RETURN TO SPORT: IMPROVING ATHLETES' CONFIDENCE AND MINDSET POST-ACL SURGERY

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This study explored the impact of three psychological interventions over seven weeks - goal setting (GS), GS and imagery (IM), and GS and mindful self-compassion (MSC) - on 20 athletes' (M_{age} = 16.75 years) pain, cognitive appraisal, depression reinjury anxiety, psychological readiness to return to sport, and range of motion (ROM). IM and GS interventions have demonstrated initial effectiveness; however, no study has examined MSC in relation to post-ACL recovery. All athletes experienced significant decrease in pain ($F(2) = 97.30$, $p = .000$) from Week 1 to Week 7 and a significant increase in ROM from Week 2 to Week 7 ($F(1) = 77.93$, $p = .000$). All athletes experienced significantly higher depression at Week 1 compared to both Week 2 and Week 7 ($F(2) = 9.01$, $p = .001$), and significantly higher difficulty coping with their injury at Weeks 1 and 2 compared to Week 7 ($F(2) = 6.32$, $p = .005$). There were no statistically significant effects found between the intervention groups at Weeks 1, 2, and 7. However there were moderate effect sizes between interventions which suggest MSC and IM could help athletes cope with their injury during the first few weeks after surgery, and GS may contribute towards less depression at seven weeks post-surgery. Limitations include small sample size, low power, and use of self-report measures. Results have implications for orthopedic surgeons, physical therapists, and health professionals working with athletes recovering from serious sport injury.

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CHAPTER 1

INTRODUCTION

According to the Centers for Disease Control and Prevention ([CDC]; 2015), the incidence of sport and recreation-related injuries in the United States has continued to increase over time, particularly among children and adolescents. In the United States there are an estimated seven million sport and recreation-related injuries per year (Conn, Annest, & Gilchrist, 2003; Tripp, Stanish, Ebel-Lam, Brewer, & Birchard,, 2011), not including sport injuries that may go unreported, such as sprains (Roach et al., 2014) and concussions (Harmon, 2013). Despite efforts to reduce the prevalence of sport injuries with advancements in sporting equipment, coaching techniques, and sport-specific conditioning, sport injuries continue to increase, particularly among recreational and adolescent athletes (Emery, Meeuwisse, & McAllister, 2006; Tripp et al., 2011). More specifically, the incidence of Anterior Cruciate Ligament (ACL) tears among children and adolescents has increased by 2.3% per year over the past two decades (Beck et al., 2017). Consistent with the high sport participation rate among male and female adolescents, rates of ACL tears peak at age 16 (girls) and 17 (boys) years, with rates of 392 and 422 tears per 100,000 person-years, respectively (Beck et al., 2017; Hughes & Watkins, 2006; Siegel et al., 2012).

The recovery and rehabilitation from an ACL tear and surgery is a minimum of six months (Frank & Gambacorta, 2013). During this process, athletes often experience a range of emotions and psychological responses, such as fear of re-injury, depression, anger and isolation, which can facilitate or interfere with the recovery and rehabilitation process, as well as impact how confident they are about returning to their sport post rehabilitation (Hedgpeth

& Gieck, 2004). Studies have indicated that only about 50% of athletes who have ACL reconstruction surgery resume sports at the same level at which they had played prior to their injury (Kvist et al., 2005; Poulsen et al., 2003). Thus, for many athletes, tearing their ACL makes real the possibility of not returning to sport, and explains why they often experience severe psychological distress, including the loss of athletic identity (Hedgpeth & Gieck, 2004).

Weise-Bjornstal et al.'s (1998) model for psychological response to sport injury has been used to understand and explain athletes' responses to sport injury and their recovery. This model suggests that some of the personal and situational variables shown to predispose athletes to sport injury (e.g., history of stressors, coping resources, personality characteristics) continue to impact athletes post-injury by influencing their cognitive appraisals (e.g., their interpretation of their injury as stressful as well as assessment of coping strategies). Athletes' cognitive appraisal are hypothesized to play a central role in triggering an emotional response (i.e., reinjury anxiety, depressive symptoms; confidence in returning to sport), and influence how athletes' approach and behave during rehabilitation (e.g., adherence, knee functioning; Albinson & Petrie, 2003; Williams & Andersen 1998). Thus, the way in which athletes perceive their injuries is more critical to understanding their emotional responses, such as fear of the unknown, depression, anger, grief, than the fact that the injury occurred (Walker & Heaney, 2013).

The Weise-Bjornstal et al. (1998) model also provides a theoretical foundation for research that has tested interventions designed to assist athletes in their recovery from ACL surgery. Such interventions have focused on behavioral responses, such as improving knee strength, range of motion, rehabilitation adherence and motivation, as well as helping injured

athletes their emotional reactions, including re-injury anxiety and loss of confidence. Specifically, such studies have examined the effectiveness of positive self-talk (Brewer, 2007), and imagery paired with relaxation (Cupal & Brewer, 2001; Maddison et al., 2011) in assisting injured athletes in coping with these behavioral and emotional reactions.

Some qualitative studies have suggested that setting and adjusting goals during the rehabilitation process can assist with ACL recovery as well. For example, Podlog and Eklund (2009) interviewed 12 elite athletes over a six to eight month period; the injured athletes who adjusted their goals during the rehabilitation process reported feeling more successful during their return to sport compared to the injured athletes who did not adjust their goals. Additionally, Mosewich et al. (2014) found through their interviews with five high-performance female athletes that setting and readjusting goals were strong coping mechanisms for helping the athletes deal with setbacks, such as serious sport injury. Overall, GS tended to increase athletes' rehabilitation adherence, confidence in returning to sport, and motivation during the early to mid-phases of rehabilitation. Regarding the efficacy of imagery on ACL recovery, Cupal and Brewer (2001) conducted a 24 week intervention with 30 recreational to competitive level athletes who had undergone ACL surgery (age range = 18 to 50 years). Athletes were randomly assigned to either an imagery paired with relaxation, placebo (i.e., received attention, encouragement, and support from the clinician at the sports medicine facility), or control group (e.g., received a standard course of physical therapy). At 24 weeks post-surgery, the imagery group had significantly greater knee strength, lower reinjury anxiety and perception of pain than the placebo and control group. Overall, these studies provide support for the idea that psychological interventions, such as GS and imagery and relaxation, can help athletes beyond

what they receive from their physical therapists and athletic trainers in their recovery post ACL surgery.

Although such psychological intervention studies have demonstrated initial effectiveness in improving behavioral and emotional response to athletes recovering from ACL as well as other serious sport injuries, they have tested only certain psychological protocols. Thus, future research might examine other medically effective psychological interventions, such as Mindfulness Based Stress Reduction (MBSR), in relation to injury recovery. MBSR programs, which were originally developed by Jon Kabat Zinn (1996), are a patient-focused educational approach that promotes the use of mindfulness meditation to help people live healthier lives and have been shown to be effective in helping adolescents and adults within medical and sport settings with pain management (Kabat-Zinn et al., 1992), stress and anxiety management (Mosewich et al., 2014; Roemer & Orsillo, 2002), focus (Edwards, Kingston, Hardy, & Gould, 2002; Roemer & Orsillo, 2002), and mood regulation (Grossman et al., 2007).

Whereas mindfulness and self-compassion are distinct, treating oneself with self-compassion can contribute toward adopting a mindful perspective (Neff, 2003). For example, a person must acknowledge, as oppose to avoid, painful feelings in order to feel compassion for themselves; additionally, individuals must not over identify with their feelings either and have enough mental space to be able to extend kindness and recognize the broader human context of one's experience (Scheff, 1981). Self-compassion therefore includes having skills in mindful disposition, as well as decentering, which are causal mechanisms for the positive effect of mindfulness on individual's psychological well-being (Bishop et al., 2004; Hoge et al., 2015). Therefore, it is not surprising that researchers, such as Germer and Neff (2013) developed

Mindful Self-Compassion (MSC), which integrates the empirically supported mindfulness exercises from Mindfulness Based Stress Reduction (MBSR) with self-compassion. The structure of MSC is the same as MBSR, individuals meeting once a week for 2.5-3.5 hours for eight weeks, weekly homework assignments, and a half day silent meditation retreat. MSC is different, though, in that the weekly formal and informal meditation exercises include a focus on self-compassion, such as identifying the inner critic, compassionate body scan, or self-compassionate letter writing (Germer & Neff, 2013). In their MSC research, Neff and Germer (2013) examined the effectiveness of an eight week intervention with 21 adults (M_{age} = 51.26 years) and found that the intervention group experienced increases in self-compassion, mindfulness, and well-being (e.g., life satisfaction, happiness, depression, anxiety and stress) compared to the control group; differences existed at the end of the eight week program, as well as at six months and one year follow-ups. Relatedly, self-compassion exercises have been found to reduce individuals' depressive symptoms, promote positive states of mind, and buffer the effects of negative self-evaluation (Neff, 2009; Neff & McGehee, 2010).

In support of applying MSC to the sport context, Mosewich et al. (2009, 2011) showed that self-compassion influences regulation of emotions and cognitions among athletes. For instance, Mosewich et al. (2011) found that among 151 young female athletes (M_{age} = 15.1 years), self-compassion was negatively related to fear of failure, fear of negative evaluation and shame proneness, and positively correlated with two emotions considered to be adaptive -- shame-free guilt proneness and authentic pride. Moreover, where shame includes a negative self-evaluation, common among injured athletes, self-kindness reflects an understanding toward oneself in instances of pain or failure (Neff, 2003b). Because athletes may generalize

their loss of physical abilities during their rehabilitation to their entire athletic identity (Hedgpeth & Gieck, 2004), the mindfulness components of self-compassion can help them hold painful thoughts and feelings in awareness without over-identifying with them and thus losing their sense of themselves as athletes (Neff 2003b). Further, self-compassion can provide an opportunity for athletes to evaluate the self without self-condemnation, allowing for more accurate perceptions of situations and potentially a better ability to change maladaptive thoughts, feelings, or behaviors (Neff, 2003). In addition, common humanity may be especially useful in dealing with the feelings of isolation and of lack of understanding from others (Thing, 2006) that tend to accompany sport injury, both of which have been associated with depressive symptoms (Poulin, Hand, & Boudreau, 2005). In further support, Mosewich et al. (2014) has suggested that mindfulness paired with self-compassion would likely help athletes in managing their pain, stress, and emotional response to sport injury in addition to challenging the negative thinking and self-criticism that athletes frequently experience following sport injury.

Statement of Purpose

Based on previous research (Germer and Neff, 2013; Mosewich et al., 2009, 2011), the MSC intervention has strong potential for helping athletes manage their psychological response to serious sport injury yet to date no study has examined it in relation to post-ACL surgical recovery. Thus, the purpose of this study is to examine the impact of three psychological interventions – goal setting (GS), GS and imagery (IM), and GS and mindful self-compassion (MSC) – on athletes' psychological (i.e., pain experience, reinjury anxiety, depressive symptoms, cognitive appraisal, and confidence in returning to sport) and rehabilitation (i.e., ROM)

outcomes post- ACL surgery. Although research supports the effectiveness of imagery paired with relaxation on improving athletes' physical strength and healing, re-injury anxiety, depressive symptoms, pain experience, and confidence in returning to sport post ACL surgery (Cupal & Brewer, 2001; Maddison et al., 2006; Maddison et al., 2011), no study has explored alternative psychological interventions, such as MSC, and compared it to an imagery relaxation intervention to determine if another approach could be as effective. Based on the empirical support for MSC helping adolescents and adults manage emotions, such as anxiety, depressive symptoms, and pain experience (Neff and McGehee, 2010; Mosewich et al., 2014), as well as being a skill they could utilize to achieve optimal performance once they have returned to sport (Neff & McGehee, 2010; Mosewich et al., 2014), this intervention could be both immediately beneficial to athletes during rehabilitation following serious sport injury and generalizable to helping them improve their performance long after they are physically healed.

Based on previous research (e.g., Cupal & Brewer, 2001, Maddison et al., 2011; Mosewich et al., 2014), I hypothesized that:

1. At baseline, there would be no differences between the groups across any of the psychological measures (i.e., pain experience, reinjury anxiety in rehabilitation or in reentry into sport, depressive symptoms, cognitive appraisal, and psychological readiness to return to sport)
2. Depressive symptoms: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would score significantly lower depression than the GS group at 1, 2 and 7 weeks post-surgery, though MSC athletes' scores would be the lowest.

3. Pain experience: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would report significantly lower pain experience than the GS group at 1, 2 weeks post-surgery, though MSC athletes would have the lowest.
4. Reinjury anxiety: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would score significantly lower on reinjury anxiety during rehab and about reentry into competition than the GS group at 2 and 7 weeks post-surgery; IM and MSC athletes will not differ significantly at weeks 2 and 7.
5. Primary cognitive appraisal: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would report significantly lower stress and difficulty due to injury than the GS group at 1, 2 and 7 weeks post-surgery, the IM and MSC athletes would not differ significantly.
6. Secondary cognitive appraisal: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would report significantly lower difficulty coping with their injury than the GS group at 1, 2 and 7 weeks post-surgery; the IM and MSC athletes would not differ significantly.
7. Psychological readiness to return to sport: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would report significantly higher psychological readiness to return to sport

than the GS group at 2 and 7 weeks post-surgery; IM will have the highest score at weeks 2 and 7.

8. Range of motion: There would be a significant main effect for the intervention group after controlling for baseline scores. Specifically, IM and MSC athletes' would report significantly higher range of motion than the GS group at 2 and 7 weeks post-surgery; IM and MSC athletes will not differ significantly at weeks 2 and 7.

CHAPTER 2

METHOD

Participants

Athletes were 14 male, and 6 female, athletes (M_{age} = 16.75 years; *SD* = 2.15), drawn from six different sports medicine and orthopedic surgery clinics across the Dallas/Ft. Worth TX area. Regarding race/ethnicity, 57% (*n* =12) were White/NonHispanic, 14.3% (*n* = 3) Black or African American, 9.5% (*n* = 2) Hispanic/Latino, 9.5% (*n* = 2) Caucasian and Hispanic, 4.8% (*n* = 1) African American and American Indian, 4.8% (*n* = 1) Caucasian and American Indian. In terms of current academic status, 5% (*n* = 1) were in middle school, 76% (*n* = 16) were in high school, 19% (*n* = 4) were in college. In terms of competitive level prior to injury, 80% (*n* = 16) played at the high school varsity level, 30% (*n* = 6) at the competitive club level, and 10% (*n* = 2) at the college level. In terms of playing status prior to injury, 81% (*n* = 17) were starters, 9.5% (*n* = 2) reserves, but played more than half a game, and 9.5% (*n* = 2) not applicable, individual sport. Prior to injury, the athletes reported spending an average of 15.7 hours (*SD* = 13.03) in practice, and 7.10 hours (*SD* = 8.15) in competition.

The athletes had participated in organized sport for 2.7 years in high school, .5 years in college, and 7.6 years in their lives. The majority of the athletes, 55% (*n* = 11) were injured participating in football, 15% (*n* = 3) in basketball, 10% (*n* = 2) in soccer, 10% (*n* = 2) in volleyball, 5% (*n* = 1) in baseball, and 5% (*n* = 1) in steer wrestling. A few athletes, 19% (*n* = 4) reported having previously had ACL surgery; they participated in rehabilitation which lasted from 6 months to 1 year. For their current ACL surgery, 57% (*n* = 12) of the athletes had surgery on their left knee; 43% (*n* = 9) had surgery on their right knee. The majority of the athletes new

ACL's, 67% (*n* = 14) were taken from their patella tendon, 28% (*n* = 6) from their hamstring, and 5% (*n* = 1) from a cadaver.

