outcomes Measurement Information System anxiety and depression questionnaires.[11] It is beneficial for ATs to collaborate with the sports medicine team, specifically with a mental health professional (eg, school counselor, sport psychologist, social worker), in developing a screening protocol and interpreting the results of mental health screening tools. Also, these questionnaires should be administered in person in case a patient reports high levels of depressive symptoms or suicidal ideation. A patient who is actively experiencing suicidal ideation should never be left alone, a

Table 2. Screening Tools for Psychosocial Responses to Injury and Mental Health Symptoms

Tool	Description	Scoring	Measurement Properties
Psychosocial screening tools[a]			
Pain Catastrophizing Scale	An exaggerated, negative response to actual or anticipated pain.	13 items, each rated on a scale from 0 (*not at all*) to 4 (*all the time*). Total scores range from 0 (*least catastrophizing*) to 52 (*most catastrophizing*).	Good test-retest reliability (0.75)[7] and good to excellent internal consistency (Cronbach α = .87 to .95).[7]
Pain Self-Efficacy Questionnaire	Confidence in a patient's ability to complete tasks despite their current pain.	10 items, each rated on a scale from 0 (*not at all*) to 6 (*completely*). Total scores range from 0 (*least self-efficacy*) to 60 (*most self-efficacy*).	Good test-retest reliability (0.73) and excellent internal consistency (Cronbach α = .92).[8]
Tampa Scale for Kinesiophobia	Fear of painful movement or reinjury.	11 or 17 items rated on a scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Total scores ranging from 11 (*least fear*) to 44 (*most fear*) on the 11-item version (*least fear*) to 60 (*most fear*) on the 17-item version.	Both have good test-retest reliability (0.80–0.81)[9]; 17-item version has good internal consistency (Cronbach α = .71–.84).[50]
Injury—Psychological Readiness to Return to Sport	Psychological readiness to return to sport (non–injury or joint specific).	6 items rated on a scale from 0 to 100. Total scores range from 0 (*no confidence*) to 100 (*complete confidence*).	Good to excellent internal consistency (Cronbach α = .78–.93).[14]
Mental health symptoms screening tools[b]			
Sport Mental Health Assessment Tool 1	Athlete-specific mental health screening tool. Uses a staged screening model with a primary tool to measure sport-related psychological distress.	Multistep screening tool. Step 1 measures sport-related psychological distress. Patients who score $\geq$17 proceed to step 2, a series of 6 validated mental health symptom screening tools (anxiety, depression, disordered eating, substance use, alcohol dependence, sleep disturbance).[c]	Demonstrated preliminary reliability and validity (Cronbach α = .59–.91).[11]
Patient-Reported Outcomes Measurement Information System anxiety and depression	Computer-adaptive self-reported emotional distress (anxiety and depression).	Emotional Distress–Anxiety subscale has 7 items with scores ranging from 36.3 (*least*) to 82.7 (*most*). Emotional Distress–Depression subscale has 8 items with scores ranging from 35.2 (*least*) to 82.4 (*most*).	Reliable and valid measures of emotional distress with minimal patient burden. Highly correlated with the full item bank.[14]

[a] Addressable within the scope of athletic training clinical practice.

[b] May require referral to mental health professional.

[c] Step 3b of the Sport Mental Health Assessment Tool 1 should only be conducted by a physician or appropriate mental health professional. A score of $\geq$1 on item 9 of the Patient Health Questionnaire-9 requires an immediate response to keep the athlete safe.

parent or guardian (if indicated) should immediately be contacted, and the mental health crisis policy should be implemented. The policy may include escorting the individual directly to an available mental health professional or an emergency room or calling 911 to ensure receipt of appropriate care. Furthermore, harm to others and child abuse or neglect should evoke the team's mental health protocol to protect the athlete and the safety and well-being of others. All ATs should follow their workplace policies and procedures relative to mental health. It is the responsibility of every institution to have mental health policy and procedure documents that align with best practices and current evidence.[12]

Frequency and Timing of Screening

We advise that the aforementioned psychosocial and mental health screenings be performed with all athletes at baseline or preseason. This recommendation is consistent with the "National Athletic Trainers' Association Position Statement: Preparticipation Physical Examinations and Disqualifying Conditions,"[13] the National Athletic Trainers' Association Intercollegiate Council for Sports Medicine Mental Health Toolkit,[14] and the National Collegiate Athletic Association's best practices on mental health screening and recognition in athletes.[12] This baseline screening serves as a tool to identify individuals who may benefit from a referral to a mental health professional and a starting point to measure changes over time and in response to injury. Additional screening should occur postinjury, at regular intervals throughout rehabilitation, before return to sport, and any time a clinician observes signs or hears patients expressing sentiments of apprehension or fear, catastrophizing, pain anxiety, decreased confidence, social isolation, etc. This screening can include the Injury-Psychological Readiness to Return to Sport scale[15] or an injury-specific psychological readiness

tool such as the Anterior Cruciate Ligament Return to Sport After Injury scale,[16] to evaluate psychological readiness for return to sport and the Tampa Scale for Kinesiophobia as part of return-to-sport testing batteries. High levels of kinesiophobia and decreased psychological readiness have been associated with an increased risk of reinjury[17,18] and should be considered when making return-to-play decisions.

