



Imagery and self-efficacy in the injury context



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ABSTRACT

Objectives: To develop and test the factorial validity of an adapted version of the Athletic Injury Imagery Questionnaire (AIQ-2; Sordani, Hall, & Forwell, 2002). To explore the effect of an imagery intervention on self-efficacy in the sport injury context.

Design: Study 1, cross-sectional; Study 2, multiple-base line.

Method: In Study 1 the AIQ-2 was adapted to include a pain management subscale. This adapted imagery questionnaire (AIQ-3) was then administered to 291 injured athletes (M age = 28.64 years, SD = 14.30). In Study 2 using a multiple-baseline single subject design, the effects of an imagery intervention on self-efficacy prior to physiotherapy treatment of five athletes with a Type B malleolar fracture (M age = 49.50 years, SD = 16.56) was examined. A follow-up post-experimental interview explored participants' perceptions of the intervention.

Results: Study 1, confirmatory factor analysis revealed evidence for the factorial validity of the AIQ-3. Study 2, results from the multiple-base line design demonstrated that for two out of the five participants there were observable and statistically meaningful increases in task efficacy, with the same result in three out of five participants for coping efficacy. The post-interview results revealed that all intervention participants perceived the intervention to be beneficial and effective beyond the general information provided.

Conclusions: The results are discussed in terms of overcoming an inherent weakness in previous injury-related imagery research and the applied implications for the time-course of rehabilitation.

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Injuries play a pivotal role in the careers of many athletes by causing both physical and psychological harm. How athletes manage their injuries can have a sizeable impact on their psychological and rehabilitation outcomes. Successful athletic injury rehabilitation is enhanced through proper adherence to a prescribed rehabilitation program (Bassett, 2006; Brewer et al., 2000). Further, previous research has shown that higher levels of self-efficacy are significantly associated with better adherence to such a program (Brewer et al., 2003; Milne, Hall, & Forwell, 2005; Woodgate, Brawley, & Weston, 2005). Therefore, self-efficacy may play an important role in an injured athlete's motivation to recover, subsequent adherence to a prescribed rehabilitation program, and treatment outcome.

A variable related to self-efficacy in rehabilitation is an injured

athlete's imagery use (Milne et al., 2005; Wesch et al., 2011). Imagery has been described as "an experience that mimics real experience, and involves using a combination of different sensory modalities in the absence of actual perception" (Cumming & Ramsey, 2008, p.5). Injured athletes report using four types of imagery (Driediger, Hall, & Callow, 2006; Rossman, 2002; Sordani, Hall, & Forwell, 2002). Cognitive imagery is used to rehearse rehabilitation exercises, and motivational imagery is used to set goals, control arousal levels and increase self-confidence. Healing imagery entails imagining the physiological processes taking place during rehabilitation (e.g., tissue and/or bone healing), whereas pain management imagery involves images of pain dissipating or images that can help the athlete cope with the pain associated with an injury.

Milne et al. (2005) investigated the relationships between injured athletes' use of cognitive, motivational, and healing imagery and both task efficacy (confidence in one's ability to perform the fundamental aspects of a task in a specific situational context) and coping efficacy (confidence in one's ability to perform a task

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under challenging conditions or to overcome social, personal and environmental constraints). Imagery was assessed using the Athletic Injury Imagery Questionnaire (AIQ-2; [Sordoni et al., 2002](#)) and self-efficacy was measured with the Athletic Injury Self-Efficacy Questionnaire (AISEQ; [Milne et al., 2005](#); [Sordoni et al., 2002](#)). The questionnaires were administered in an outpatient physiotherapy clinic to 270 injured athletes, and cognitive imagery was found to be significantly associated with task efficacy but no other significant relationships emerged.

A limitation of the AIQ-2 and consequently research that has employed it (e.g., [Milne et al., 2005](#)) is that cognitive, motivational and healing imagery are assessed but not pain management imagery. Pain is the most pervasive and debilitating obstacle to effective rehabilitation experienced by injured athletes. It has significant physical and psychological effects in almost every aspect of recovery ([Arvinen-Barrow & Walker, 2013](#); [Heil, 1993](#)). Therefore, pain management imagery may be an important resource for athletes involved in injury rehabilitation. Further, qualitative analysis does highlight that injured athletes use this type of imagery (e.g., [Driediger et al., 2006](#)). Thus, pain management imagery needs to be measured in order to overcome the limitation of the AIQ-2 and previous injury-related imagery research that has used it. Consequently, in Study 1, the AIQ-2 was adapted to include a pain management imagery subscale and the factorial validity tested. The aim of Study 1 was to develop a measure reflecting a broader range of types of imagery that injured athletes report using, which could then be used in Study 2.