Measures

A 4-item Visual Analog Scale (VAS; Hawker, Mian, Kendzerska, & French, 2011; Haefeli & Elfering, 2006) measures current level of pain, pain experienced over the past 2 weeks, and the impact of pain on work, social, school, and recreational activities. For items such as "make a mark along the line that corresponds to your current level of pain," athletes responded along a horizontal line that is 100mm in length; the line is anchored by the qualitative descriptors of *no pain* and *pain as bad as it could be*. The total score is based on the mean of the four items; a higher score indicates greater pain intensity (Hagg et al., 2003). Ferraz et al. (1990) reported a one-hour test-retest reliability of .94 for outpatients in a rheumatology clinic. For convergent validity, the VAS has shown to be highly correlated with a 5-point verbal descriptive scale of pain (i.e., nil, mild, moderate, severe, and very severe; $r = 0.71$ to 0.78) and a numeric rating scale (i.e., with response options from "no pain" to "unbearable pain;" $r = 0.62$ to 0.91) in patients with a variety of rheumatic diseases (Downie et al., 1978). In the current study the Cronbach's alphas ranged from .82 to .85.

Based on previous research (Albinson & Petrie, 2003; Daly et al. 1995; Ptacek, Smith & Zanas, 1992), two single items were used to assess the athletes' primary appraisal ("I am experiencing stress due to my injury") and secondary appraisal ("my injury is difficult to deal with"). Athletes responded to each item using a 5-point Likert scale ranging from 0 (*strongly disagree) to* 4 (*strongly agree*). Higher scores indicate higher stress and greater difficulty

coping. Primary and secondary appraisals at days 4, 7, and 14 post-injury predicted total mood disturbance at day 28, with correlations ranging from .96 to .99 (p <.05). In addition, primary and secondary appraisal at day 7 post-injury predicted active cognitive coping on day 28 (r's = -.96, p <.05), supporting its predictive validity (Albinson & Petrie, 2003).

The Center for Epidemiological Studies Depression scale for the National Longitudinal Study of Children and Youth (CES-D-12-NLSCY; Poulin et al., 2005) is a 12-item scale which assesses symptoms associated with clinical depression such as depressed mood, diminished interest or pleasure, and feelings of worthlessness or inappropriate guilt. On items such as "I felt like I was too tired to do things," the athletes indicated the frequency of occurrence over the past seven days from 0 (*never or rarely*) to 3 (*always*). The total score is the sum of all the items and ranges from 0, *no symptoms*, to 36, *very elevated symptoms*. Among 12,771 Canadian adolescents in junior and senior high school the Cronbach's alpha was .85 (Poulin et al., 2005). In a sample of 408 high school students, perceived quality of connectedness with schools, such as whether teachers care about them and whether they feel close to people at school, was independently related to lower depressive symptoms in girls (*OR*=0.85, p<01) and in boys (*OR*=0.81, p<.01), supporting the CES-D-12 construct validity (Langille, Rasic, Kisely, Flowerdew, & Cobbett, 2012). In the current study the Cronbach's alphas ranged from .73 to .82.

The 28-item Reinjury Anxiety Inventory (RIAI; Walker, Thatcher, & Lavallee, 2010) assesses anxiety in terms of Reinjury during Rehab (RIAI-RR; 13 items; anxiety, doubts, feeling on edge about getting reinjured during any stage of the rehabilitation process; e.g., "I feel nervous about becoming re-injured during rehabilitation") and Re-entry into Competition (RIAI-

REC; 15 items; body feeling tense, re-injury worries, performing poorly or getting reinjured during reentry into competition; e.g., "I am worried that I may not do as well as I could on returning to competition due to re-injury worries"). For items such as "I have doubts that I will remain injury free during rehabilitation," athletes responded from 0 (*not at all*) to 3 (*very much so*). Total score for each factor is the sum of the respective items; higher scores indicate greater anxiety. In a sample of 248 injured athletes ranging in age from 17 years to 39 years, Cronbach alphas have ranged from .96 to .98 and two week test-retest reliabilities from .41 to .65 (Walker et al., 2010). The RIAI-REC is positively correlated with injured athletes' concerns related to returning to sport after serious sport injury (RSSIQ-return concerns, Podlog & Eklund, 2005; r= 0.50, p <.01), and with behavioral disengagement defined as intentionally not engaging in activities related to returning to competitive sport post-injury (MCOPE, Crocker & Graham's, 1995; r= 0.25, p <.01), supporting its concurrent validity (Wadey et al., 2014). The two factors accounted for 80.56% of the total variance in re-injury anxiety among injured athletes, supporting its content validity (Walker et al., 2010). In the current study the Cronbach's alphas ranged from .93 to .96.

The 6-item Injury Psychological Readiness to Return to Sport Scale (I-PRRS; Glazer, 2009) assesses athletes' confidence in returning to sport after injury. For items such as "my confidence to play without pain is," athletes responded from 0 (*no confidence at all*) to 100 (*complete confidence*). Total score is the mean percentage of the 6 items and ranges from 0% (*no confidence*) to 100% (*complete confidence*). In a sample of 22 injured collegiate athletes, Glazer (2009) found that Cronbach alphas ranged from .78 to .93. He also found that I-PRRS scores were negatively correlated with the Total Mood Disturbance (TMD) scores of the Profile

of Mood States short form (POMS; McNair, Lorr, & Droppleman, 1992) 1 day after injury (r= -0.62, p =.002), supporting its concurrent validity. In addition, positive correlations were found between the athletes' and athletes' trainers I-PRRS scores when the athletes were cleared to return to competition (r= 0.82, p <.01) and after the healed athletes completed their first competition post-injury (r= 0.83, p <.001), showing external validity. In the current study the Cronbach's alphas ranged from .85 to .93.

Range of motion (ROM) measures represent athlete's knee flexion and extension, which were obtained from their physical therapists. To enhance reliability of the ROM assessment, each physical therapist used standardized goniometry procedures (Gerhardt, Cocchiarella, & Lea, 2002) to assess the degree of flexion (135 degrees; fully bend knee joint) and extension (0 degrees; completely straight knee joint). The total ROM for each knee is the difference value (i.e., flexion minus extension) with greater scores representing greater ROM (Maddison et al., 2006).

Manipulation Check Measures

The 26-item Self-Compassion Scale (SCS; Neff, 2003) measures positive and negative aspects of the five main components of self-compassion: self-kindness; self-judgement; common humanity; isolation; and mindfulness. For the purpose of this study, I examined the 5-item self-kindness (e.g., "When I am going through a very hard time, I give myself the caring and tenderness that I need"); and the 4-item mindfulness subscales (e.g., "When I am feeling down, I try to approach my feelings with curiosity and openness"). For each item, the athletes indicated how often they behaved in this manner from 1 (*almost never*) to 5 (*almost always*).

For each subscale the total score is the mean of the subscales respective items; higher scores indicate greater levels of self-kindness or mindfulness. In a sample of 3165 adolescents (M_{age} = 15.49, *SD* = 1.59) , Cronbach alpha for the self-kindness and mindfulness subscales were .77 and .70, respectively (Cunha, Xavier, & Castilho, 2016). The self-kindness subscale positively correlated with Early Memories of Warmth and Safeness Scale (*r* = .34, *p* = <.001; EMWSS; Richter, Gilbert, & McEwan, 2009) and negatively correlated with the Depression, Anxiety, and Stress Scales (DASS-21; Lovibond & Lovibond, 1995) of depression (*r* = -.21, *p* = <.001), stress (*r* = -.16, *p* = <.001), and anxiety (*r* = -.11, *p* = <.001). The mindfulness subscale was positively correlated with EMWSS (*r* = .29, *p* = <.001) and negatively correlated with depression (*r* = -.23, *p* = <.001), stress (*r* = .20, *p* = <.001), and anxiety (*r* = .16, *p* = <.001), supporting its convergent and discriminant validity. Further, the mindfulness and self-kindness items loaded on separate factors that were positively correlated (*r* = .67, *p* = <.001). In the current study the Cronbach's alpha for the self-kindness and mindfulness subscales ranged from .84 to .93 and from .79 to .81, respectfully.

The 10-item Athletic Injury Imagery Questionnaire-2 (AIIQ-2; Sordoni, Hall, & Forewell, 2002) examines athlete's frequency of imagery use during the rehabilitation across three different types (Hare, Evans, & Callow, 2008): motivational (3 items; imaging managing the arousal and affect that are associated with the injury), cognitive (3 items; imaging successfully completing specific rehabilitation exercises and strategies), and healing (4 items; imaging body healing itself and managing pain). For items such as, "I imagine coping with the stress associated with my injury," athletes rated their frequency of use from 1 (*never*) to 7 (*frequent*). The total score was the mean of all the items; higher scores indicate higher frequency of

imagery use. The AIIQ-2 demonstrates strong internal consistency among injured athletes, Cronbach's alpha ranging from .86 to .93 (Milne et al., 2005; Sordoni et al., 2000). In a sample of 71 injured athletes receiving physiotherapy, cognitive use of imagery during injury rehabilitation was significantly related to the previous use of imagery in training (r=.29, p<.01) and in competition (r=.36, p<.01), and both motivational and cognitive imagery were significantly correlated with the previous use of imagery in rehabilitation (r=.51, p<.001; r=.79, p<.001) respectively, showing external validity. In the current study the Cronbach's alpha ranged from .84 to .92.

The 4-item bond subscale of the Working Alliance Inventory short form revised (WAI-SR; Hatcher & Gillaspy, 2006) examines the bond between the athlete and researcher in terms of liking, appreciating, trust, and confidence (e.g., "I am confident in _____'s ability to help me"). For each item, the athletes inserted the name of their research assistant in the blank spaces and responded from 1 (*never*) to 7 (*always*). Total score is the mean of the four items; higher scores indicate a greater level of bond. In sample of 231 clients (M_{age} = 28.5 years, SD = 7.2), Hatcher and Gillaspy (2006) found the bond scale to be strongly correlated with the goal and task scales and asserted that the bond scale may enhance the agreement on goals and tasks. In support of using the bond scale, Reynolds et al. (1995) reported a factor analysis on the observer-rated version of the WAI-S and found that bond items formed a single factor (relationship), whereas task and goal items loaded together to make up a different factor (agreement-confidence). In the current study the Cronbach's alphas ranged from .91 to .97.

Demographic and Background Information

The athletes provided data on their gender, race/ethnicity, age, current academic status, sport before injury, years of experience in organized sport, level of sport participation prior to injury (i.e., high school, club, or collegiate), hours of time spent in practice and competition per week prior to injury, playing status on their teams prior to injury (e.g., starter, reserve). Athletes reported whether they had previously had ACL surgery and participated in rehabilitation. Other questions included: which sport or physical activity they were doing when they got injured, on which knee they were having surgery, and the type of tendon they would be using for their new ACL (i.e., patella, hamstring, or cadaver).

Procedures

The University of North Texas Institutional Review Board for Human Subjects Research provided approval for this study. Prior to participation, all athletes provided informed consent and for athletes under the age of 18 years old I obtained parental consent.

Recruitment

Athletes who had torn their ACLs were recruited from five medical and orthopedic surgery clinics in the Dallas - Fort Worth TX region and from the University of North Texas athletics department. During athletes' pre-surgical office visits (e.g., approximately two to five weeks before their surgery), the orthopedic surgeon or a member of his medical staff (e.g., nurse) provided athletes who met the inclusion criteria (see Screening section) a flier containing

information about the study and the contact information for the University of North Texas Research Team. UNT athletic trainers and coaches referred athletes to the research study.

Interested athletes provided contact information (e.g., name, parent's names, phone numbers) that the medical staff faxed or emailed to the research team. I then contacted potential participants within 48 hours of receipt of the contact information to do an initial screening. If eligible, I set up their first meeting, which took place during the week before their surgery. Initial meetings occurred at their current medical clinic, at the University of North Texas (UNT) psychology clinic, or at the athlete's home.

Screening

To be eligible, individuals needed to have a medical diagnosis of a torn ACL that required surgical repair and prior to injury have been involved in an organized sport for a minimum of 4 to 6 hours of training and competition per week. Screening criteria for exclusion was based on Santorelli's (2014) MBSR standards of practice, as well as studies utilizing IM to improve the physical and psychological outcomes of post-ACL surgery adults (Maddison et al., 2012; Cupal & Brewer, 2001; Lebon et al., 2012). All athletes were screened for clinical levels of psychopathology through a series of "yes" or "no" questions, such as "in your lifetime have you ever been diagnosed; or have you been treated in the last year for: major depression disorder (MDD), suicidality, attention deficit/hyperactivity disorder (ADHD), learning disability, anxiety disorder, autism spectrum, psychotic episode, or a personality disorder." Athletes who had another physical trauma or injury beyond the knee injury, such as a concussion, which could impair one's ability to adhere to the intervention protocols or result in a longer time in

rehabilitation compared to standard ACL rehabilitation, were excluded (see Appendix B for list of screening questions). I provided athletes with a description of the intervention limitations (e.g., no guarantee of being assigned to a specific intervention group; need to practice treatment in between sessions) and asked them to commit to their assigned group protocol for the next four months. No athlete was excluded due to another serious injury or due to the presence of clinical levels of psychopathology. Before the pre-surgery meeting, a random number generator was use to randomly assign all athletes to one of the three treatment groups (i.e., mindful self-compassion, guided imagery, or goal setting only), stratified by gender. (See Table 14 for participant adherence to each protocol).

Data Collection Timeline

For all athletes data were collected at five different times: baseline (two to seven days before surgery), one week post-surgery, two weeks post-surgery, seven weeks post-surgery, and 16 weeks post-surgery. For this study, only data from baseline to seven weeks were examined (see Table 1 for list of measures examined in this study). All surveys were completed online and sent to the athletes 48 hours before their scheduled appointment in an email and text message. At baseline (i.e., pre-surgery meeting) through four weeks post-surgery athletes completed the online survey of psychological measures 48 hours prior to or during their in person appointment. At seven weeks post-surgery through 16 weeks, athletes completed the online survey before their 15 minute phone appointment. The researchers sent reminder text messages and phone calls if the athletes had not completed the survey by their scheduled appointment.

All Interventions

All athletes completed a one hour session (i.e., presurgery meeting) and seven 30-minute sessions during which the researcher provided each athlete with goal setting skills, and a Mindful Self-Compassion (MSC) or Imagery (IM) exercise if they were assigned to one of those conditions. For all athletes, the first four sessions (i.e., two to seven days before surgery, one week post-surgery, two weeks post surgery, and four weeks post-surgery) occurred in person whereas the fifth through eighth sessions (i.e., seven to 16 weeks post-surgery) occurred by phone. Researchers were doctoral students who had been trained in each treatment protocol. Two of the researchers were blind to this study's hypotheses. The primary investigator made efforts to reduce investigator allegiance by following a standardized script for each condition and by having each researcher provide all three interventions. Additionally, each athlete was randomly assigned to one of the research team members who was then in charge of implementing the treatment protocol throughout the duration of the study. The assigned researcher was in contact with her athlete on a weekly basis, primarily via text, though email and/or phone calls were used to remind him/her of upcoming appointments, to follow their goals, and practice their assigned exercises. Each athlete could earn $10 in cash following each of the first four in person sessions and a $20 gift certificate was mailed to athletes after completing the 16 week survey.