Strength of Recommendation: A

PSYCHOSOCIAL INTERVENTIONS WITHIN THE SCOPE OF AT CLINICAL PRACTICE

Communication Strategies

Effective patient-provider communication has been linked with enhanced outcomes after injury.[19] Covassin et al[19] suggested the use of the "4Es" to improve AT communication with patients. The 4E model consists of (1) *engaging* with the patients in familiar and easy-to-understand language, (2) *empathizing* with the patient to understand their point of view, (3) *educating* the patient on the details of the injury and recovery process, and (4) *enlisting* the patient in the decision-making process to create a collaborative environment that supports the patient's thoughts and feelings.[19]

When educating patients on their injury, clinicians should discuss the physical impairments (eg, "You are presenting with weakness of the hip flexors and external rotators. This may be contributing to the way you are moving. Together, we will work to strengthen these muscles and improve your movement patterns. Hopefully, this will help reduce your hip pain") instead of only the pathoanatomy (eg, "You have an acetabular labral tear that is causing your hip pain"). Lastly, we also advise using motivational interviewing techniques, such as engaging in active listening, using open-ended questions, affirming patients when they express positive behaviors in rehabilitation, and effectively summarizing conversations with them to demonstrate that the patient was heard during the conversation.[20] This can help to enhance the rapport between the AT and the patient and create a collaborative rehabilitation environment.

Strength of Recommendation: B

Goal Setting to Enhance Self-Efficacy. A frequently examined psychological factor after sport-related injury is self-efficacy. Self-efficacy is an individual's belief in their ability to execute a specific behavior to achieve a specific goal.[9] For example, in patients with femoroacetabular impingement syndrome, low self-efficacy was associated with worse patient-reported pain and function preoperatively[21] and postoperatively.[22] Similarly, deficits in knee self-efficacy were linked with decreased physical activity after anterior cruciate ligament reconstruction (ACLR).[23] Effectively addressing self-efficacy deficits in clinical practice is critically important. Goal setting may be an effective intervention to improve self-efficacy after sport-related injury.

Goal setting is a process of identifying the steps needed to achieve specific outcomes and is one of the most commonly used strategies by ATs in rehabilitation.[2] Goals are categorized as process, performance, or outcome goals.[24] *Process goals* target specific behaviors, or the processes needed to perform an action, and are highly controllable by the patient (for example, attending rehabilitation 3 times per week). Process goals are the building blocks for *performance goals*, which are personal standards that individuals strive to achieve (for example, attaining 120° of passive knee flexion by week 4).[24] Performance goals are the building blocks for outcome goals. Performance and process goals are key because they reflect patient behavior and focus instead of end results. An *outcome goal* is the singular aim that a patient is working toward (for example: returning to full sports participation in 1 year). Although highly motivating, outcome goals are the least likely to be in the patient's control. However, achieving process and performance goals significantly increases the likelihood of achieving outcome goals.[25] When goal setting with patients, clinicians should use the SMART framework (specific, measurable, actionable, realistic, time bound), offer a variety of goals, and ensure that the goals are revisited at major clinical time points. When applied effectively, goal setting enhanced self-efficacy in individuals with sport-related injuries.[26]

Strength of Recommendation: A

Self-Talk to Enhance Self-Efficacy and Motivation. *Intrinsic self-determined motivation* (ie, doing an activity for inherent satisfaction rather than external rewards or validation) has been associated with greater psychological readiness for return to sport.[4] *Self-talk* is what individuals say to themselves internally or out loud and can be positive (eg, praising), negative (eg, self-criticism), or instructional (eg, "keep your eye on the ball").[19] A patient can use self-talk to help instruct, motivate, and build self-efficacy. Self-talk can manifest in different ways, such as affirmations, cue words (eg, "chill," "calm"), or mantras (eg, "slow and steady"). An AT should encourage patients to minimize negative self-talk and engage in positive self-talk to reduce stress and enhance adherence during rehabilitation. Furthermore, integrating positive self-talk may promote an adaptive physiological state (eg, decreased heart rate and muscle tension) during rehabilitation.[27] For example, ATs can ask their patients to report their self-talk before and after rehabilitation. Obtaining this information will allow the AT to address potentially negative self-talk at the start of the rehabilitation session and reinforce positive self-talk at the end. Although self-talk during rehabilitation after sport-related injury has been studied far less often than goal setting, it has been linked with increased quadriceps strength,[28] improved balance,[29] and better adherence to rehabilitation.[30]

