Reinjury Fear and Anxiety Following Anterior Cruciate Ligament Injury. Let’s Get Our Constructs Straight!

SYNOPSIS: There is increasing attention in the literature to psychological consequences of anterior cruciate ligament injury, particularly those related to reinjury fear/anxiety. However, noticeable knowledge gaps exist, pertaining to how different fear-related constructs (e.g., kinesiophobia, reinjury anxiety) are defined and consequently assessed. This editorial tackles some fundamental issues: first regarding the distinction between reinjury anxiety, which is assessed using questionnaires, and fear of reinjury, which is an acute response to injury-relevant scenarios. Next, the frequent focus of practitioners on pain as the major injury-instigated threat, which oversimplifies the complex injury experience and, in turn, the individual anxiety perceived by patients. A call to researchers and clinicians is issued to further consider the constructs they evaluate and related assessment tools. While fear is more challenging to assess and requires individual exposure to threatening situations, anxiety-relevant questionnaires should be carefully selected rather than using common ones that may not suit the population.

Fear vs Anxiety
There seems to be some confusion about the concepts fear and anxiety in the sports medicine literature. Too often, the term “fear” is used when it is anxiety that is being described. While some would dismiss this as meaningless semantics, I argue that this basic distinction is fundamental before any conclusions are made regarding the evaluated emotion and its implications for rehabilitation and sports participation.

A major emphasis is given recently to psychological consequences following anterior cruciate ligament (ACL) injury, particularly those related to the individual’s worries of reinjuring their knee. Indeed, feeling anxious about future injuries is the primary reason for not returning to preinjury activity levels after ACL injury. It is thus the responsibility of clinicians to effectively target these psychological concerns in rehabilitation, to better inform personalized treatment decisions and improve rehabilitation outcomes, culminating in successful return to sports.

While precise assessment is essential for guiding effective treatment, it is difficult to assess fear and anxiety well given several knowledge gaps. This article aims to highlight and put into context basic concepts and considerations for clinicians who are assessing fear, anxiety and their related constructs following ACL injury.

The American Psychological Association clearly distinguishes between anxiety, a long-term emotion broadly connected with future threats, and fear, which is a short-lived response to an identifiable trigger.

Imagine yourself walking alone inside a dark forest (FIGURE 1A). In this scenario, you might feel anxiety, despite the lack of an identifiable threat. Alternatively, a sudden presence of a bear lurking in the shadows (FIGURE 1B) might conversely induce fear. It is important to understand that the 2 concepts are interrelated. One might not feel fear without the initial anxiety. On the other hand, repetitive instances of threats from bears would likely increase the general anxiety when walking through forests.

Next, consider a soccer player with ACL injury who is returning to play. They are about to pass the ball to a teammate while reacting to opposing players under the stress of competition. Such a scenario, involving both divided attention and biomechanical risks, may trigger a fear response, which is likely amplified given an existing anxiety.

In that sense, the fear-anxiety relationship can be seen as circular. An initial threat might trigger the development of anxiety, which would then amplify future fear responses to comparable situations. The acute response is however seldom evaluated by researchers and clinicians when administering questionnaires to patients. Commonly used “fear” questionnaires more likely measure anxiety, an inquiry that is future oriented, based on the current judgment of the patient’s physical abilities. Fear on the other hand is present oriented and can only be experienced when the athlete is...
confronted with an injury-relevant scenario. During such scenarios, fearful athletes may be inclined to focus their attention internally, toward their injured body part, a tendency that might increase their risk of secondary noncontact injuries given their decreased attention to external cues.11

It may seem logical to assume a clear link between anxiety (ie, questionnaire assessed) and acute fear responses. Markström et al9 proposed that self-reported reinjury anxiety can manifest in muscle activation patterns during side-hop landings. In their work, participants following ACL reconstruction were stratified based on one discriminating question: “I am afraid that I might injure myself accidentally.” Those classified as “high-fear” (although a more accurate labeling would be “high-anxiety”) seemed to demonstrate protective landing patterns, compared to both “low-fear” persons and uninjured controls, suggesting a certain connection between self-reported anxiety and neuromuscular patterns.