Presurgery Meeting

At the pre-surgical meeting, which occurred two to seven days prior to surgery, athletes completed the baseline measures (see Table 1) and viewed a brief film depicting a male

adolescent athlete describing the physical and psychological benefits he experienced after going through one of the seven week psychological interventions post ACL-surgery. Following the video, all athletes received a basic introduction to goal setting; those athletes assigned to the other two conditions also were introduced to either IM or MSC skills as appropriate and instructed to use immediately following surgery (see sections on each condition for more details).

Goal Setting Only Condition (GS)

The athletes assigned to this group were asked to adhere to the following protocol and not practice any other kind of coping strategy, such as IM or MSC, over the course of the intervention. The researchers had the same amount of contact with the athletes assigned to the GS condition as the athletes assigned to the IM and MSC conditions; the difference was GS athletes focused only on identifying and adhering to their physical rehabilitation goals.

The basic structure of each session was twofold. First, they reviewed the rehabilitation goals from the previous week and discussed progress and obstacles. Second, they created rehabilitation goals for the upcoming weeks. Standard physical rehabilitation goals were suggested at the top of each session's goal setting worksheet and adjusted by the researcher to coincide with the athlete's progress in his/her actual rehabilitation (Burton, 1989; Evans, Hardy, & Flemming, 2000). Each goal setting sheet asked the athletes to set performance and process goals, and a long-term goal that was focused on when the athlete returned to sport in 6 to 8 months. Athletes also were asked to consider setting goals related to their attitudes and

thoughts that they wanted to have during the time period in between sessions (see Appendix C & D for a detailed description of the GS protocol and GS worksheets).

Pre-Surgery (Session 1)

During this meeting, athletes were given a basic introduction to goal setting that included exploring whether they had previously used goal setting in sport, the benefits of goal setting (e.g., direction, awareness of progress, and helps one maintain motivation over lengthy rehabilitation), and different kinds of goals (e.g., outcome, performance and process). The researcher also helped them create one long term goal (e.g., returning to sport in 6 to 8 months) and several short-term process goals pre-operation (e.g., the time they have before scheduled surgery) as well as post-surgery (e.g., 2 to 5 days post-surgery).

For the pre-operation goals, the researchers spoke with the athletes about what they had been working on (e.g., leg strengthening exercises) and how they felt and thought about the upcoming surgery (e.g., being confident in the surgery going smoothly). The post-surgery goals focused on icing for a certain time period (as recommended by their doctor) per day, using continuous passive motion (CPM) machine (e.g., controlled range of motion) for a certain number of hours per day, maintaining a positive attitude, and completing their physical therapy exercises as assigned.

Session 2

During this session rehabilitation goals for the one to two weeks post-surgery were discussed and focused on maintaining full passive knee extension, gradually increasing knee

flexion (0 to 90 degrees), diminishing swelling and pain, muscle training, and patellar mobility (Wilk et al., 2012).

Session 3

During this session rehabilitation goals for two to four weeks post-surgery were discussed and focused on the same goals described in Session 2 except adding some goals related to appreciating any additional freedoms they may have (e.g., able to shower with knee), and getting the stitches taken out.

Session 4

During this session rehabilitation goals for four to seven weeks post-surgery were discussed and emphasized continuing to improve knee range of motion (0 to 125 degree knee bend), light cycling, eliminating all pain and inflammation during activities, improving lower extremity strength, muscle endurance, balance, and continuing to restore limb confidence and function.

Session 5

During this session rehabilitation goals for seven to ten weeks post-surgery, goals were discussed and focused on continuing to work on the goals from Session 4, and additionally improving upon knee strength deficits, and continuing to restore confidence in limb functioning.

Session 6

During this session rehabilitation goals for 10 to 13 weeks post-surgery were discussed and focused on reinstalling confidence in the knee and ACL being integrated into the leg, quadriceps strength improving, no pain or swelling, walking without a limp, and continuing to cycle.

Session 7

During this session rehabilitation goals for 13 to 16 weeks post-surgery were discussed and focused on enhanced muscular power and endurance, improved neuromuscular control, progression to light jogging, and continuing to increase lower extremity strength.

Session 8

During this session rehabilitation goals for 16 weeks and beyond were discussed and focused on the athlete having regained full knee range of motion, knee strength being close to the same level or exceeding what it was prior to injury, the athlete being able to do more sport specific movements, and feeling confident and motivated about returning to sport in a few more months.

All goals depended on whether the athlete reached the goals set during the previous session and, if not, the goals were adapted to fit the athlete's current physical progress in rehabilitation. The standardized goals offered were based on expected progress in rehabilitation among athletes who had received patella tendon grafts, which surgeons

commonly do because the recovery time and return to mobility tends to be quicker (Burton, 1989; Evans, Hardy, & Flemming, 2000).

Mindful Self-Compassion (MSC) Intervention

Based on Germer and Neff's (2013) MSC intervention that integrates Jon Kabat Zinn's mindfulness-based stress reduction (MBSR) program with self-compassion exercises, the athletes in this group were introduced to eight key mindful self-compassion exercises (Kabat-Zinn, 1979; Germer & Neff, 2013; Tartakovsky, 2013). The athletes completed all the activities outlined in the GS only condition, in addition they were taught eight key MSC exercises and asked to practice these exercises at least three times per week, with the exception of the exercises presented in the pre-surgery meeting (practice every-day immediately following surgery).

The structure of each session was (a) reviewing activities from the past week and following the GS protocol for this session, (b) listening to one to two MSC exercises (10 to 15 minutes total), (c) processing the athletes thoughts and feelings about the exercises introduced, (d) planning how the MSC will be implemented in the upcoming week or two and any obstacles that might interfere, and (e) reviewing their homework, reminding them to respond to the researcher, and scheduling next appointment. The MSC exercises varied each week to fit what the athletes were expected to be experiencing in rehabilitation and during their physical recovery. (See Appendix E for a detailed description of the MSC protocol).

Pre-Surgery Session (Session 1)

The athletes were introduced to goal setting intervention as previously described. After the athletes had written down their goals, the researcher provided a brief introduction to mindful self-compassion, as well as to its potential benefits, such as increased body awareness, improved attention, pain management, and sport performance. The athletes were taught two exercises to help them cope with distressing feelings (e.g., frustration, sadness, anxiety) and develop skills to later improve their sport performance. The first skill was mindful breathing, which teaches athletes how to get in touch with the present moment and center themselves with their breath. The researchers recommended that the athletes apply this skill when they were feeling overwhelmed or struggling with their emotions, experiencing physical pain, having difficulties falling asleep, and/or wanting to simply relax. The second exercise involved creating a self-compassion mantra based on Neff (2013). The basic structure of the mantra was:

- I am struggling right now…
- Other athletes who have torn their ACLs have struggled too…
- I am going to accept myself as I struggle…
- And I am going to be kind to myself as I do…

The researchers had the athletes write this mantra down and read it over the next week anytime they were struggling with feelings/thoughts of distress, discomfort, anxiety, or pain, with the intention of bringing comfort and relief in the moment.

Session 2

The athletes were introduced to a decentering technique called “leaves on a stream” intended to help them recognize how they are feeling but not become overwhelmed by their

emotions. During this exercise athletes visualized a stream and practiced placing distressing thoughts (e.g., I am never going to return to sport) on the leaves that were floating by in the stream. Similar to the first session, the athletes were advised to use this exercise whenever they were experiencing a difficult emotion, such as during rehabilitation, to help make the emotions feel more manageable.

Session 3

The athletes had two exercises. The first was a self-compassion writing assignment during which they wrote down several statements a close person in their life (e.g., family, friend, physical therapist, teammate) has told them that they found comforting when they were struggling. The athletes were instructed to look at these statements whenever they noticed themselves being critical about themselves, their injury or their progress. The second exercise was a centering exercise based on mindfulness principles. During this exercise the athletes were instructed to center themselves on their breath and to mindfully examine a polished, smooth stone that the researchers had given them. The exercise was intended to help athletes manage difficult emotions, improve attentional focus, and have an object that reminded them to be in the present moment in their everyday activities such as rehabilitation.

Session 4

The athletes were taught a mindful self-compassion exercise in which they focused on their knee and practiced becoming aware of how their body felt in that location and how they could try to accept and soothe their knee using self-compassion, called soften-allow-soothe.

They were told that they could apply this technique whenever they noticed any discomfort in their knee and practice relaxing their body and allowing the body to heal itself.

Session 5

The athletes participated in a "compassionate body scan" in which they moved their attention and awareness to different parts of their body (e.g., from the crown of their head down to their toes) giving themselves compassion for any pain, tension, shame or feelings of inadequacies they felt toward each body part. This exercise expanded upon the previous week to encompass the entire body and again worked on improving the athletes' attentional focus and ability to intentionally relax specific muscles.

Session 6

Athletes listened to a self-compassion letter written by the researcher to fit all athletes for when they have returned to sport, intended to increase the athletes' confidence in their new ACL and increase their awareness of the control they have in their recovery process. This exercise was intended to help them remain focused over the next few months on doing their rehabilitation and to build confidence in them feeling ready to return to sport.

Session 7

The athletes practiced mindful walking intended to help them practice being in the present moment. The athletes were instructed to utilize this skill during their active

rehabilitation exercises, such as cycling and jogging, to help them relax and improve the quality of their exercising.

Session 8

The athletes were given an adapted version of the mindful "leaves on a stream" exercise which they learned during Session 2. This version emphasized practicing noticing and letting go of fears, anxiety, or negative thoughts they may have about returning to sport. The end of this exercise included the self-compassion mantra, adapted to emphasize feelings and thoughts associated with returning to sport. This exercise served as a review of the skills they had gained while participating in this study.

Imagery Intervention

The IM intervention is a replication of the cognitive, motivational, and healing IM used by Cupal and Brewer (2001). Cognitive IM was used to rehearse rehabilitation exercises and specific motor activities (e.g., quadriceps contractions, cycling; Guillot et al., 2004). Motivational IM was used to image meeting goals, managing arousal levels, and increasing self-efficacy in rehabilitation, as well as self-confidence in returning to sport (Maddison et al., 2012). Healing IM was used to image the physiological processes taking place during rehabilitation (e.g., tissue healing, flexibility increasing; Madison et al., 2012). The athletes completed all the activities outlined in the GS only condition; in addition they were taught eight key IM exercises and asked to practice these exercises at least three times per week, with the exception of the

exercises presented in the pre-surgery meeting (which they were asked to practice every-day immediately following surgery).

The structure of each session was (a) reviewing activities from the past week and following the GS protocol for this session, (b) listening to a guided IM which often began with several minutes in diaphragmatic breathing to induce relaxation (10 to 15 minutes each), (c) planning how the IM would be implemented and could be helpful in the upcoming week or two and discussing any obstacles that might interfere, and (d) reviewing their homework, reminding them to respond to the researcher, and scheduling next appointment (see Appendix F for a detailed description of the IM protocol).

Pre-Surgery (Session 1)

Athletes were introduced to goal setting (see description in goal setting condition). After the athletes had written down their goals, they were introduced to IM, as well as the potential benefits of this psychological tool, such as improved pain management, faster physical recovery, and increased sport performance. The athletes listened to a 9 minute IM starting with several minutes of diaphragmatic breathing to induce relaxation and imagining one's pain floating away like a balloon intended to help with pain management and emotional regulation.

Session 2

The researcher showed the athletes a brief video (e.g., 4 minutes) depicting their ACL reconstruction surgery so they had a visual of the internal structures that they could then use during their IM. In addition, the researcher provided the athlete with a diagram depicting the

standard steps during ACL reconstruction surgery. Then the athlete listened to the second IM exercise, which focused on imagining one's physical symptoms (e.g., tightness of joints, and limited range of motion) as normal and protective, in addition to imagining oneself coping effectively with one's pain.

Session 3

The athletes imagined themselves successfully dealing with feelings of discouragement and helplessness through a "golden orb" exercise intended to help athletes imagine their body healing itself, and the image of their strength returning to the injured knee during rehabilitation exercises, such as riding on the stationary bike and contracting their quadriceps.

Session 4

The athletes imagined the interior of the joint, imagining the surrounding muscles (e.g., quadriceps) being strong and the newly formed ACL and surrounding tendons being smooth, strong, and flexible.

Session 5

The athletes created a mental image of returning to and surpassing their previous knee strength in their chosen sport or activity and utilizing this image when they have doubts about their recovery, as well as, continuing to imagine their ACL becoming stronger and more powerful with each day.

Session 6

The athletes imagined their injured knee ligaments flexing and stretching effectively during their weekly rehabilitation exercises and themselves being completely healed and performing at their peak once they're physically healed, intended to increase confidence in returning to sport and reduce reinjury anxiety.

Session 7

The athletes focused on the interior of the injured knee, imagining their tendons being healed by a magical liquid that is similar to blood flow, describing in depth the internal healing taking place in their body and the impact that they are having on increasing the speed of their recovery.

Session 8

The athletes imagined themselves without pain or limitations approximately one year from now, performing desired activities freely and smoothly, expressing appreciation toward the body for its healing, and remaining patient, as well as confident, that their body will continue healing itself during the remainder of their recovery.

Data Analysis

Missing value analyses (MVA) was conducted for each of the dependent variables (Visual Analog Scale [VAS]; Injury Psychological Readiness to Return to Sport Scale [I-PRRS], Cognitive Appraisal [CA]; Center for Epidemiological Studies Depression National Longitudinal

Study of Children and Youth [CES-D-12-NLSCY]; Reinjury Anxiety Inventory [RIAI]; and Range of Motion [ROM]). Based on Little's missing completely at random (MCAR) chi-square test all data were found to be missing completely at random (Little, 1988). Missing data ranged from a low of .18 % to a high of 7.45%. Missing values were replaced using the mean of the items from a specific subscale for each individual at a specific time point (Schlomer, Bauman, & Card, 2010). If the participant did not complete more than 50% of the measure or subscale, their response was excluded from the analyses. The exception to this decision was four primary and four secondary cognitive appraisal (i.e., single item measures) items that were missing. Instead, I used multiple regression to estimate these missing values, which is a better fit for ANOVA analyses (Paul, 2001). Two participants decided to discontinue after completing baseline measurements and because willingness to commit to the protocol was a prerequisite for participation in the study they were both excluded from all analyses.

Each outcome variable was checked for distributional normality (i.e., skewness, kurtosis, and outliers). If z-values fell within the range of -1.96 to +1.96 the data were assumed to be normally distributed in terms of skewness and kurtosis (Tukey, 1977; Hoaglin, Iglewicz, & Tukey, 1986). Histograms and boxplots were used to determine the presence of outliers in all baseline outcome measures. The only outlier found was a 59 year old participant; he was excluded from all analyses because of the differences in life experiences compared to the rest of the sample which ranged in age from 13 to 22 years old.