Strength of Recommendation: B

Graded-Exposure Therapy to Decrease Injury-Related Fears. Injury-related fear has been identified as a primary barrier in the failure to return to activity after sport-related injuries.[23] Injury-related fear consists of multiple constructs, such as kinesiophobia (ie, fear of movement/reinjury), fear-avoidance beliefs, and fear of failure.[23] Injury-related fear demonstrated improvements from preoperative ACLR to 3 to 6 months post-ACLR and stabilized at the 6-month time point.[31] Moreover, Bullock et al[31] proposed that after the acute recovery phase (6 months), specific psychological interventions were needed to address injury-related fear. We hypothesize a similar trajectory for other

Table 3. Graded-Exposure Therapy Progression[a]

Task	Progression			
	1	2	3	4
Landing after a double-legged jump	On floor	Off 4-in (10.2-cm) step	Off 8-in (20.3-cm) step	Off 12-in (30.5-cm) step
Squats	Mini squat	Wall squat with ball	Double-legged squat with no weight	Double-legged squat with weight
Volleyball spike approach	Without a swing or ball	With swing without ball	With swing and ball	With swing, ball, and blocker
Baseball/softball throw	Toss ball using only wrist	Nonstride throw	Incorporate stride into throw	Long toss
Hop	Double-legged vertical hop	Double-legged forward hop	Single-legged vertical hop	Single-legged forward hop
Pivoting movement	Rotational lunge	Walk forward and change direction	Jog forward and change direction	Sprint forward and change direction

[a] Adapted from Baez et al[34].

sport-related injuries, such that injury-related fear is initially high, naturally reduces throughout the acute recovery phase, and stabilizes and maintains after the acute recovery phase. Unfortunately, few researchers have implemented high-quality observational and interventional studies to characterize the prevalence and consequences of injury-related fear after sport-related injury. Beyond the failure to return to sport, these fears have been associated with deficits in self-reported function,[17] elevated pain,[32] and a higher secondary injury risk[17]. Therefore, it is important to address injury-related fears throughout rehabilitation. Active therapies, including graded exposure, have been used to manage fears after sport-related injuries.

Graded exposure addresses a patient's injury-related fear via direct exposure to fear-eliciting tasks.[33] Patients can work with the AT to develop a hierarchy of fear-eliciting situations, with the most fearful task at the top of the list and the least fearful task at the bottom. We advise ATs to consult with appropriate mental health professionals, sport psychology professionals, or both in developing graded-exposure therapy exercises. Patients and ATs should work together to tackle the least fearful tasks first, using traditional rehabilitation progression through exercises. However, in addition to using soreness or pain as the primary basis for progression, rehabilitation specialists should assess fear to identify whether to progress a patient to the next step of a particular task. After reaching the final progression for that exercise, the patient can advance to the next item on the list, eventually tackling the most fear-eliciting task. Only 1 fearful task should be confronted at a time during the exposure therapy. This allows patients to feel more confident progressing through the hierarchy and less fearful as they reach the top of the hierarchy, with the most fearful task. Graded-exposure therapy has led to decreases in fear in patients with chronic low back pain[33] and ACLR.[34] Examples of recommendations for progression through commonly feared activities after sport-related injuries are provided in Table 3.

Strength of Recommendation: B

Mindfulness and Relaxation Training to Mitigate Painful and Fearful Experiences. *Mindfulness* is the ability to stay present in the moment without becoming overly reactive to thoughts, emotions, or feelings.[35] Mindfulness may be helpful for addressing a multitude of psychological responses after injury, including pain catastrophizing and injury-related fear. Mobile applications (eg, Headspace, Calm) are available for integrating mindfulness into clinical practice. Focused-attention mindfulness and open-monitoring mindfulness are most often used to channel a mindful state.[36] *Focused-attention mindfulness* occurs when an individual focuses attention on a sensation, object, or sound (eg, such as the breath during diaphragmatic breathing or an external environmental factor) to achieve a clear mind. *Diaphragmatic breathing*, or "belly breathing," is a relaxation technique that reduces anxiety and stress and improves physical measures such as balance.[37] Diaphragmatic breathing involves taking deep, slow breaths to draw air into the lower portions of the lungs and is usually initiated while lying supine.[4] Patients may be encouraged to internally count (eg, count of 4) while breathing in and breathing out.[4] With continuous and intentional practice, a patient can achieve a relaxed state with just a few breaths while standing, sitting, or lying down.[4] Focusing on the breath during diaphragmatic breathing can help to achieve a mindfulness state and allow the patient to stay present in the moment.