Cases such as this bring us back to the importance of the fear-anxiety distinction. It is not about the semantics, but about the conceptual understanding of the 2 terms, which affects how clinicians interpret the clinical picture presented by their patients. Does a composite score in any anxiety questionnaire truly predict the patient’s response to fearful situations? Perhaps to some extent. Nevertheless, I argue that although an anxious patient might have some fear (and vice versa), it is wrong to assume that one clearly predicts the other.

When it comes to assessing fear, an individually tailored approach should be taken by simulating injury-relevant scenarios that correspond with the individual anxieties of patients. As for outcome measures, both physiological (eg, kinematics, electromyography8) or subjective (eg, follow-up questions) can then quantify a genuine fear response. On the other hand, when it comes to anxiety, careful attention should be given to the assessed construct and its related instrument.

Is Pain What It’s All About?

Kinesiophobia is defined as “an excessive, irrational and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury.”5 Despite often being shortened to merely “fear of movement,” the original definition places pain as the main movement-instigated threat, most likely because when coined by Kori et al,5 this diagnosis described patients suffering from chronic musculoskeletal pain. Subsequently, the concept was integral to the widely acknowledged fear-avoidance model,7 being an acceptable framework for the last 40 years.

The model describes how pain-related anxiety often results in an inability to shift the attention away from pain-related information. A patient’s hypervigilance may then serve as a short-term mechanism to reduce anxiety,7 as well as fulfill a protective purpose to some extent. However, it can also lead to inactivity, increased pain, continuing the cycle. Kinesiophobia and its related instrument the Tampa Scale of Kinesiophobia (TSK) have been overwhelmingly used for assessing various
Considering the potentially life-changing nature of an ACL injury,10 the focus on pain oversimplifies the effect an injury has on an athlete, who may be anxious about more than the acute reinjury pain (FIGURE 2).

We should therefore ask ourselves why the TSK still the dominating anxiety assessment tool in ACL research?26 Is it not conceivable that a pain-free patient might still experience reinjury anxiety that will be thus overlooked? With reinjury anxiety negatively influencing an athlete’s psychological readiness to return to sports, the ACL-Return to Sport after Injury (ACL-RSI) scale is perhaps a more appropriate alternative. Unlike the TSK, the ACL-RSI is not pain centered but incorporates constructs such as confidence and individual risk appraisal. Although not a pure measure of reinjury anxiety, it is a future-oriented inquiry relating to a perceived ability to perform, utilizing wording like “nervous,” “relaxed,” and “concerned for your knee,” while also referring to future injury. The ACL-RSI is directed toward the athletic population while also referring to other aspects of the injury experience (eg, the surgery and prolonged rehabilitation), making it a useful tool in the context of reinjury anxiety among athletes.

Another less common tool—the Reinjury Anxiety Inventory (RIAI)—was developed in 2010 by Walker et al.12 This 28-item questionnaire covers aspects related to anxiety of getting re-injured during both rehabilitation and competition. It is arguably more relevant to athletes, as it steers away from the pain-centered dogma, which misses salient aspects of ACL-injured patients’ anxiety experience. Nevertheless, the TSK as an anxiety assessment instrument is still dominating the ACL literature.9 Incidentally, a modified version was introduced by Kvist et al.,6 where the word “pain” was replaced with wordings such as “knee trouble.” Unfortunately, these considerations are seldom made.

**FIGURE 2**
An anxious athlete might be worried about various implications of a future injury, ones that have deeper personal significance than the mere acute symptoms (eg, pain). Assessment tools should therefore consider these aspects of life rather than be limited to pain as the injury-instigated threat. Otherwise, we as researchers and clinicians are at risk of underestimating an athlete’s anxiety levels in his/her assessment. Abbreviation: ACL, anterior cruciate ligament. *The word cloud is hypothetical and not based on actual patient data.

**KEY POINTS**

**FINDINGS:** A common psychological consequence of anterior cruciate ligament (ACL) injury, reinjury anxiety, is regularly conflated with fear. Assessing anxiety is often done using pain-centered questionnaires that do not meet the needs of athletic individuals with ACL injury.

**IMPLICATIONS:** Researchers and clinicians should consider matching their anxiety assessment tools to the target individuals. Patient-specific fears should consequently be assessed by exposing them to comparable situations and evaluating their response.

**CAUTION:** While some assessment tools are arguably more fitting to patients with ACL injury than others, this is not clear-cut, and judgment should still be exercised based on individual patient needs.
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REFERENCES


MORE INFORMATION

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