For each of the eight dependent variables I focused on the data from baseline to seven weeks (see Tables 2 - 5 for correlation matrix at each time). Although there were no significant differences found at baseline for all outcome variables, which may have been due to the low

power associated with the small sample size, I was conservative and controlled for baseline scores. Initially I ran a series of repeated measures analyses of covariance (ANCOVA) so I could examine any potential interactions between condition and time; however there were no significant interactions for any of the outcome variables. Because of no significant interactions, I decided to run a series of one-way ANCOVAs that focused on the main effect of the intervention (see Tables 6 to 13 for results). I chose this analysis because it enabled me to use the full sample size at each time point and to examine differences between the intervention groups while controlling for baseline scores. The independent variable was the intervention condition (i.e., GS only, MSC, and IM). The covariate for each analysis was the outcome measure at baseline. The only exception was range of motion (ROM) because I did not have baseline measures so I ran an ANOVA at two weeks post-surgery. For ROM at 7 weeks, I ran a one-way ANCOVA with ROM two weeks post-surgery as the covariate. The ANCOVAs were run for each variable at each time, so the *p*-value for each test was adjusted to .01 to reduce the likelihood of Type I error. I calculated Cohen's d's to represent the size of the effect for each analysis. Although there were no statistically significant differences between any of the intervention groups at any point in time, for the purpose of guiding future research in the results I have noted effect sizes of .5 or greater and discussed these differences as well as lack of differences in the discussion (see Figures 1-8).

CHAPTER 3

RESULTS

Preliminary Analyses

To examine the fact that three different researchers conducted the protocol and each delivered all of the different interventions, one-way Analyses of Variance (ANOVAs) at one week, two weeks and seven weeks post-surgery were conducted. The independent variable was the researchers and the dependent variable was the Working Alliance Inventory (WAI) bond subscale. There were no main effects of the researchers on bond scores at one week $F(2, 17) = 1.08$, $p = .360$ ($\mu^2 = .11$), at two weeks $F(2, 17) = 1.21$, $p = .322$ ($\mu^2 = .13$), or at seven weeks post-surgery $F(2, 14) = 1.20$, $p = .329$ ($\mu^2 = .15$).

As a manipulation check for the imagery condition, a one way ANOVA was run with the intervention condition as the independent variable and the total imagery score as the dependent variable at baseline, two weeks, and seven weeks post-surgery. At baseline, the main effect for the intervention group was not significant $F(2, 17) = .30$, $p = .745$. At two weeks post-surgery, although the main effect for intervention group was not significant, $F(2, 16) = .62$, $p = .553$, IM group ($M = 5.48$; $SD = 1.13$) reported slightly higher total imagery scores compared to the MSC condition ($M = 4.73$; $SD = 1.25$; $d = .65$). The IM group reported similar scores to the GS group ($M = 5.07$; $SD = 1.14$; $d = .36$). At seven weeks post-surgery although the main effect for intervention group was also not significant, $F(2, 14) = .50$, $p = .619$, the IM group ($M = 5.82$; $SD = .98$) reported slightly higher total imagery scores compared to the MSC group ($M = 5.07$; $SD = 1.52$; $d = .62$). The IM group reported similar scores to the GS group (M = 5.43; $SD = 1.13$; $d = .32$).

As a second manipulation check, one-way ANOVAs were run at baseline, two weeks and seven weeks post-surgery with the intervention condition as the independent variable and the mindfulness subscales as the dependent variable and a second one-way ANOVA with the self-kindness subscale as the dependent variable. At baseline for the mindfulness subscale, the main effect for the intervention group was not significant, $F(2, 17) = .87$, $p = .439$, power = .05. At two weeks post-surgery, although the main effect for intervention group was not significant, $F(2, 17) = .71$, $p = .507$, power = .04, the MSC group ($M = 3.13$; $SD = 1.07$) reported slightly higher mindfulness compared to the GS group ($M = 2.5$; $SD = .96$; $d = .63$) and was similar to the IM group ($M = 3.0$; $SD = 1.03$; $d = .13$). At seven weeks post-surgery, the main effect for intervention group was not significant, $F(2, 13) = .12$, $p = .890$, power = .01. The participants assigned to the MSC group ($M = 3.17$; $SD = 1.62$) reported similar mindfulness compared to the IM ($M = 2.81$; $SD = .72$; $d = .33$) and the GS ($M = 2.96$; $SD = .77$; $d = .19$) group.

At baseline for the self-kindness subscale, the main effect for the intervention group was not significant, $F(2, 17) = .33$, $p = .723$, power = .02. At two weeks post-surgery, the main effect for intervention group was not significant, $F(2, 17) = .04$, $p = .964$, power = .01, and the MSC group ($M = 2.83$; $SD = 1.14$) reported similar self-kindness compared to the GS ($M = 2.71$; $SD = .97$; $d = .12$) and to the IM condition ($M = 2.69$; $SD = 1.00$; $d = .14$). At seven weeks post-surgery, the main effect for intervention group was not significant, $F(2, 13) = .33$, $p = .724$, power = .02. The participants assigned to the MSC group ($M = 2.48$; $SD = 1.32$) reported similar levels of self-kindness compared to the GS ($M = 3.03$; $SD = .83$; $d = .48$) and to the IM group ($M = 2.85$; $SD = 1.47$; $d = .32$).

One Week Post-Surgery

For an effect size *f* of .45 and 80% power I would need a sample size of 64; thus I was 31 people short.

Pain

The main effect for intervention group was not significant, $F(2, 17) = .61$, $p = .557$, power = .04, nor was the covariate, $F(2, 17) = 1.73$, $p = .207$, power = .08. The participants in the GS group ($M = 62.17$; $SE = 7.05$) experienced higher subjective pain compared to the MSC group ($M = 50.8$; $SE = 7.57$; $d = .61$) and the IM group ($M = 57.51$; $SE = 7.05$; $d = .25$). The MSC group experienced lower subjective pain compared to the IM group which was a small effect ($d = .36$).

Primary Cognitive Appraisal

Although the main effect for intervention group was not significant, $F(2, 17) = .64$, $p = .541$, power = .04, the covariate (baseline scores) was, $F(2, 17) = 7.03$, $p = .017$, power = .42. The participants in the IM group ($M = 1.31$; $SE = .53$) experienced lower stress due to injury compared to the MSC group ($M = 2.18$; $SE = .57$; $d = .56$) and similar scores to the GS group ($M = 1.83$; $SE = .53$; $d = .34$). The effect size between the GS group and the MSC group was small ($d = .22$).

Secondary Cognitive Appraisal

Neither the main effect for intervention group, $F(2, 17) = .1.10$, $p = .357$, power = .07, nor the covariate, $F(2, 17) = .93$, $p = .349$, power = .04, was significant. The participants in the

MSC group (*M* = 2.06; *SE* = .53) experienced less difficulty dealing with their injury compared to the GS group (*M* = 3.13; *SE* = .49; *d* = .82) and similar scores to the IM group (*M* = 2.67; *SE* = .49; *d* = .47). The IM group experienced similar difficulty dealing with their injury compared to the GS group (*d* = .35).

Depression

The main effect for intervention group, $F(2, 17) = .69$, $p = .515$, power = .04 and the covariate, $F(2, 17) = 1.41$, $p = .253$, power = .07, were not significant. The participants in the IM group (*M* = 8.99; *SE* = 2.17) experienced lower depression compared to the MSC group (*M* = 12.75; *SE* = 2.39; *d* = .67) and similar scores to the GS group (*M* = 11.20; *SE* = 2.19; *d* = .39). The GS group experienced similar depression compared to the MSC group (*d* = .27).

Two Weeks Post-Surgery

Pain

The main effect for intervention group was not significant, $F(2, 17) = .23$, $p = .794$, power = .02, though the covariate was significant, $F(2,17) = 13.13$, $p = .002$, power = .75. The participants in the MSC group (*M* =28.25; *SE* = 6.65) experienced similar pain compared to the IM group (*M* = 34.4; *SE* = 6.20; *d* = .30) and the GS group (*M* =30.67; *SE* = 6.20; *d* = .12). The GS group experienced similar pain compared to the IM group (*d* = .18).

Primary Cognitive Appraisal

The main effect for intervention group was not significant, $F(2,17) = .26$, $p = .772$, power

= .02, though the covariate was, $F(2,17) = 11.33$, $p = .004$, power = .67. The participants in the GS group ($M = 1.68$; $SE = .52$) compared to the to the MSC group ($M = 2.22$; $SE = .56$; $d = .33$) and to the IM group ($M = 1.85$; $SE = .52$; $d = .10$) reported similar levels of stress associated with their injuries. The IM group also experienced similar levels of difficulty dealing with their injury compared to the MSC group ($d = .22$).

Secondary Cognitive Appraisal

The main effect for intervention group was not significant, $F(2,17) = .16$, $p = .857$, power = .02, though the covariate was, $F(2,17) = 3.67$, $p = .073$, power = .20. The participants in the GS group ($M = 2.55$; $SE = .57$) experienced similar levels of difficulty dealing with their injury compared to the MSC group ($M = 2.81$; $SE = .62$; $d = .17$) and to the IM group ($M = 2.33$; $SE = .57$; $d = .14$). The IM group also experienced similar levels of difficulty dealing with their injury compared to the MSC group ($d = .31$).

Depression

The main effect for intervention group was not significant, $F(2,17) = .16$, $p = .851$, power = .02, though the covariate was, $F(2,17) = 4.67$, $p = .046$, power = .26. The participants in the GS group ($M = 6.85$; $SE = 2.13$) experienced similar depression compared to the MSC group ($M = 8.53$; $SE = 2.33$; $d = .29$) and to the IM group ($M = 8.18$; $SE = 2.11$; $d = .23$). The MSC and IM groups reported similar levels of depressive symptomatology ($d = .06$).

Reinjury Anxiety for Reentry into Competition

The main effect for intervention group was not significant, $F(2,17) = .29$, $p = .749$, power = .02, though the covariate was, $F(1,17) = 10.61$, $p = .005$, power = .63. The participants in the IM group ($M = 12.59$; $SE = 3.52$) experienced similar levels of reinjury anxiety about reentry into competition compared to the MSC group ($M = 16.45$; $SE = 3.85$; $d = .35$) and to the GS group ($M = 15.31$; $SE = 3.51$; $d = .25$). The GS group experienced similar reinjury anxiety about reentry into competition compared to the MSC group ($d = .10$).

Reinjury Anxiety in Rehab

Neither the main effect for intervention group, $F(2,17) = .05$, $p = .952$, power = .01, nor the covariate, $F(2, 17) = .008$, $p = .931$, power = ,01, were significant. The participants in the MSC group ($M = 9.03$; $SE = 3.70$) experienced similar reinjury anxiety in rehab compared to the IM group ($M = 10.55$; $SE = 3.41$; $d = .18$), but comparable levels with the GS group ($M = 9.54$; $SE = 3.43$; $d = .06$). The GS group experienced lower reinjury anxiety in rehab compared to the IM group ($d = .12$).

Psychological Readiness to Return to Sport

The main effect for intervention group was not significant, $F(2,17) = 1.47$, $p = .261$, power = .10, though the covariate was, $F(2,17) = 12.39$, $p = .003$, power = .72. The participants in the IM group ($M = 82.61$; $SE = 5.75$) experienced higher psychological readiness to return to sport compared to the MSC group ($M = 68.68$; $SE = 6.13$; $d = .71$) and similar to the GS group (M

= 79; *SE* = 5.75; *d* = .18). The GS group experienced higher psychological readiness to return to sport compared to the MSC group (*d* = .52).

Range of Motion

The main effect for intervention group was not significant, *F*(2,9) = .34, *p* = .718, power = .02. The participants in the GS group (*M* = 100.5; *SD* = 5.0) had higher ROM compared to the MSC group (*M* = 88.75; *SD* = 34.21; *d* = .62) and similar to the IM group (*M* = 93.0; *SD* = 6.22; *d* = .39). The participants in the IM group reported similar ROM compared to the MSC group which was a small effect (*d* = .22).

Seven Weeks Post-Surgery

Pain

Neither the main effect for intervention group, *F*(2, 14) = .37, *p* = .697, power = .02, nor the covariate, *F*(2,14) = 1.98, *p* = .183, power = .09, were significant. The participants in the IM group (*M* =8.83; *SE* = 6.08) experienced similar pain compared to the MSC group (*M* = 14.97; *SE* = 5.55; *d* = .45) and to the GS group (*M* =15.17; *SE* = 5.52; *d* = .47). The GS and MSC groups reported comparable levels of pain (*d* = .01).

Primary Cognitive Appraisal

The main effect for intervention group was not significant, *F*(2,14) = 1.49, *p* =.26, power = .09, though the covariate was, *F*(2,14) = 7.76, *p* = .015, power = .44. The participants in the MSC group (*M* = 1.49; *SE* = .44) experienced lower stress due to injury compared to the GS

group (*M* = 2.30; *SE* = .44; *d* = .62) and a comparable level with the IM group (*M* = 1.25; *SE* = .48; *d* = .18). The IM group experienced lower stress due to injury compared to the GS group (*d* = .80).

Secondary Cognitive Appraisal

The main effect for intervention group was not significant, *F*(2,14) = .06, *p* = .943, power = .01, yet the covariate was, *F*(2,14) = .79, *p* = .389, power = .04. The participants in the GS group (*M* = 1.65; *SE* = .57) experienced similar levels of difficulty dealing with their injury compared to the MSC group (*M* = 1.73; *SE* = .57; *d* = .06) and to the IM group (*M* = 1.94; *SE* = .63; *d* = .22). The IM and MSC groups were comparable in their reported abilities to cope (*d* = .16).

Depression

The main effect for intervention group was not significant, *F*(2,14) =1.00, *p* = .394, power = .06, though the covariate was, *F*(2,14) = 9.71, *p* = .008, power = .56. The participants in the GS group (*M* = 4.25; *SE* = 1.53) experienced lower depression compared to the IM group (*M* = 7.33; *SE* = 1.62; *d* = .72) and to the MSC group (*M* = 6.58; *SE* = .148; *d* = .54). The MSC group reported slightly lower levels of depressive symptomatology than the IM group (*d* = .18).

Reinjury Anxiety for Reentry into Competition

The main effect for intervention group was not significant, *F*(2,14) = .31, *p* = .738, power = .02, though the covariate was, *F*(1,14) = 29.84, *p* = .000, power = .98. The participants in the

GS group (*M* = 10.96; *SE* = 3.14) experienced similar reinjury anxiety about reentry into competition compared to the IM group (*M* = 14.61; *SE* = 3.38; *d* = .30) and to the MSC group (*M* = 13.13; *SE* = 3.07; *d* = .18). There was comparable scores in reinjury anxiety between the IM and MSC groups (*d* = .12).

Reinjury Anxiety in Rehab

The main effect for intervention group was not significant, $F(2,14) = .52$, $p = .605$, power = .03, yet the covariate was, $F(2, 14) = 8.14$, $p = .014$, power = .47. The participants in the GS group (*M* =6.24; *SE* = 3.12) experienced lower reinjury anxiety in rehab compared to the IM group (*M* = 11.10; *SE* = 3.39; *d* = .57) and similar scores to the MSC group (*M* = 8.60; *SE* = 3.01; *d* = .28). The MSC group experienced similar reinjury anxiety in rehab compared to the IM group (*d* = .29).