Open-monitoring mindfulness is the opposite: the individual's attention is open and remains aware of everything happening around them, including all sensations, objects, and sounds.[36] During this mindfulness experience, a patient allows thoughts to come and go, noting them and then letting them go. When teaching patients general mindfulness techniques, ATs should explain when to use each for maximal benefit (eg, use focused attention to redirect attention to breathing rather than pain during rehabilitation, use open monitoring when noticing fear during rehabilitation exercises to acknowledge the fearful thought and then let it go to stay present in the current task).[38] Mindfulness has been helpful in reducing pain and injury-related fear in athletes with patellofemoral pain syndrome[39] and has led to improvements in regulatory emotional self-regulation among injured athletes.[40]

Strength of Recommendation: B

Imagery to Reduce Pain and Improve Functional Outcomes. *Imagery* refers to the internal representations generated by an individual that allow for perception

without the presence of sensory input.[4] Athletic trainers can use healing imagery, soothing imagery, and performance imagery to aid in pain management and during rehabilitation activities.[41] Healing imagery encourages the patient to envision internal bodily processes during rehabilitation.[4] Patients are advised to identify and visualize meaningful representations, such as imagining a ligament as a rope and seeing the rope come together for healing. Soothing imagery incorporates all senses in imagining oneself in a state of relaxation, which could be helpful during painful aspects of the rehabilitation process. Performance imagery is an imaginal experience in which patients mentally rehearse sport-specific skills without physically completing the tasks. Through several randomized controlled trials, investigators have examined the effectiveness of imagery in improving outcomes after sport-related injuries. Imagery led to greater knee strength,[42] less pain,[42] and reduced knee laxity[43] in patients after ACLR, enhanced wrist range of motion after forearm immobilization,[44] and better muscular endurance after ankle sprains.[45] Based on this accumulated evidence, the integration of imagery may be a viable psychological intervention to enhance outcomes in patients after sport-related injuries. It is worth noting that imagery may be most effective when delivered in combination with other psychological interventions (eg, graded-exposure therapy). Multimodal interventions have shown increased potency over single-component interventions when treating individuals with musculoskeletal pain conditions.[46]

Strength of Recommendation: A

Social Support to Reduce Stress and Improve Overall Well-Being. After sport-related injuries, ATs often serve as a primary source of social support for patients. *Social support* is the perception and actuality that one has assistance from and is cared for by individuals in one's network.[47] Social support networks may consist of friends, family, coaches, teammates, and members of the sports medicine team.[47] Many types of social support exist, including informational, tangible, and emotional support.[47] *Informational support* describes providing facts and knowledge, often through advice or feedback. As patients navigate the recovery process, ATs are a primary source of informational support. Social support from ATs had a significant influence on injured athletes' rehabilitation and well-being.[48] *Tangible support* involves providing physical or financial assistance to the individual, such as giving a patient a ride to a doctor's appointment. *Emotional support* is expression of care, empathy, concern, or sympathy, which could include creating a safe space for patients to express their feelings. Social support is thought to improve physical and mental health by buffering the effects of stress on the patient.[49] Therefore, it may be advantageous to ensure that patients are using their social support networks, including family, friends, teammates, coaches, and the sports medicine staff. Clinicians should be aware that the types and amounts of support patients need will fluctuate throughout the phases of rehabilitation.[50] Regularly communicating with patients regarding their expectations and need can help to ensure adequate social support throughout the rehabilitation process. Unfortunately, few researchers have explored integrating social support as an intervention to improve outcomes after sport-related injuries.

Strength of Recommendation: C

Pain Education to Reduce Pain Catastrophizing and Injury-Related Fears. Pain education mitigates the effects of poor psychosocial health, specifically pain catastrophizing, by assisting patients in reconceptualizing their pain experience.[51] Metaphors and imagery are used to describe complex pain concepts, thereby decreasing the threat of pain, encouraging healthy movement, and facilitating focused engagement in rehabilitation. Examples of concepts covered in pain education are *nociception*, or the idea that pain is a multisystem output (example: the brain [cortex] can be represented as a boardroom with multiple characters or an onion with many layers [eg, the current physical environment, past experiences, current emotional state, tissue-level information]). Based on this information, the brain decides whether to produce the perception of pain. It is important to emphasize that pain does not always equal tissue damage; nociception is only 1 character, and pain can be present without nociception (eg, phantom limb pain).[51,52] Pain education also highlights that pain is an evolutionarily advantageous human experience that keeps us alive, and that over time, our nervous system can become *sensitized*—that is, hypervigilant and hypersensitive. What was once an innocuous stimulus may now be interpreted as painful (example: "Your nerves may be on high alert. It will take time for your nerves to become less sensitive, but participating in your rehabilitation exercises is safe and will help you feel better in the long run").[51] Pain education is effective in reducing pain catastrophizing and kinesiophobia and can be implemented in short periods of time, with total effective dosages under or approximately 1 hour that can be broken into multiple sessions (eg, four 15-minute sessions).[51] Sessions can occur in group or one-on-one settings. Some musculoskeletal providers prefer to use a pain education model as the basis for interacting with patients who are experiencing poor psychosocial responses to injury.[53] Certain patients may respond more favorably to a cognitive treatment approach than a somatic approach.

