

# Are athletes psychologically ready for sport following a concussion?

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Sport-related concussions have garnered increasing attention in recent years. Part of making sport safer at all levels of competition involves ensuring that concussions are properly managed. Graduated return to play (RTP)<sup>1</sup> has been a widely implemented strategy to assist with concussion management. RTP is a six-stage process managed by health professionals that progressively increases athletes' exertion until they are able to resume preconcussion activity levels.<sup>1</sup> Graduated RTP should ensure athletes are *physically* and *physiologically* ready for competition. However, existing RTP criteria do not comprehensively account for *psychological* readiness for competition. Given that a lack of psychological readiness could lead to heightened competitive anxiety, hesitant performances and greater risk of secondary concussion after returning to sport, insufficiently attending to concussed athletes' psychological readiness during RTP appears to be cause for concern and is worth examining.

Research on psychological aspects of sport injury has primarily focused on musculoskeletal injuries (eg, sprains, tears and fractures) and not concussions. Adolescent athletes have expressed concerns about the prospect of reinjury, diminished performance and skill execution, as well as appearing incompetent or physically unfit when attempting to return to sport after musculoskeletal injury.<sup>2</sup> In light of this evidence, researchers have investigated athletes' psychological readiness to return to sport.<sup>3 4</sup> Preliminary research suggests that psychological readiness encompasses three components: confidence to return to sport, realistic expectations regarding one's sporting abilities and motives to regain previous performance standards.<sup>3 4</sup> In fact, one study found that only 40% (66/164) of athletes returned to preinjury activity levels following anterior cruciate ligament reconstruction.<sup>3</sup> Importantly, psychological readiness was found to be the strongest predictor

of athletes' ability to return to preinjury performance levels following musculoskeletal injury.

Concussed athletes also experience psychological concerns when returning to sport, possibly due to uncertain recovery times, symptoms associated with concussion (headaches, nausea and concentration difficulties), as well as growing awareness of the potential long-term cognitive impairments associated with this injury. In a study that surveyed 722 National Collegiate Athletics Association American football athletes, 40% believed they would suffer a concussion and 10% believed they would develop dementia, chronic traumatic encephalopathy or Alzheimer's disease as a result of playing football.<sup>5</sup> Although the study did not directly focus on psychological readiness during RTP, these data<sup>5</sup> suggest that collegiate athletes have serious concerns about the health implications that are being linked with concussions. This may underscore the need to better understand and assess concussed athletes' psychological readiness during RTP.

A few instruments have been developed to assess concepts related to athletes' psychological readiness to resume sport participation following musculoskeletal injury.<sup>6 7</sup> The Re-Injury Anxiety Inventory (RIAI) is a 28-item measure to assess athletes' anxiety during recovery as well as during re-entry to competition.<sup>6</sup> Examples of RIAI items include: 'I had doubts that I would remain injury free during rehabilitation' and 'I felt nervous about becoming re-injured during re-entry into competition'. Another instrument, the Injury-Psychological Readiness to Return to Sport (I-PRRS), has six items and is used to assess athletes' confidence to perform sport-specific activities following an injury. Examples of I-PRRS items include: 'My overall confidence to play is...' and 'My confidence to not concentrate on the injury is...'. To date, the RIAI and/or I-PRRS have not been adapted for concussed athletes, which is unfortunate because these instruments could allow for an assessment of athletes' psychological readiness for sport during RTP.

Athletes with musculoskeletal injuries, who were psychologically underprepared when returning to sport, reported a heightened fear of reinjury, poorer performance and greater risk of

secondary injury.<sup>3 4</sup> Studying whether similar outcomes are apparent among formerly concussed athletes is both timely and necessary. To move this line of research forward, there is a need to determine (1) the key components of psychological readiness among concussed athletes, (2) whether concussed athletes receiving medical clearance to return report being psychologically underprepared and (3) the implications of psychological readiness on RTP outcomes. With regard to the implications of psychological readiness, prospective studies could also investigate whether psychological intervention is warranted among formerly concussed athletes.

Research is also needed to determine how RIAI or I-PRRS items could be integrated with existing tools that are used for RTP decision making, such as the Sport Concussion Assessment Tool 5 (SCAT5) or Child SCAT5.<sup>1</sup> Such integration would provide clinicians with valuable information for assessing athletes' readiness to return to sport. We recommend that clinicians question formerly concussed athletes about their psychological readiness during consultations (ie, using RIAI or I-PRRS as guides) to inform RTP decision making.

Ultimately, comprehensive determination of concussed athletes' physical and psychological readiness may prove vital in promoting healthy RTP outcomes such as enhanced sport performance, reductions in secondary concussion and greater long-term sport participation.

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## Editorial

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