Psychological Readiness to Return to Sport

The main effect for intervention group was not significant, $F(2,14) = .92$, $p = .423$, power = .052, though the covariate was, $F(2,14) = 36.17$, $p = .000$, power = 1.00. The participants in the GS group (*M* = 83.96; *SE* = 4.43) experienced similar levels of psychological readiness to return to sport compared to the MSC group (*M* = 76.42; *SE* = 4.19; *d* = .40) and to the IM group (*M* = 76.21; *SE* = 4.99; *d* = .41). The IM and MSC groups reported comparable levels of readiness (*d* = .01).

Range of Motion

The main effect for intervention group was not significant, $F(2,9) = .44$, $p = .661$, power = .02, though the covariate (ROM at two weeks post-surgery) was, $F(2,9) = 8.70$, $p = .018$, power = .41. The participants in the IM group ($M = 131.98$; $SE = 4.56$) had similar ROM compared to the GS group ($M = 126.66$; $SE = 4.66$; $d = .46$) and to the MSC group ($M = 126.86$; $SE = 4.63$; $d = .44$). The GS and MSC groups were comparable in their ROM ($d = .01$).

Post-Hoc Analyses

Because there were no main effects found for the intervention group, as hypothesized, I conducted a post-hoc analysis to see if there were changes over time across all groups as would be expected. I ran a repeated measures ANOVA for time across each outcome variable so I could examine differences in the outcome measures from baseline to Week 7 post-surgery.

Pain

The time effect was significant, $F(2) = 97.30$, $p = .000$, $\mu^2 = .86$, power = 1.0. Participants' pain scores significantly decreased from Week 1 ($M = 55.15$; $SD = 17.17$) to Week 2 ($M = 28.82$; $SD = 19.14$) to Week 7 ($M = 13.23$; $SD = 13.54$).

Primary Cognitive Appraisal

The time main effect was not significant, $F(2) = .63$, $p = .541$, $\mu^2 = .04$, power = .04; participants stress scores did not change significantly across the three time periods: Week 1 ($M = 2.00$; $SD = 1.54$), Week 2 ($M = 2.00$; $SD = 1.58$), and Week 7 ($M = 1.71$; $SD = 1.31$).

Secondary Cognitive Appraisal

The time effect was significant, $F(2) = 6.32$, $p = .005$, $\mu^2 = .28$, power = .67. Participants difficulty coping with injury did not change significantly between Week 1 ($M = 2.59$; $SD = 1.28$) and Week 2 ($M = 2.53$; $SD = 1.46$), but both were significantly different from Week 7 ($M = 1.76$; $SD = 1.30$).

Depression

The time effect was significant, $F(2) = 9.01$, $p = .001$, $\mu^2 = .55$, power = .85. Participants depression scores were significantly higher at Week 1 ($M = 11.17$; $SD = 5.74$) compared to both Week 2 ($M = 8.03$; $SD = 6.26$) and Week 7 ($M = 5.98$; $SD = 4.28$). Participants' depression scores did not change significantly between Week 2 and Week 7.

Reinjury Anxiety for Reentry into Competition

The time effect was not significant, $F(1) = 1.09$, $p = .313$, $\mu^2 = .06$, power = .05. Participants' reinjury anxiety for reentry into competition did not change significantly across the two time periods: Week 2 ($M = 14.59$; $SD = 10.97$), and Week 7 ($M = 12.80$; $SD = 12.35$).

Reinjury Anxiety in Rehab

The time effect was not significant, $F(1) = .22$, $p = .649$, $\mu^2 = .01$, power = .02. Participants' reinjury anxiety for reentry into competition did not change significantly across the two time periods: Week 2 ($M = 9.16$; $SD = 7.75$) and Week 7 ($M = 8.5$; $SD = 8.48$).

Psychological Readiness to Return to Sport

The time effect was not significant, $F(1) = 2.62$, $p = .125$, $\mu^2 = .14$, power = .13. Participants' psychological readiness to return to sport did not change significantly across the two time periods: Week 2 ($M = 74.61$; $SD = 20.05$) and Week 7 ($M = 79.02$; $SD = 18.96$).

Range of Motion

The time effect was significant, $F(1) = 77.83$, $p = .000$, $\mu^2 = .88$, power = 1.0. Participants' ROM improved significantly from Week 2 ($M = 94.08$; $SD = 19.03$) to Week 7 ($M = 128.50$; $SD = 11.65$).

CHAPTER 4

DISCUSSION

The current study expanded on past research (Cupal & Brewer, 2001; Germer & Neff (2013; Maddison et al., 2011) by exploring the impact of three psychological interventions – goal setting (GS), GS and imagery (IM), and GS and mindful self-compassion (MSC) – on athletes' psychological and rehabilitation outcomes post- ACL surgery. In particular, I examined the interventions' effects on pain, cognitive appraisal (i.e., primary and secondary), depression, reinjury anxiety (i.e., during rehab and about reentry into competition), psychological readiness to return to sport, and range of motion (ROM). There were no statistically significant effects between the intervention groups at Weeks 1, 2, and 7, which is likely due to the small sample and low power. Thus, for this discussion, I am going to interpret moderate effect sizes (Cohen, 1992) found between the intervention groups, specifically for pain, primary and secondary cognitive appraisal, depression, reinjury anxiety about rehabilitation, psychological readiness to return to sport, and ROM.

Pain

Consistent with physical rehabilitation protocols and previous studies with athletes post-ACL surgery (Cupal & Brewer, 2001; Frank & Gambacorta, 2013; Maddison et al., 2006), my findings indicate that pain significantly decreased from Week 1, to Week 2, to Week 7 for all participants. Only athletes in the MSC condition reported lower pain experience compared to the GS group, which occurred at one week post-surgery (d = .61). There were no other

moderate effect sizes, thus the intervention groups were similar in their pain experiences at Weeks 2 and 7.

During the first MSC session, athletes received an introduction to goal setting and a brief introduction to mindful self-compassion and a discussion of its potential benefits (e.g., increased body awareness, improved attention, pain management, and sport performance).The athletes were also taught two exercises: (a) Mindful breathing (which teaches athletes how to get in touch with the present moment and center themselves with their breath), and (b) Self-Compassion Mantra (which involves reading four statements that reminds athletes this is a moment of struggle, others can relate to this struggle, and to practice showing acceptance and kindness toward themselves during difficult moments; Neff, 2013). The athletes were instructed to practice mindful breathing at least once per day starting the day of their surgery for one week, and to read the self-compassion mantra anytime they were struggling with feelings/thoughts of distress, discomfort, anxiety, or pain; the purpose of each was to bring comfort and relief in the moment. The difference in pain experienced between the athletes in the MSC and GS conditions at Week 1 is consistent with previous research on mindfulness in medical settings (Grossman et al., 2007; Schmidt et al., 2011). Specifically, mindfulness, including mindful breathing, has effectively helped individuals cope with pain associated with a range of medical illnesses including fibromyalgia (Grossman et al., 2007; Schmidt et al., 2011), and multiple sclerosis and cancer (Van Den Hurk et al. 2015). Additionally, the results from the current study are consistent with Mosewich et al.'s (2014) suggestion that mindfulness would likely help injured athletes with pain management.

One explanation for the differences in the athletes' pain ratings is that mindful breathing is associated with decentering, which is defined as viewing internal experience with increased objectivity and not reacting to thoughts, feelings, memories, and psychological events that arise in the mind (Fresco et al., 2007; Feldman, Greeson, & Senville, 2010). For example, individuals who practice mindful breathing when they are in pain may be less reactive, or feel less overwhelmed, by the pain. In support, Feldman et al. (2010) examined a sample of 190 female undergraduates who participated in a 15 minute stress management exercise. They found that the association between frequency of repetitive thoughts and negative reactions to thoughts was relatively weaker in the mindful breathing condition compared to the progressive muscle relaxation and loving-kindness meditation. Further, the self-compassion mantra provided an opportunity for athletes to evaluate the self without self-condemnation and remember that they are not alone (i.e., common humanity) in dealing with their injury. Such a perspective might allow for more accurate perceptions of situations and potentially a better ability to change maladaptive thoughts, feelings, or behaviors that could arise when one is experiencing high physical pain (Neff, 2003). Overall, the results of this study provide support for mindful breathing combined with the self-compassion mantra reducing athletes' pain one week following ACL surgery (Cupal & Brewer, 2001; Sng et al., 2012). Whereas it was hypothesized that athletes in the MSC condition would continue to experience the lowest pain at Week 2 and Week 7, the lack of moderate effects at these times is likely due to the fact that pain levels dropped significantly after the first week. Thus, by the second week the pain was not difficult to manage regardless of condition.

Primary Cognitive Appraisal

The athletes' reported stress due to their injury did not vary significantly from baseline through seven weeks post-surgery (Weise-Bjornstal et al.'s, 1998). These results are consistent with previous research that supports athletes experiencing stress due to injury that is likely to be consistent during the initial stage of the injury-recovery process (Leddy, Lambert, & Ogles, 1994; Udry, 1997), during the rehabilitation process (Clement et al., 2015), and in some cases at six months when they are contemplating returning to play (Morrey, Stuart, Smith, & Wiese-Bjornstal, 1999). Further, consistent with previous research (Baer et al., 2012; Hoge et al., 2015; Nyklicek & Kuijpers, 2008; Pearson, Brown, Bravo, & Witkiewitz, 2015; Vollestad et al., 2011) and as hypothesized, the GS condition reported greater stress due to injury compared to both the MSC (d = .62) and the IM (d = .80) conditions at Week 7; there were no other between subject comparisons with moderate to large effect sizes. Between weeks four to seven, athletes in the MSC condition practiced a mindful self-compassion exercise called soften-allow-soothe that had them focus on their knee and practice becoming aware of how their body felt in that location and how they could try to accept without judgment and soothe their knee using self-compassion. This exercise was intended to help athletes build upon their skills in decentering by noticing any discomfort in their knee and, rather than reacting, allow the body to heal itself. In addition, the soften-allow-soothe exercise builds skill in dispositional mindfulness, which is defined as the tendency to be aware of present-moment experiences with a non-judgmental attitude (Bishop et al., 2004; Hoge et al., 2015). The results of the current study are consistent with previous research that found that increases in dispositional mindfulness and decentering accounted for reductions in anxiety and stress following a mindfulness-based intervention

amongst early and late adults (Baer et al., 2012; Nyklicek & Kuijpers, 2008; Vollestad et al., 2011). For example, one study examined 38 young adults with Generalized Anxiety Disorder (GAD) and compared the MBSR intervention to a stress management education program (Hoge et al., 2015). They found support for decentering and dispositional mindfulness as mediators of the relationship between mindfulness and the positive physical and psychological outcomes, such as reduced anxiety and experience of physical pain. Additionally, results from two randomized wait list controlled studies among adults, who had general psychological distress (e.g., depressive and anxiety symptoms) and who went through an eight week MBSR program, revealed that mindfulness partially mediated improvements in quality of life and reductions in stress (Baer et al., 2012; Nyklicek & Kuijpers, 2008).

Between Weeks 4 through 7 athletes in the IM condition were asked to imagine the interior of their joint, more specifically the surrounding muscles (e.g., quadriceps) being strong and the newly formed ACL and surrounding tendons being smooth, strong, and flexible. This imagery exercise was designed to help the athletes relax and focus their mind on their body healing (i.e., healing imagery), viewing their new ACL as strong (i.e., motivational imagery), and to assist with effectively completing their assigned rehabilitation (i.e., cognitive imagery). Whereas mine is the first study to provide quantitative support for imagery reducing stress due to injury compared to goal setting among athletes at seven weeks post-ACL surgery, these findings are consistent with previous qualitative research (Driediger et al., 2006; Weinberg, Butt, Knight, Burke, & Jackson, 2003). For example, Driediger et al. (2006) conducted a semi-structured interview with 10 athletes (M_{age} = 21.7 years) whose injuries ranged from sprained ankle to a torn ACL. The athletes reported using cognitive imagery to learn and properly

perform rehabilitation exercises; motivational imagery (e.g., imagining being fully recovered) to increase their mental toughness, as well as to foster having a positive attitude; and healing imagery (e.g., imagining positive images of internal physiological processes) to aid in the recovery process, which would all contribute towards reduction in stress due to injury. Additionally, Weinberg et al. (2003) conducted an exploratory investigation with 523 athletes from two NCAA Division I universities and found that a total of 149 responses were categorized as using imagery to manage tough/difficult situations, such as when injured or tired.

Secondary Cognitive Appraisal

Overall, athletes' reported difficulty coping with their injury did not differ significantly between Weeks 1 and 2, but decreased significantly for all athletes by Week 7 post-surgery. In support of these findings, in the current study pain was significantly correlated with difficulty coping with injury during Week 1 (r = .68, p < .01) and Week 2 (r = .48, p < .05), but not at Week 7 (r = .32, p = .12). By Week 7 the athletes' pain had decreased substantially and, as it did, its relationship to the athletes' perception of their ability to cope also lessened. Consistent with my hypothesis, at one week post-surgery athletes in the MSC condition reported lower difficulty coping with injury compared to the GS condition (d = .61). One week following ACL surgery athletes typically experience high levels of physical pain, as well as limitations in mobility and loss in freedoms (e.g., inability to take a shower or move around without assistance). One explanation for this finding is the MSC group was able to successfully manage their pain, which increased their perception of being able to cope with their injury. In further support of this explanation, Auvinen et al. (2017) found among 1773 adolescents that multi-site

musculoskeletal pain, which may be caused by an injury, was associated with the athletes' perceptions of their psychological distress. That is, more physical pain equates to higher levels of psychological distress and more doubt in the ability to cope.

Emotional Responses

Consistent with previous research (Cupal & Brewer, 2001), in the current study all the athletes' depression scores decreased significantly from Week 1, to Week 2, to Week 7 post-surgery. Additionally, inconsistent with my hypothesis, at one week post-surgery athletes in the IM condition reported lower levels of depressive symptoms compared to the MSC condition (*d* = .67). One explanation is that athletes' levels of depressive symptomatology for the IM and MSC group at Week 1 were both in the low range (see Table 9); thus athletes in the two groups are unlikely to have differences in their depressive symptomatology from a clinical perspective.

Additionally, inconsistent with my hypothesis at seven weeks post-surgery the athletes in the GS condition reported lower depression than the athletes in the IM (*d* = .72), and MSC (*d* = .54), conditions. One explanation is that all the athletes' depressive symptoms decreased significantly from Week 2 to Week 7 so although there was a quantitative difference, the mean scores for each of the three groups were in the very low range (see Table 9) and unlikely to be causing any impairment for the athletes. Overall, athletes tend to experience the greatest fluctuation in mood during the initial stage of the injury-recovery process (Leddy, Lambert, & Ogles, 1994; Udry, 1997) and in some cases at six months when they are contemplating returning to play (Morrey, Stuart, Smith, & Wiese-Bjornstal, 1999); thus future researchers

should consider examining depression when athletes are physically healed but likely to experience doubt, or fear, upon reentry into competition.