Strength of Recommendation: A

Facilitating Referrals to Mental Health Providers. Athletic trainers must have a robust mental health referral network and know when and how to facilitate an appropriate referral. If a patient demonstrates "red flags" (ie, excessive worry or stress, any talk of hopelessness or suicide, self-harm, flat affect, inability to concentrate or focus, disclosure of anything concerning [eg, thoughts of harming others, a history of trauma]), this warrants a referral to an appropriate mental health provider. For facilitating mental health provider referrals, ATs should follow the 5-step process outlined by Brewer and Redmond[4] consisting of assessment, consultation, trial intervention, referral, and follow-up (Figure 2). During assessment, the AT should monitor the patient's thoughts, emotions, behaviors and support networks and how the patient's behaviors are affecting others. If a conversation with the patient is appropriate, using "I statements" to characterize observations regarding the patient and their behavior can be beneficial. During this evaluation, the AT should seek clarification from the patient about what has been noted and assess the current coping resources. After this discussion, the AT is encouraged to consult with an appropriate mental health provider to determine

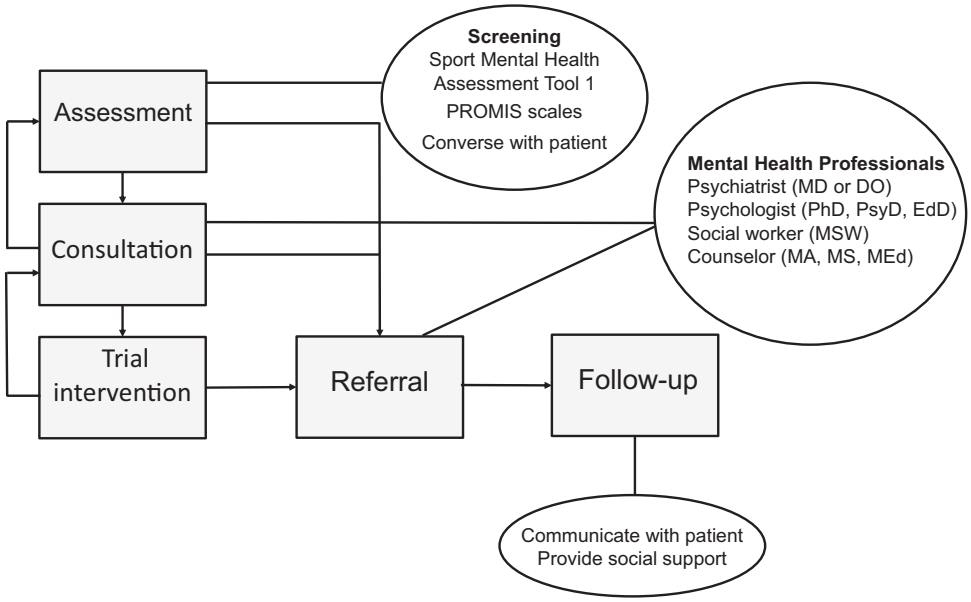

Figure 2. Referral process. Adapted with permission from Brewer BW, Redmond CJ. *Psychology of Sport Injury*. Human Kinetics; 2017.[4] Abbreviation: PROMIS, Patient-Reported Outcomes Measurement Information System.

whether to implement a trial intervention or immediately refer the patient to address factors outside of the scope of athletic training clinical practice. A trial intervention may include some of the aforementioned techniques, including goal setting, relaxation training, mindfulness, imagery, exposure therapy, and other psychological skills training within the scope of athletic training clinical practice.

When facilitating the referral conversation with the patient, the AT should explain professional competencies (eg, "I am an expert in your physical recovery") and then recommend referral to an appropriate provider (eg, "Maybe speaking to someone about all of this can help you feel better physically and mentally? Dr X has helped a lot of patients after injury when they found aspects of their rehabilitation process to be challenging. How would you feel if I arranged a meeting for you to meet with Dr X? I am happy to attend if that makes you feel more comfortable"). Rather than requiring the patient to independently create a relationship with a mental health professional, the AT can *facilitate* an in-person introduction between the patient and the mental health professional to create "buy-in" and ease initial appointment anxieties. By facilitating this relationship between the patient and mental health professional, the AT can also build trust between providers and patients and rapport among providers, which is essential to maintaining an effective sports medicine team. Importantly, as identified in the last step of the referral process, the AT should follow up with the patient after the appointment. The patient may not wish to disclose details of the session, but reaching out to express support is an important component of the therapeutic alliance. All ATs should have a written mental health policy and procedure document aligning with best practices. This document should be reviewed and updated annually. Additionally, it is critical for institutions (eg, athletics departments, administrators) to fully participate in this process by openly communicating, actively planning (ie, policies and procedures), and providing the required support (eg, sport psychologists and other mental health professionals) for the sports medicine staff so that they can prioritize multidisciplinary, whole-person care for their patients.