Another limitation of the imagery rehabilitation research is the lack of intervention studies conducted in this context. Given injured athletes report using imagery extensively during rehabilitation ([Driediger et al., 2006](#); [Evans, Hare, & Mullen, 2006](#)) and that imagery interventions have proven to be effective in both sport and exercise (e.g., [Duncan, Rodgers, Hall, & Wilson, 2011](#); [Munroe-Chandler, Hall, Fishburne, Murphy, & Hall, 2012](#)), it is somewhat surprising that only a limited number of imagery interventions have been conducted in the injury rehabilitation context. Strong support for an imagery intervention in injury rehabilitation is provided from a randomized-controlled trial ([Cupal & Brewer, 2001](#)), which examined the effect of guided imagery and relaxation on knee strength, re-injury anxiety, and pain among patients undergoing surgical reconstruction of the anterior cruciate ligament reconstruction. Results demonstrated significantly greater knee strength and significantly less re-injury anxiety and pain at 24-week post-surgery among the intervention compared with the placebo and control conditions.

The only imagery intervention study considering self-efficacy was recently conducted by [Maddison et al. \(2011\)](#). The aim of this study was to evaluate the effectiveness of a guided imagery and relaxation program on improving functional outcomes post-anterior cruciate ligament repair delivered over nine individual sessions as an adjuvant treatment to standard rehabilitation. A randomized controlled trial was conducted. Participants were randomized to guided imagery and standard rehabilitation or standard rehabilitation alone (control). The primary outcome was knee strength 6-month post-operatively, but other variables were also examined including knee laxity and self-efficacy. Following the intervention, the groups did not differ on knee strength but the intervention group demonstrated a significant positive effect for knee laxity. In addition, there was a significant group by time interaction for self-efficacy. Although self-efficacy decreased over time for both groups, in the intervention group it remained fairly stable between weeks 6 and 12 compared with the control group. However, the study by [Maddison et al. \(2011\)](#) has several limitations worthy of identification. Specifically, the intervention combined imagery and relaxation, thus it is not possible to partial out the

independent influence of imagery on the outcome variables. In addition, a composite score for task and coping efficacy was used rather than examining each separately. Despite the limitations of this study, theoretically it is understandable that imagery may maintain or even enhance self-efficacy. Indeed, [Bandura \(1997\)](#) states that self-efficacy beliefs are constructed from four principle antecedents: enactive mastery experience, vicarious experience, verbal persuasion, and physiological and affective states, with imagery increasing self-efficacy via these antecedents. Related to the present context, for example, by using cognitive imagery (e.g., prior to performing a rehabilitation exercise, I am able to image myself completing it perfectly) injured athletes could gain enactive mastery experiences which may increase task efficacy.

Given the paucity of intervention research in the injury context, and that research highlights changes in imagery use across early, mid and late phases of injury rehabilitation ([Hare, Evans, & Callow, 2008](#)) it would be prudent to conduct more research in this area, and to focus on one phase of rehabilitation. Further, the research investigating imagery use and self-efficacy have done so while the patients have been undergoing physiotherapy, rather than prior to commencing treatment, yet self-efficacy is proposed to be important for patients about to commence a rehabilitation program (cf. [Lox, Martin Ginis, & Petruzzello, 2014](#)). Thus, using a multiple-baseline single-subject design, Study 2 applies an imagery intervention in an attempt to improve the psychological state of five patients about to commence physiotherapy treatment through the use of imagery and its effects on task and coping efficacy. Based on the theoretical rationale that imagery enhances self-efficacy via its antecedents, it was hypothesised that the imagery intervention would result in higher task and coping efficacy in comparison to baseline.

1. Study 1

1.1. Method

1.1.1. Participants

A sample of 292 injured athletes were recruited from a Canadian University Sport Medicine Clinic. Seven participants were excluded due to missing or incomplete data. The final sample consisted of 285 sport rehabilitation participants, 47% men ($n = 134$) and 53% women ($n = 151$), aged 18–74 years ($M = 28.64$, $SD = 14.30$), who had sustained diverse injuries. Inclusion criteria were that participants had to be 18 years of age or older and engaged in physiotherapy for at least one week. Participants were from 36 different sports, with ice-hockey reported most frequently (9.10%) followed by alpine skiing (8.80%) and soccer (8.10%). Level of participation was reported as either recreational ($n = 149$), provincial ($n = 49$), varsity ($n = 55$) or national ($n = 39$).

1.2. Measures

1.2.1. Athletic Injury Imagery Questionnaire (AIQ-2; [Sordoni et al., 2002](#))

The AIQ-2 consists of twelve items delineating the three types of imagery: cognitive imagery “Before performing a rehabilitation exercise, I imagine myself completing it perfectly”, motivational imagery “I imagine myself achieving my treatment goals”, and; healing imagery “I imagine my body repairing itself.” Participants rate their imagery use on a 9-point Likert scale from 1 (never) to 9 (always), indicating their use of that particular type of imagery. Previous research ([Sordoni et al., 2002](#); [Milne et al., 2005](#)) has found the AIQ-2 to be both valid and reliable for the subscales measured.

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