For all the athletes, their psychological readiness to return to sport decreased from baseline through Week 2 and increased at Week 7. Consistent with previous research (e.g., Evans et al., 2000; Cupal & Brewer, 2001) and my hypothesis, at two weeks post-surgery the athletes in the IM condition reported higher psychological readiness to return to sport compared to the MSC condition (d = .71). Specifically, at two weeks post-surgery the athletes in the IM condition were asked to focus on imagining their physical symptoms (e.g., tightness of joints, and limited range of motion) as normal and protective, in addition to instructing the athletes to practice using this imagery when they were completing their rehabilitation exercises. In other words the imagery intervention at this time provided a reframing for the pain and physical symptoms as protective which contributed to an increase in perception of coping with their injury and a higher score on the psychological readiness to return to sport compared to the MSC condition. Although the current study is the first to quantitatively measure psychological readiness to return to sport (i.e., Psychological Readiness to Return to Sport Scale [I-PRRS]) among athletes post-ACL surgery, there is qualitative support for these findings (Evans et al., 2000; Cupal and Brewer, 2001). For example, Evans et al. (2000) interviewed three rugby players in their mid-twenties who had undergone surgery to repair a sport-related injury (i.e., dislocated shoulder, fractured fibia and tibia, or torn ACL); each athlete had participated in a minimum of three months of rehabilitation. The results indicated that the imagery intervention was associated with reduced reinjury anxiety, increased confidence in overall level of fitness and in returning to sport.

For all athletes reinjury anxiety about rehabilitation and reentry into competition remained the same from baseline through Week 2, and decreased at Week 7. Inconsistent with my hypothesis, at seven weeks post-surgery the athletes in the GS condition reported lower reinjury anxiety about rehabilitation than the IM condition (*d* = .57). One explanation is that at seven weeks post-surgery all athletes were reporting very low reinjury anxiety about rehabilitation because they had regained knee functioning as indicated by the significant increase in knee ROM. Thus, from a clinical perspective reinjury anxiety about rehabilitation was likely not very salient for athletes, regardless of condition, after they had already successfully completed seven weeks of rehabilitation. Further, because reinjury anxiety about reentry into competition is the most commonly cited reason presented by athletes for not returning to sport post ACL surgery injury (Ardern et al., 2011a; McCullough et al., 2012), and likely to be triggered when an athlete is contemplating returning to play, future researchers should examine reinjury anxiety about reentry into competition for athletes at five to six months post ACL surgery.

Range of Motion

As expected based on previous research (Evans, Hardy, & Flemming, 2000; Frank & Gambacorta, 2013), all athletes ROM scores improved from Week 2 to Week 7. Inconsistent with my hypothesis at two weeks post-surgery the GS group reported greater ROM compared to the MSC group (*d* = .62); there were no differences with the IM group. One explanation is that there were a lot of external factors which could have impacted ROM. For instance, athletes started physical therapy at different times and the athletes had different physical therapists. In

other words, there was not a standard rehabilitation protocol which all the athletes followed (See limitations and future directions for more details). Whereas these external factors likely impacted all of the groups it is worth noting that by seven weeks post-surgery all athletes had achieved full ROM, thus although there was a difference between GS and MSC groups at two weeks post-surgery this difference is unlikely to impact the athletes knee ROM over time.

Limitations and Future Directions for Research

The current study had several limitations that warrant discussion. First, although the sample was representative of the demographics of adolescents and early adults at high risk of tearing their ACL (Beck et al., 2017), the sample size was small, which contributed to low statistical power for all analyses. The moderate effect sizes, however, indicated that there were differences between groups despite the lack of statistical significance (Andersen & Stoove, 1998). Data were collected over the span of 1.5 years, though recruitment was a challenge because participants had to be seen pre-surgery, which necessitated a referral from an orthopedic surgeon. Unfortunately, I experienced difficulties getting a sufficient number of surgeons to commit to the study and making consistent referrals. Even though I created a protocol that minimized the time needed to recruit subjects, because of the orthopedic surgeons very busy and demanding schedules they were unable to consistently refer patients to the project (see Appendix B for recruitment material). We recommend future researchers allow ample time (minimum of 2 years) for data collection and also consider other recruitment sources (e.g., high school coaches).

Second, with the exception of the ROM measures, all measures were self-report and thus subject to reporting biases. Although the researchers checked in with athletes weekly about whether they were completing their weekly practice (e.g., working toward their goals, or listening to their mindfulness or imagery recording for that week), I cannot be sure regarding their level of compliance with home practice and completion of the exercises. Additionally, athletes were inconsistent in responding to text messages as well as the questionnaire at seven weeks post-surgery. The study was designed to limit the in person sessions to four in order to reduce the time commitment required for participation. However, the low response rate at seven weeks post-surgery may indicate that all meetings should take place in person to increase accountability and adherence to the study protocol. In addition, the first two questionnaires (i.e., pre-surgery, two weeks post-surgery) were completed in the presence of the experimenter whereas the third questionnaire (i.e., seven weeks post-surgery) was completed independently. It is possible that the presence of an experimenter could have influenced the athletes' to respond more positively because of their desire to please the experimenter. Additionally, although an objective measure was included in this study (e.g., Range of Motion), future studies could benefit from including more objective measures such as neurobiological factors (e.g., hypothalamic-pituitary-adrenal (HPA) function) that are less susceptible to self-report biases and provide information that can expand the application of the study to other medical professionals (e.g., physical therapists, surgeons; Maddison et al., 2011).

Further, in future research, it would be ideal to standardize physical therapy by having the same physical therapist (or PT clinic) oversee rehabilitation. Taking this approach could contribute to a greater response rate and control for the influence of physical therapy on

psychological and rehabilitation outcomes (Cupal & Brewer, 2001; Frank & Gambacorta, 2013). Additionally, studies should assess for the time delay between injury and surgery because delays greater than 12 weeks is significantly related to an increase in the amount of additional injuries (e.g., medial meniscal tears and lateral compartment chondral injuries) that could impact rehabilitation outcomes (Lawrence, Argawal, & Ganley, 2011). Further, future researchers should examine the impact of the IM and MSC intervention on athletes' post-ACL surgery beyond seven weeks and see if at 16 or 24 weeks the athletes see improvement in reinjury anxiety and depression symptoms (Bennett & Dorjee, 2016; Cupal & Brewer, 2001). Overall, future studies might formally investigate the optimal length for the exercises, or whether alternative strategies to increase the dose of mindfulness or imagery (e.g., group practice, social media accountability) achieve more positive effects in adolescents compared to adults. Lastly, to date there is no cross-sectional measurements of the impact of mindfulness and self-compassion or imagery exercises across different ages in adolescence, or mediational pathways within age brackets amongst athletes post-ACL surgery, thus future researchers should attempt to fill this gap and examine these areas so psychological interventions can effectively be adapted for the adolescent population (Burke, 2010, Johnson et al., 2016; Meiklejohn et al., 2012).

Implications

Although there were no statistically significant differences found between the intervention groups, the moderate effect sizes provide findings that are worthy of further investigation across a broad range of applications. The current study is one of a limited number

of studies (Cupal & Brewer, 2001) that has investigated the effect of several psychological interventions on adolescent athletes' post-ACL surgery and the first study to examine the impact of a MSC intervention on athletes' post-ACL surgery. Whereas, results from psychological interventions with adult athletes post-ACL surgery are promising (Driediger et al., 2006, Maddison et al., 2006, 2012) more research should be conducted with adolescents who are at the highest risk of tearing their ACL (Beck et al., 2017) and more vulnerable to negative consequences following serious sport injury (Mainwaring et al., 2010). My results suggest that mindful breathing and the self-compassion mantra (Neff, 2013) may help adolescent athletes in specific scenarios (e.g., pain management and difficulty coping with injury) during the first week following ACL surgery. The results also suggest that healing, motivational, and cognitive imagery can lessen athletes' experience of depression and improve psychological readiness to return to sport during the first few weeks following surgery. At seven weeks, goal setting in addition to physical therapy may contribute to improvement in depression and reinjury anxiety about rehabilitation. Overall, the results of this study provide further support that in addition to physical therapy athletes could benefit from using psychological interventions, though more research is needed to determine the active ingredients, optimal dose, and time of application for each psychological intervention (i.e., GS, MSC and GS, IM and GS) in helping adolescent athletes in their recovery from ACL surgery.

Conclusion

The current study is the first to explore the effect of mindful self-compassion compared to another empirically supported psychological intervention, imagery and goal setting, on

adolescent athletes' psychological and rehabilitation outcomes following ACL reconstruction surgery. The moderate effect sizes indicate that more research should be conducted on the impact of these psychological interventions (i.e., GS, MSC and GS, IM and GS) on adolescent athletes' psychological responses post-ACL surgery. Although imagery is a useful strategy for helping athletes manage depression and increasing confidence in returning to sport (Cupal & Brewer, 2001), the results of this study add to the sport injury literature by revealing that mindful self-compassion is an effective strategy for helping adolescents manage pain and cope with stress due to injury, especially during the first week following surgery. The findings also suggest that physical therapists should include setting process and performance goals that provide structure and motivation for achieving specific milestones and may have emotional benefits such as decreased reinjury anxiety during rehabilitation, depression, and improved psychological readiness to return to sport.

Table 1

Assessment Timeframe

TIME 1 (2 to 7 days before surgery)	TIME 2 (1 week post-surgery)	TIME 3 (2 weeks post-surgery)	TIME 4 (7 weeks post-surgery)
VAS	VAS	VAS	VAS
I-PRRS		I-PRRS	I-PRRS
CA	CA	CA	CA
CES-D-12-NLSCY	CES-D-12-NLSCY	CES-D-12-NLSCY	CES-D-12-NLSCY
RIAI		RIAI	RIAI
SCS		SCS	SCS
AIIQ		AIIQ	AIIQ
	WAI	WAI	WAI

Note. Visual Analog Scale (VAS); Injury Psychological Readiness to Return to Sport Scale (I-PRRS), Cognitive Appraisal (CA); Athletic Injury Imagery Questionnaire-2 (AIIQ-2); Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY); Self-Compassion Scale (SCS); Reinjury Anxiety Inventory (RIAI).

Table 2

*Correlations, Means, and Standard Deviations of All Non-Standardized Variables at Baseline (*N *= 20)*

Variable		1	2	3	4	5	6	7
1	VAS	-	.25	.46*	.41	.46*	-.09	.37
2	I-PRRS	-	-	.29	-.29	.55*	.52*	.81**
3	CA-1	-	-	-	.38	.50*	-.13	.47
4	CA-2	-	-	-	-	.51*	.16	.48*
5	CES-D	-	-	-	-	-	.17	.67**
6	RIAI-R	-	-	-	-	-	-	.55*
7	RIAI-C	-	-	-	-	-	-	-
M		34.88	76.50	1.95	2.60	7.70	9.89	17.05
SD		19.97	19.22	1.35	1.27	5.65	8.84	11.75

Note. Visual Analog Scale (VAS) ranges in score from 0 to 100; Injury Psychological Readiness to Return to Sport Scale (I-PRRS) ranges in scores from 0 to 100; Cognitive Appraisal-Primary (CA-1), and Cognitive Appraisal-Secondary (CA-2) both range in scores from 0 (*low*) to 4 (*high*); Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY) ranges from 0 (*low*) to 36 (*high*); Reinjury Anxiety Inventory during rehabilitation (RIAI-R) ranges from 0 (*not at all*) to 39 (*very much*); Reinjury Anxiety Inventory in returning to competition (RIAI-C) ranges from 0 (*not at all*) to 45 (*very much*). *$p < .05$; **$p < .01$

Table 3

*Correlations, Means, and Standard Deviations of All Non-Standardized Variables at 1 Week (*N *= 20)*

Variable		1	2	3	4
1	VAS	-	.22	.68**	.32
2	CA-1	-	-	.47*	.53*
3	CA-2	-	-	-	.42
4	CES-D	-	-	-	-
M		57.13	1.75	2.65	10.89
SD		18.63	1.55	1.31	5.65

Note. Visual Analog Scale (VAS) ranges in score from 0 to 100; Cognitive Appraisal-Primary (CA-1), and Cognitive Appraisal- Secondary (CA-2) both range in scores from 0 (*low*) to 4 (*high*); Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY) ranges from 0 (*low*) to 36 (*high*). *$p < .05$; ** $p < .01$

Table 4

*Correlations, Means, and Standard Deviations of All Non-Standardized Variables at 2 Weeks (*N *= 20)*

Variable		1	2	3	4	5	6	7	8
1	VAS	-	.27	.25	.48*	.08	.27	.16	-.37
2	I-PRRS	-	-	-.63**	-.41*	-.60**	-.58*	-.68**	-.04
3	CA-1	-	-	-	.58**	.46*	.48*	.56*	-.27
4	CA-2	-	-	-	-	.07	.42	.33	-.22
5	CES-D	-	-	-	-	-	.63**	.73**	-.04
6	RIAI-R	-	-	-	-	-	-	.89**	.08
7	RIAI-C	-	-	-	-	-	-	-	.09
8	ROM	-	-	-	-	-	-	-	-
M		31.25	77.17	1.90	2.55	7.82	9.74	14.70	94.08
SD		20.29	19.72	1.65	1.54	5.84	8.31	11.00	19.03

Note. Visual Analog Scale (VAS) ranges in score from 0 to 100; Injury Psychological Readiness to Return to Sport Scale (I-PRRS) ranges in scores from 0 to 100; Cognitive Appraisal-Primary (CA-1), and Cognitive Appraisal-Secondary (CA-2) both range in scores from 0 (*low*) to 4 (*high*); Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY) ranges from 0 (*low*) to 36 (*high*); Reinjury Anxiety Inventory during rehabilitation (RIAI-R) ranges from 0 (*not at all*) to 39 (*very much*); Reinjury Anxiety Inventory in returning to competition (RIAI-C) ranges from 0 (*not at all*) to 45 (*very much*); Range of Motion Test (ROM; $n = 12$) ranges from 0 degrees (*completely straight*) to 135 degrees (*fully bent knee joint*). *$p < .05$; ** $p < .01$

Table 5

*Correlations, Means, and Standard Deviations of all Non-Standardized Variables at 7 Weeks (*N *= 17)*

Variable		1	2	3	4	5	6	7	8
1	VAS	-	-.64**	.12	.32	.21	.54*	.48	-.47
2	I-PRRS	-	-	-.13	-.56*	-.28	-.73**	-.81**	-.05
3	CA-1	-	-	-	.21	.33	.26	.35	.09
4	CA-2	-	-	-	-	.54*	.65**	.55*	.15
5	CES-D	-	-	-	-	-	.44	.53*	-.12
6	RIAI-R	-	-	-	-	-	-	.87**	.24
7	RIAI-C	-	-	-	-	-	-	-	.30
8	ROM	-	-	-	-	-	-	-	-
M		13.24	79.02	1.71	1.76	5.98	8.50	12.80	125.0
SD		13.54	18.96	1.31	1.30	4.28	8.48	12.35	16.84

Note. Visual Analog Scale (VAS) ranges in score from 0 to 100; Injury Psychological Readiness to Return to Sport Scale (I-PRRS) ranges in scores from 0 to 100; Cognitive Appraisal-Primary (CA-1), and Cognitive Appraisal-Secondary (CA-2) both range in scores from 0 (*low*) to 4 (*high*); Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY) ranges from 0 (*low*) to 36 (*high*); Reinjury Anxiety Inventory during rehabilitation (RIAI-R) ranges from 0 (*not at all*) to 39 (*very much*); Reinjury Anxiety Inventory in returning to competition (RIAI-C) ranges from 0 (*not at all*) to 45 (*very much*); Range of Motion Test (ROM; *n* = 13) ranges from 0 degrees (*completely straight*) to 135 degrees (*fully bent knee joint*). *$p < .05$; ** $p < .01$