Strength of Recommendation: B

SUMMARY

To optimize patient outcomes after sport-related injury, we must treat patients from a biopsychosocial perspective. Psychologically informed practice encourages this approach through the integration of psychological screening, psychological intervention, and referral, which are within the scope of athletic training clinical practice. Because of their proximity to and frequent interactions with their patients, ATs are uniquely situated to provide psychological interventions and referrals. We recommend administering patient-reported outcome measures to screen for maladaptive psychosocial responses and mental health symptoms at baseline, postinjury, before return to sport, at major clinical time points, and if a patient is exhibiting symptoms. We also advise incorporating techniques such as goal setting, self-talk, graded-exposure therapy, relaxation training, mindfulness, social support, and pain education. Lastly, we encourage ATs to refer patients to mental health providers (1) when the symptoms are out of the scope of their clinical practice and (2) if the AT does not feel confident in handling the case.

Currently, limited evidence supports the broad adoption of psychological interventions in athletic training clinical practice. Additional rigorous clinical trials that determine the efficacy and effectiveness of psychological interventions for patients with sport-related injuries are needed. Athletic training curricula, best-practice guidelines, and clinical practice should be examined to identify opportunities for enhancing the education, professional guidance, dissemination, and implementation strategies of psychologically informed practice for patients with sport-related injuries.

REFERENCES

1. Henderson JP. *Practice Analysis*. 7th ed. Board of Certification; 2015.
2. Cormier ML, Zizzi SJ. Athletic trainers' skills in identifying and managing athletes experiencing psychological distress. *J Athl Train*. 2015; 50(12):1267–1276. doi:10.4085/1062-6050-50.12.02
3. Main CJ, George SZ. Psychologically informed practice for management of low back pain: future directions in practice and research. *Phys Ther*. 2011;91(5):820–824. doi:10.2522/ptj.20110060
4. Brewer BW, Redmond CJ. *Psychology of Sport Injury*. Human Kinetics; 2017.
5. Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *J Am Board Fam Med*. 2004;17(1):59–67. doi:10.3122/jabfm.17.1.59
6. Sullivan MJL, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. *Psychol Assess*. 1995;7(4):524–532. doi:10.1037/1040-3590.7.4.524
7. Nicholas MK. The pain self-efficacy questionnaire: taking pain into account. *Eur J Pain*. 2007;11(2):153–163. doi:10.1016/j.ejpain.2005.12.008
8. Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the TSK-11: a shortened version of the Tampa Scale for Kinesiophobia. *Pain*. 2005;117(1):137–144. doi:10.1016/j.pain.2005.05.029
9. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84(2):191–215. doi:10.1037//0033-295x.84.2.191
10. Gouttebarge V, Bindra A, Blauwet C, et al. International Olympic Committee (IOC) Sport Mental Health Assessment Tool 1 (SMHAT-1) and Sport Mental Health Recognition Tool 1 (SMHRT-1): towards better support of athletes' mental health. *Br J Sports Med*. 2021; 55(1):30–37. doi:10.1136/bjsports-2020-102411
11. Pilkonis PA, Choi SW, Reise SP, et al; PROMIS Cooperative Group. Item banks for measuring emotional distress from the Patient-Reported Outcomes Measurement Information System (PROMIS®): depression, anxiety, and anger. *Assessment*. 2011;18(3):263–283. doi:10.1177/1073191111411667
12. Young J, Neil ER, Granger K, Walker SE, Chadburn JL, Eberman LE. Preparedness, confidence, and best practices in preventing, recognizing, and managing mental health cases in NCAA institutions. *J Athl Train*. 2023;58(2):156–162. doi:10.4085/129-20
13. Conley KM, Bolin DJ, Carek PJ, Konin JG, Neal TL, Violette D. National Athletic Trainers' Association position statement: preparticipation physical examinations and disqualifying conditions. *J Athl Train*. 2014;49(1):102–120. doi:10.4085/1062-6050-48.6.05
14. NATA ICSM mental health toolkit. National Athletic Trainers' Association. Accessed June 1, 2023. https://www.nata.org/sites/default/files/icsm_mental_health_toolkit.pdf
15. Glazer DD. Development and preliminary validation of the Injury-Psychological Readiness to Return to Sport (I-PRRS) scale. *J Athl Train*. 2009;44(2):185–189. doi:10.4085/1062-6050-44.2.185
16. Webster KE, Feller JA, Lambros C. Development and preliminary validation of a scale to measure the psychological impact of returning to sport following anterior cruciate ligament reconstruction surgery. *Phys Ther Sport*. 2008;9(1):9–15. doi:10.1016/j.ptsp.2007.09.003
17. Paterno MV, Flynn K, Thomas S, Schmitt LC. Self-reported fear predicts functional performance and second ACL injury after ACL reconstruction and return to sport: a pilot study. *Sports Health*. 2018; 10(3):228–233. doi:10.1177/1941738117745806
18. McPherson AL, Feller JA, Hewett TE, Webster KE. Psychological readiness to return to sport is associated with second anterior cruciate ligament injuries. *Am J Sports Med*. 2019;47(4):857–862. doi:10.1177/0363546518825258
19. Covassin T, Beidler E, Ostrowski J, Wallace J. Psychosocial aspects of rehabilitation in sports. *Clin Sports Med*. 2015;34(2):199–212. doi:10.1016/j.csm.2014.12.004
20. Anstiss T. Motivational interviewing in primary care. *J Clin Psychol Med Settings*. 2009;16(1):87–93. doi:10.1007/s10880-009-9155-x
21. Jochimsen KN, Mattacola CG, Noehren B, Picha KJ, Duncan ST, Jacobs CA. Low self-efficacy and high kinesiophobia are associated with worse function in patients with femoroacetabular impingement syndrome. *J Sport Rehabil*. 2020;30(3):445–451. doi:10.1123/jsr.2019-0498
22. Jochimsen KN, Noehren B, Mattacola CG, Di Stasi S, Duncan ST, Jacobs C. Preoperative psychosocial factors and short-term pain and functional recovery after hip arthroscopy for femoroacetabular impingement syndrome. *J Athl Train*. 2021;56(10):1064–1071. doi:10.4085/1062-6050-139-20
23. Baez SE, Hoch MC, Hoch JM. Psychological factors are associated with return to pre-injury levels of sport and physical activity after ACL reconstruction. *Knee Surg Sports Traumatol Arthrosc*. 2020; 28(2):495–501. doi:10.1007/s00167-019-05696-9
24. Burton D, Naylor S, Holliday B. Goal setting in sport: investigating the goal effectiveness paradox. In: Singer RN, Hausenblas H, Janelle CM, eds. *Handbook of Sport Psychology*. 2nd ed. John Wiley & Sons; 2001:497–528.
25. King IM. King's theory of goal attainment. *Nurs Sci Q*. 1992; 5(1):19–26. doi:10.1177/089431849200500107.
26. Brinkman C, Baez SE, Genoese F, Hoch JM. Use of goal setting to enhance self-efficacy after sports-related injury: a critically appraised topic. *J Sport Rehabil*. 2019;29(4):498–502. doi:10.1123/jsr.2019-0032
27. Baez SE, Hoch JM, Cormier M. The stress and injury model and cognitive appraisal model: implications for patients after anterior cruciate ligament reconstruction. *Athl Train Sports Health Care*. 2020; 12(4):181–187. doi:10.3928/19425864-20190924-02
28. Theodorakis Y, Beneca A, Goudas M, Antoniou P, Malliou P. The effect of self-talk on injury rehabilitation. *Eur Yearb Sport Psychol*. 1998;2:124–135.
29. Beneka A, Malliou P, Gioftsidou A, et al. Effects of instructional and motivational self-talk on balance performance in knee injured. *Eur J Physiother*. 2013;15(2):56–63. doi:10.3109/21679169.2013.776109
30. Scherzer CB, Brewer BW, Cornelius AE, et al. Psychological skills and adherence to rehabilitation after reconstruction of the anterior cruciate ligament. *J Sport Rehabil*. 2001;10(3):165–172. doi:10.1123/jsr.10.3.165
31. Bullock GS, Sell TC, Zarega R, et al. Kinesiophobia, knee self-efficacy, and fear avoidance beliefs in people with ACL injury: a systematic review and meta-analysis. *Sports Med*. 2022;52(12):3001–3019. doi:10.1007/s40279-022-01739-3
32. Suttmiller AMB, Cavallario JM, Baez SE, Martinez JC, McCann RS. Perceived instability, pain, and psychological factors predict function and disability in individuals with chronic ankle instability. *J Athl Train*. 2022;57(11–12):1048–1054. doi:10.4085/1062-6050-0605.21
33. López-de-Uralde-Villanueva I, Muñoz-García D, Gil-Martinez A, et al. A systematic review and meta-analysis on the effectiveness of graded activity and graded exposure for chronic nonspecific low back pain. *Pain Med*. 2016;17(1):172–188. doi:10.1111/pme.12882
34. Baez S, Cormier M, Andreatta R, Gribble P, Hoch JM. Implementation of in vivo exposure therapy to decrease injury-related fear in females with a history of ACL-reconstruction: a pilot study. *Phys Ther Sport*. 2021;52:217–223. doi:10.1016/j.ptsp.2021.09.009
35. Ludwig DS, Kabat-Zinn J. Mindfulness in medicine. *JAMA*. 2008; 300(11):1350–1352. doi:10.1001/jama.300.11.1350
36. Brown KW, Berry D, Eichel K, Beloborodova P, Rahrig H, Britton WB. Comparing impacts of meditation training in focused attention, open monitoring, and mindfulness-based cognitive therapy on emotion reactivity and regulation: neural and subjective evidence from a dismantling study. *Psychophysiology*. 2022;59(7):e14024. doi:10.1111/psyp.14024
37. Hopper SI, Murray SL, Ferrara LR, Singleton JK. Effectiveness of diaphragmatic breathing for reducing physiological and psychological stress in adults: a quantitative systematic review. *JBI Database System*