Table 6

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Pain Experience as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		1 week		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	31.07	7.88	57.51	7.05	34.4	6.2	8.83	6.08
GS	38.57	7.88	62.17	7.05	30.67	6.2	15.17	5.52
MSC	35	8.51	50.8	7.57	28.25	6.65	14.97	5.55

Note. Pain experience was measured using the Visual Analog Scale (VAS) ranges in score from 0 to 100. IM is the imagery condition; GS is the goal setting only condition; and MSC is the mindful self-compassion condition. **N* =17

Table 7

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Primary Cognitive Appraisal as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		1 week		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	2.14	0.53	1.36	0.49	1.78	0.39	1.37	0.51
GS	2	0.53	1.9	0.49	1.62	0.39	2.38	0.41
MSC	2	0.62	1.84	0.58	1.73	0.43	1.25	0.45

Note. Cognitive Appraisal-Primary (CA-1) range in scores from 0 (*low*) to 4 (*high*); IM is the imagery condition; GS is the goal setting only condition; and MSC is the mindful self-compassion condition. **N* =17

Table 8

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Secondary Cognitive Appraisal as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		1 week		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	2.71	0.5	2.66	0.48	2.16	0.61	1.68	0.53
GS	2.86	0.5	3.04	0.49	2.03	0.61	1.47	0.44
MSC	2.00	0.6	2.22	0.59	2.98	0.7	1.69	0.49

Note. Cognitive Appraisal-Secondary (CA-2) range in scores from 0 (*low*) to 4 (*high*); IM is the imagery condition; GS is the goal setting only condition; and MSC is the mindful self-compassion condition. **N* =17

Table 9

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Depression as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		1 week		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	8.14	2.19	8.99	2.17	8.18	2.11	7.33	1.62
GS	9.00	2.19	11.2	2.19	6.85	2.13	4.25	1.53
MSC	5.67	2.36	12.75	2.39	8.53	2.33	6.58	1.48

Note. Center for Epidemiological Studies Depression National Longitudinal Study of Children and Youth (CES-D-12-NLSCY) ranges from 0 (*low*) to 36 (*high*); IM is the imagery condition; GS is the goal setting only condition; and MSC is the mindful self-compassion condition. *N =17

Table 10

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Reinjury Anxiety Rentry into Competition as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	19.14	4.57	12.59	3.52	14.61	3.38
GS	18.43	4.57	15.31	3.51	10.96	3.13
MSC	13.00	4.93	16.45	3.85	13.13	3.07

Note. Reinjury Anxiety Inventory in returning to competition (RIAI-C) ranges from 0 (*not at all*) to 45 (*very much*); GS is the goal setting only condition; and MSC is mindful self-compassion condition. *N =17

Table 11

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Reinjury Anxiety during Rehab as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	9.39	3.5	10.55	3.41	11.1	3.39
GS	11.43	3.5	9.54	3.43	6.24	3.12
MSC	8.67	3.78	9.03	3.7	8.6	3.01

Note. Reinjury Anxiety Inventory during rehabilitation (RIAI-R) ranges from 0 (*not at all*) to 39 (*very much*); IM is the imagery condition; GS is the goal setting only condition; and MSC is mindful self-compassion condition. **N* =17

Table 12

*Adjusted Means and Standard Error after Controlling for Baseline Scores on the Measure of Injury Psychological Readiness to Return to Sport as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 20)*

	Baseline		2 weeks		7 weeks*	
Condition	*M*	*SE*	*M*	*SE*	*M*	*SE*
IM	81.67	7.48	82.61	5.75	76.21	4.99
GS	71.43	7.48	79	5.75	83.96	4.43
MSC	76.39	8.08	68.68	6.13	76.42	4.19

Note. Psychological Readiness to Return to Sport Scale (IPRRS) ranges in score from 0 (*no confidence at all*) to 100 (*complete confidence*); IM is the imagery condition; GS is the goal setting only condition; and MSC **N* =17

Table 13

*Adjusted Means and Standard Error on the Measure of Range of Motion as a Function of Time and Condition in Athletes' Post-ACL Surgery (*N *= 12)*

	2 weeks		7 weeks	
Condition	*M*	*SE*	*M*	*SE*
IM	93	10.14	76.21	4.99
GS	100.5	10.14	83.96	4.43
MSC	88.75	10.14	76.42	4.19

Note. Range of Motion (ROM) ranges from 0 to 135 degrees. IM is the imagery condition; GS is the goal setting only condition; and MSC is mindful self-compassion condition. **N* = 13

Table 14

Percentage of Participants in Each Condition who reported Practicing their Assigned Intervention a Minimum of Three Times per Week

	IM	MSC	GS
1 week	100%	100%	100%
2 weeks	86%	83%	86%
7 weeks	71%	83%	100%

Note. IM is the imagery condition; GS is the goal setting only condition; and MSC is the mindful self-compassion condition.

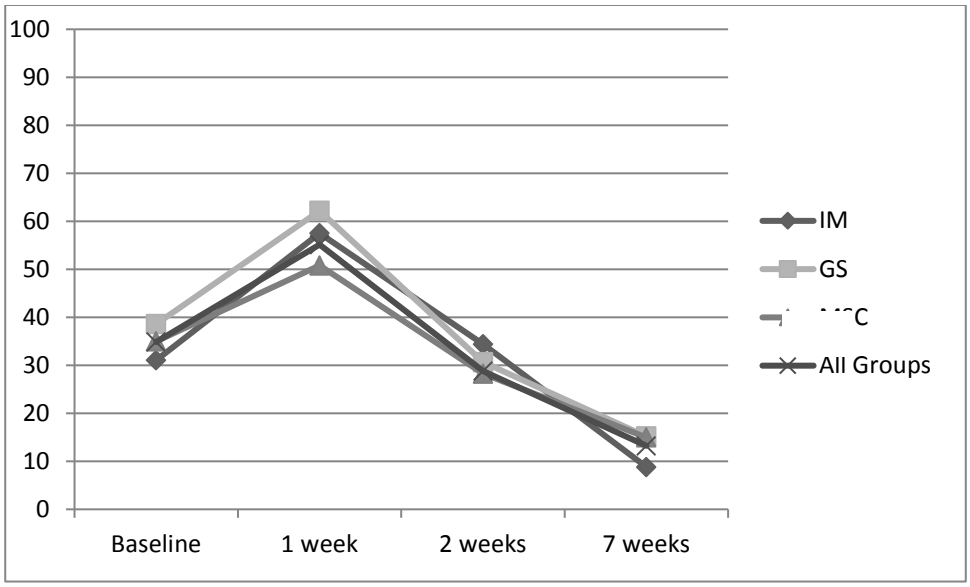

Figure 1. Mean pain experience by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time. * < .01 ** <.001

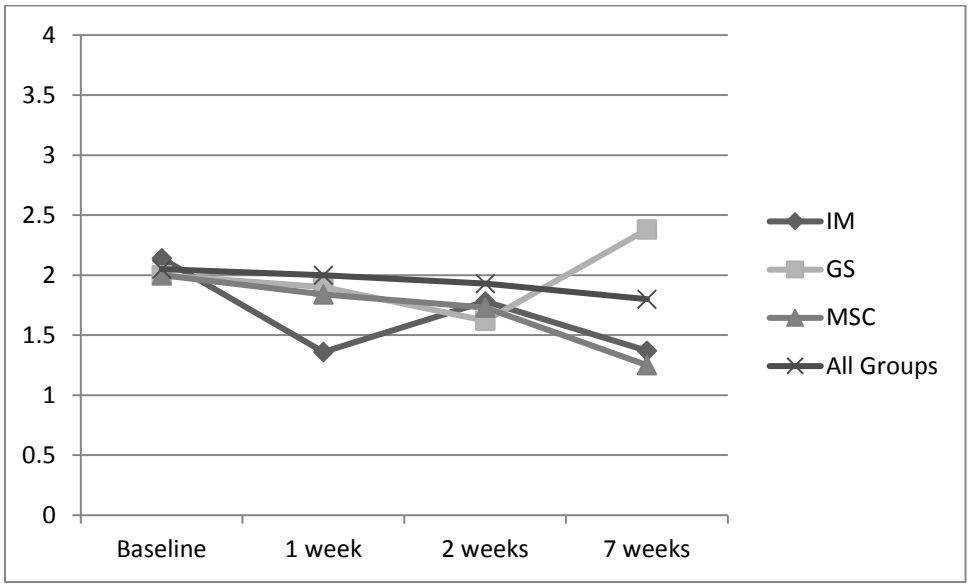

Figure 2. Mean primary cognitive appraisal by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time.

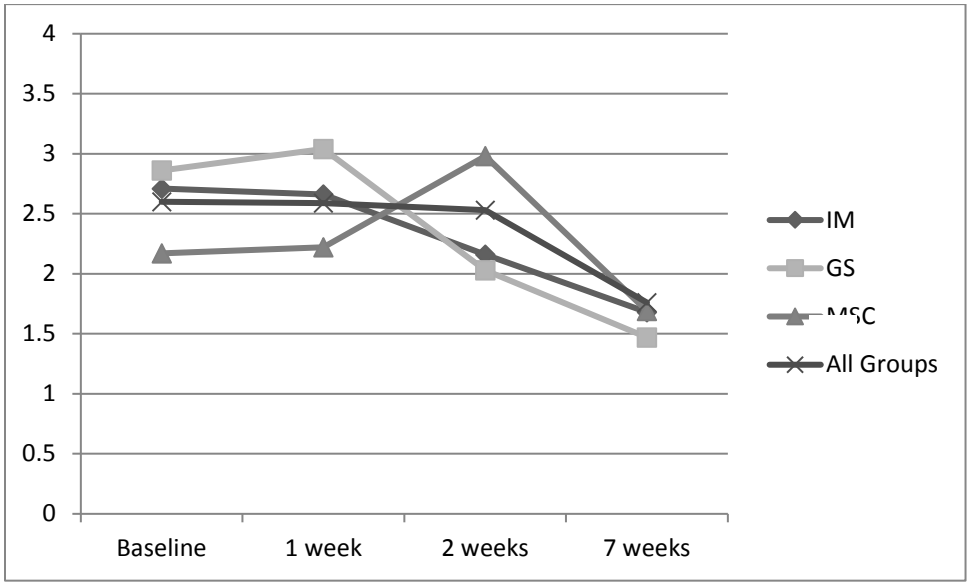

Figure 3. Mean secondary cognitive appraisal by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time. * < .01 ** <.001

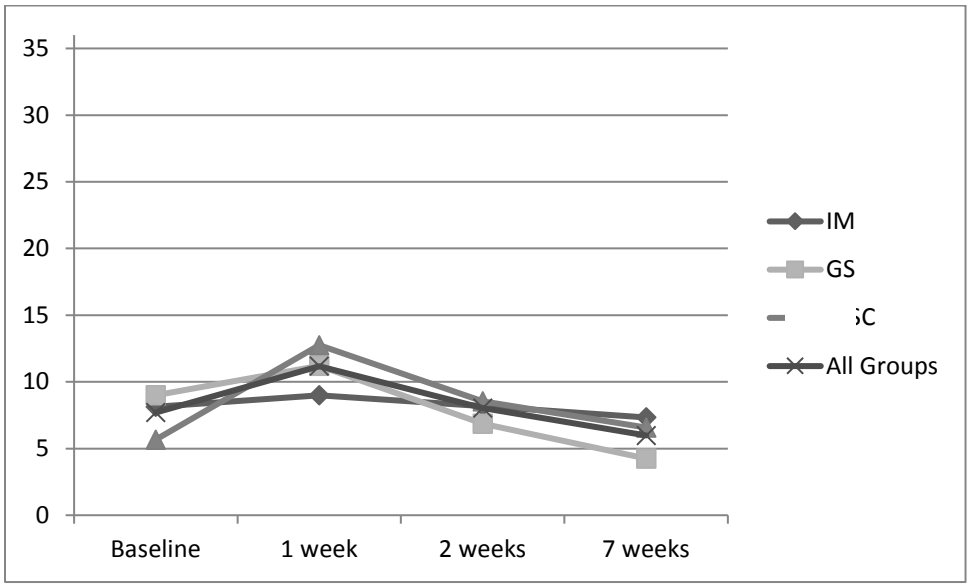

Figure 4. Mean depression by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time.

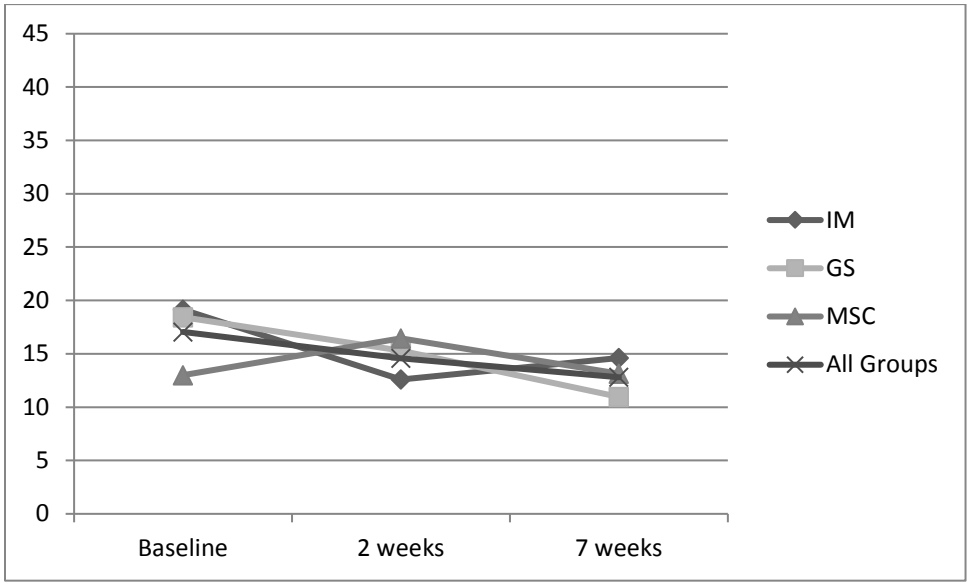

Figure 5. Mean reinjury anxiety about reentry into competition by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time.

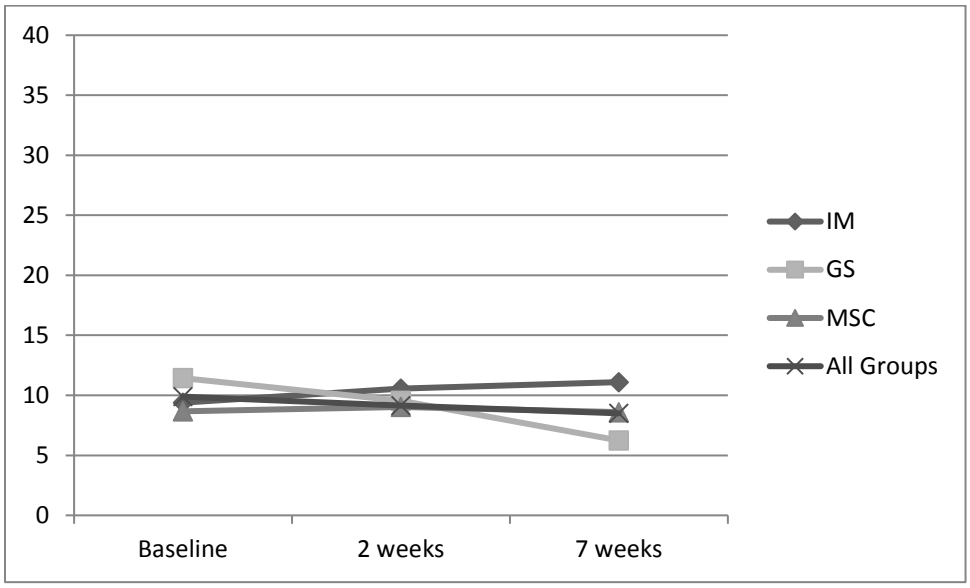

Figure 6. Mean reinjury anxiety during rehabilitation by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time.