Rev Implement Rep. 2019;17(9):1855–1876. doi:10.11124/JBISRIR-2017-003848
38. Hilton L, Hempel S, Ewing BA, et al. Mindfulness meditation for chronic pain: systematic review and meta-analysis. *Ann Behav Med*. 2017;51(2):199–213. doi:10.1007/s12160-016-9844-2
39. Bagheri S, Naderi A, Mirali S, Calmeiro L, Brewer BW. Adding mindfulness practice to exercise therapy for female recreational runners with patellofemoral pain: a randomized controlled trial. *J Athl Train*. 2021;56(8):902–911. doi:10.4085/1062-6050-0214.20
40. Tang Y, Liu Y, Jing L, Wang H, Yang J. Mindfulness and regulatory emotional self-efficacy of injured athletes returning to sports: the mediating role of competitive state anxiety and athlete burnout. *Environ Res Public Health*. 2022;19(18):11702. doi:10.3390/ijerph191811702
41. Zach S, Dobersek U, Filho E, Inglis V, Tenenbaum G. A meta-analysis of mental imagery effects on post-injury functional mobility, perceived pain, and self-efficacy. *Psychol Sport Exerc*. 2018;34:79–87. doi:10.1016/j.psychsport.2017.09.011
42. Cupal DD, Brewer BW. Effects of relaxation and guided imagery on knee strength, reinjury anxiety, and pain following anterior cruciate ligament reconstruction. *Rehabil Psychol*. 2001;46(1):28–43. doi:10.1037/0090-5550.46.1.28
43. Maddison R, Prapavessis H, Clatworthy M, et al. Guided imagery to improve functional outcomes post-anterior cruciate ligament repair: randomized-controlled pilot trial. *Scand J Med Sci Sports*. 2012;22(6):816–821. doi:10.1111/j.1600-0838.2011.01325.x
44. Newsom J, Knight P, Balnave R. Use of mental imagery to limit strength loss after immobilization. *J Sport Rehabil*. 2003;12(3):249–258. doi:10.1123/jsr.12.3.249
45. Christakou A, Zervas Y, Lavallee D. The adjunctive role of imagery on the functional rehabilitation of a grade II ankle sprain. *Hum Mov Sci*. 2007;26(1):141–154. doi:10.1016/j.humov.2006.07.010
46. Türp JC, Jokstad A, Motschall E, Schindler HJ, Windecker-Gétaz I, Ettlin DA. Is there a superiority of multimodal as opposed to simple therapy in patients with temporomandibular disorders? A qualitative systematic review of the literature. *Clin Oral Implants Res*. 2007;18(suppl 3):138–150. doi:10.1111/j.1600-0501.2007.01480.x
47. Hardy CJ, Crace RK, Burke KL. Social support and injury: a framework for social support-based interventions with injured athletes. In: Pargman D, ed. *Psychological Bases of Sport Injuries*. 2nd ed. Fitness Information Technology; 1999:175–198.
48. Clement D, Shannon VR. Injured athletes' perceptions about social support. *J Sport Rehabil*. 2011;20(4):457–470. doi:10.1123/jsr.20.4.457
49. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychol Bull*. 1985;98(2):310–357.
50. Fernandes HM, Machado Reis V, Vilaça-Alves J, Saavedra F, Aidar FJ, Brustad R. Social support and sport injury recovery: an overview of empirical findings and practical implications. *Rev Psicol Deporte*. 2014;23(2):445–449. doi:10.13140/2.1.1164.3525
51. Watson JA, Ryan CG, Cooper L, et al. Pain neuroscience education for adults with chronic musculoskeletal pain: a mixed-methods systematic review and meta-analysis. *J Pain*. 2019;20(10):1140.e1–1140.e22. doi:10.1016/j.jpain.2019.02.011
52. Genoese FM, Harkey MS, Baez SE. The neuromatrix theory of pain and transactional theory of stress and coping: improving understanding of pain catastrophizing in individuals with ACL reconstruction and knee osteoarthritis. *Int J Athl Ther Train*. 2023;28(2):77–83. doi:10.1123/ijatt.2022-0074
53. Gonzalez AI, Kortlever JT, Brown LE, Ring D, Queralt M. Can crafted communication strategies allow musculoskeletal specialists to address health within the biopsychosocial paradigm? *Clin Orthop Relat Res*. 2021;479(6):1217–1223. doi:10.1097/CORR.0000000000001635

Address correspondence to Shelby Baez, PhD, ATC, Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, G410 Fetzer Hall, Chapel Hill, NC 27514. Address email to sbaez@unc.edu.