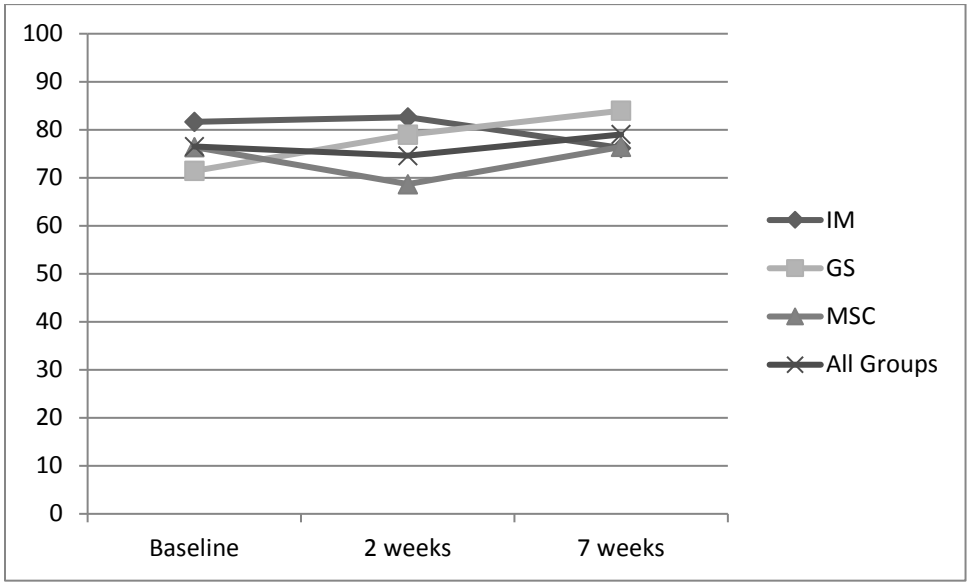

Figure 7. Mean psychological readiness to return to sport by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time.

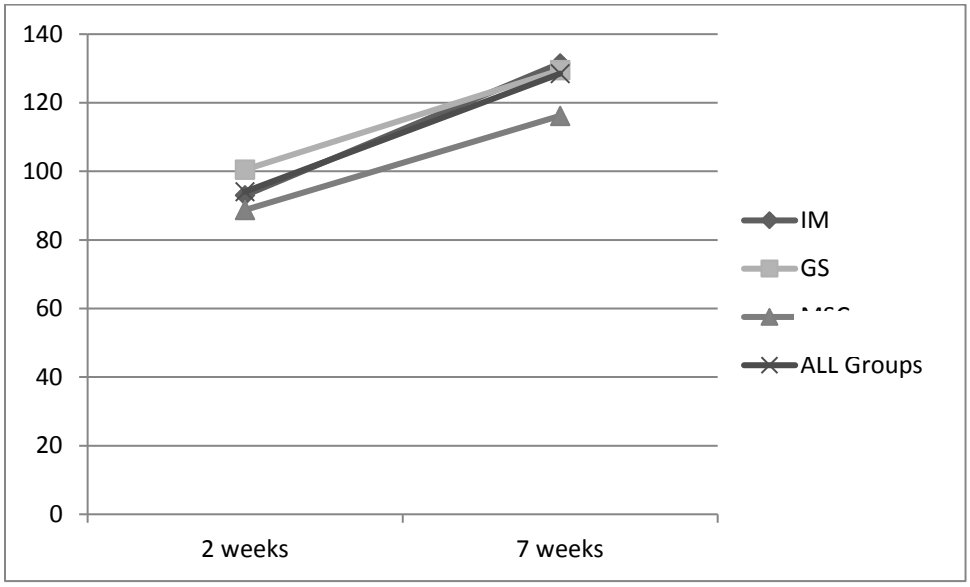

Figure 8. Mean range of motion by condition and for all groups. IM is the imagery condition; GS is the goal setting only condition; MSC is the mindful self-compassion condition; and All Groups is all the participants over time. * < .01 ** <.001

APPENDIX A

EXTENDED LITERATURE REVIEW

Return to Sport: Improving Athletes' Confidence and Mindset Post-ACL Surgery

According to the Centers for Disease Control and Prevention (CDC), the incidence of sport and recreation-related injuries in the United States has continued to increase over time, particularly among children and adolescents. For instance, from 2001 to 2009, the estimated number of visits to the emergency department due to sport and recreational injuries increased by 62% (CDC, 2011). In the United States there is an estimated seven million sport and recreation-related injuries per year (Conn, Annest, & Gilchrist 2003; Tripp, Stanish, Ebel-Lam, Brewer, & Birchard,, 2011), not including sport injuries that may go unreported, such as sprains (Roach et al., 2014) and concussions (Harmon, 2013). Further, an estimated 2,651,581 children and adolescents are treated annually for sports and recreation-related injuries (CDC, 2011). Despite efforts to reduce the prevalence of sport injuries with advancements in sporting equipment, coaching techniques, and sport-specific conditioning, sport injuries continue to increase particularly amongst recreational and adolescent athletes (Bergandi, 1985, Emery, Meeuwisse, & McAllister, 2006; Tripp et al., 2011; Yaffe, 1983).

When athletes are injured they experience a range of emotions that vary based on the severity of the injury and, if required, length of rehabilitation. For instance, athletes who are within the first four weeks post-injury (or surgery) commonly feel distress about their injury and impatience toward rehabilitation, but overall are eager to return to sport (Hedgpeth & Gieck, 2004). Athletes with more than four weeks of recovery and rehabilitation often experience fear of re-injury as well as anger and isolation, and can vary in how confident or skeptical they are about returning to their sport post rehabilitation. More severe injuries, such as tearing one's Anterior Cruciate Ligament (ACL), entail a much longer period of recovery (e.g., six months or

longer) and athletes may have a range of psychological responses (e.g., depression, fear of reinjury) that can facilitate or interfere with the recovery and rehabilitation process as well as the ease with which they are able to return to sport (Hedgpeth & Gieck, 2004). For instance, among athletes who have undergone ACL surgery, high fear of re-injury is positively correlated with low knee-related functioning (Kvist et al., 2005) as well as increased likelihood of actual re-injury (Walker, Thatcher, Lavallee, and & Golby, 2004; Thing, 2006; Williams & Anderson, 1998). Additionally, several studies have indicated that only about 50% of athletes who have ACL surgery resume sports at the same level at which they had played prior to their injury (Kvist et al., 2005; Poulsen et al., 2003). Thus, for many athletes, tearing their ACL can represent the end of their athletic careers, which may cause psychological distress, including severe isolation, grief, and often loss of athletic identity (Hedgpeth & Gieck, 2004).

Previous research has studied a number of psychological interventions that were designed to help athletes with the psychological consequences of injury, including positive self-talk (Brewer, 2007), setting and adjusting goals during the rehabilitation process (Mosewich et al., 2014; Podlog & Eklund, 2009), and imagery paired with relaxation (Cupal & Brewer, 2001; Maddison et al., 2011). Given that mindfulness, as well as, self-compassion exercises, have been shown to be effective in helping with pain management (Kabat-Zinn et al., 1992), stress and anxiety management (Mosewich et al., 2014; Roemer & Orsillo, 2002), focus (Edwards, Kingston, Hardy, & Gould, 2002; Roemer & Orsillo, 2002), and mood regulation (Grossman et al., 2011), these interventions have potential for assisting athletes yet to date no study has examined them in relation to post-ACL surgical recovery. Thus, the purpose of this study is to expand previous research by comparing three different post ACL surgery psychological

interventions -- goal setting (GS), GS and imagery, and GS and mindfulness self-compassion – on athletes' cognitive, emotional and physical responses post-ACL surgery. In the sections that follow I will discuss the prevalence of ACL injuries, models that explain sport injury response, athletes' psychological response to sport injury, and an in depth description of psychological interventions conducted with athletes post-injury, and the two proposed interventions.

ACL Injuries

Prevalence. ACL is a common orthopedic sport injuries; approximately 300,000 individuals who are involved in sports or recreational activities per year within the U.S. experience it (Evans, Shaginaw, & Bartolozzi, 2014; Schub & Saluan, 2011). Similarly, among over 46,000 Finnish adolescents who were followed for nine years, Parkkari, Pasanen, Mattila, Kannus, and Rimpela (2008) found that the incidence for cruciate ligament injury of the knee was 60.9 per 100,000 person-years. From 1999 to 2000, ACL surgery was the sixth most common orthopedic procedure performed annually at a cost of approximately $2 billion for the surgeries alone.

Approximately 70% of torn ACL's occur in sport (Hughes & Watkins, 2006; Johnson, 1988). In fact, both male and female athletes who play sports, such as soccer, football, or skiing, are 10 times more likely to damage their ACL when compared to athletes in other sports (Dragoo, Bruan, Durham, Chen, & Harris, 2012). For instance, during a five year period (i.e., 2004-2005 and 2008-2009) a total of 318 ACL injuries occurred among NCAA football players during 2,222,155 AEs (e.g., number of athlete-exposures); 93.16% of the ACL injuries resulted from player contact or acute noncontact. Additionally, among male NCAA football players ACL injuries were the third most common type of knee injury, and ACL surgery was the second most

common type of surgery (Dragoo et al., 2012; Bradley et al., 2008). Whereas ACL injuries occur among both men and women, the incidence of non-contact ACL injuries is approximately four times more likely among women who participate in intercollegiate soccer, basketball, and rugby, compared to male athletes participating in the same sports (Gwinn, Wilckens, McDevitt, Ross, & Koa, 2000). After controlling for socioeconomic status and self-perceived health factors (e.g., BMI, puberty), the adjusted hazard ratio for ACL injury was 8.5 for female, and 4.0 for male amongst Finnish adolescents (Parkkari et al., 2008). Researchers have suggested that the gender difference is related to anatomical (e.g., neuromuscular gender differences), hormonal (e.g., puberty, female menstrual cycle decreasing dynamic knee stability), and training factors (e.g., the majority of knee injuries among females resulting without contact with other players and with contact among males; Hewett, Myer, & Ford, 2004; Hewett, Myer, & Ford, 2006; Pasanen et al., 2007).

Nevertheless, male and female adolescents who participate in organized sport have a risk of cruciate ligament injury that is four times greater compared to adolescents who are not involved in sport (Hughes & Watkins, 2006). Given that the rate at which children and adolescents participate in sports continues to grow, it is expected that the number of ACL surgeries will increase as well (Grunbaum al. 2004). In addition to sport participation, other risk factors for ACL injury include neuromuscular and biomechanical abnormalities, including mutations within collagen producing genes, hormonal factors related to the female menstrual cycle, and anatomical and structural influences, such as ACL morphology, tibial and femoral surface geometry, knee joint laxity, and lower extremity structural alignments (Shultz et al., 2012).

Surgery and rehabilitation. A torn ACL most often occurs when an individual is twisting, cutting, or jumping or during a sudden deceleration (Siegel, Vandenakker-Albanese, & Siegel, 2012). The knee is held together by four ligaments; the two located on the sides of the knee are called collateral ligaments and the two inside the knee which cross one another are referred to as the ACL and posterior cruciate ligament (PCL; Tripp et al., 2011). The ACL provides stability in the knee by keeping the femur from sliding too far forward in relation to the tibia (Irrgang, 1993).

When the ACL is torn it requires surgical reconstruction for which there are several different techniques (Tripp et al., 2011). In general, ACL surgery involves implanting an artificial ligament in the knee, which can be harvested from the tendon in the hamstring, patella, or a cadaver, and attaching it where the original ACL had been located between the femur and the tibia (Jorgensen, 1999). The timing of ACL surgery may range from one to six weeks post injury, though this timeframe will depend on several preoperative factors including knee swelling, strength, and range of motion (Evans et al., 2014).

The standard rehabilitation process is a minimum of six months and broken into two phases (i.e., early and late); either phase can be extended due to complications, such as tears in cartilage or multiple ligaments being injured (Thing, 2006). Whereas ACL rehabilitation conducted in the early phase included prolonged immobilization, non-weight bearing, and slow progression to activity, since the 2000s standard rehabilitation protocols emphasize earlier weight bearing and generally a more accelerated return to physical activity, particularly for athlete patients (Myer et al., 2015). Some surgeons still recommend that athletes avoid any weight bearing during the first three weeks, and that they wear a knee brace during the first

three to six weeks at all times except while bathing or during physical rehabilitation (Tripp et al., 2011). The early phases of post-ACL surgery involves following stringent criteria-based guidelines for increasing range of motion (ROM) and eventually progressing to full weight bearing exercises, which typically occurs around 12 weeks post-surgery (Tripp et al., 2011). In contrast, the final phases include a broader range of exercises, such as cycling, treadmill training, progressively higher weight bearing sport specific movements, which typically occurs between 13 and 24 weeks (Shelbourne, & Nitz, 1990; Wilk & Andrews, 1992; Wilk, Reinold, & Hooks, 2003). There is high variability in the speed with which athletes' progress through these stages, when they return to sport participation (if desired), and their level of concern with reinjury (Myer et al., 2015). Further, there is limited research regarding the period of time individuals need post-ACL surgery for their new ACL graft to be as strong as their original. However, among mammals graft strength tends to be at its weakest approximately 6 to 8 weeks post-surgery (Butler et al., 1989). From a medical perspective, athletes' return to play is determined based on their graft stability (e.g., anterior posterior tibiofemoral motion), post-surgical timeline, confidence, and subjective medical team opinion (Myer et al., 2015).

Despite improvements in surgical techniques for ACL surgery, many athletes still never achieve their preinjury abilities or return to sport post-surgery. In a sample of 47 athletes (76%) who participated in active sports, such as soccer, football and ice hockey before injury, only 19 athletes (31%) at three to four years post ACL surgery were active in the same sports ($p < .05$; Kvist et al., 2005). Similarly, Poulsen et al. (2003) reported that among 60 athletes ages 13 to 64 years who had undergone ACL surgery, after completing the standard six months of rehabilitation, only 27 (45%) participated in sports at the same level as they did preoperatively.

Among National Football League athletes who injured their ACLs more than 21% never returned to professional football; among the football players who did return to play, their performance was significantly compromised compared with their preinjury level (Carey et al., 2006). Athletes from youth sports to nationally competitive levels often struggle with returning to sport following ACL surgery, and researchers have suggested that psychological factors play a significant role (Ardern, Webster, Taylor, & Feller, 2011a; Ardern et al., 2011b; Ardern, Webster, Taylor, & Webster, 2012; Christino et al., 2015; McCullough et al., 2012).

Overall, the majority of ACL injuries among athletes require surgery followed by an extensive rehabilitation process through which athletes' progress at varying speeds. Although non-contact ACL injuries occur more frequently among female, compared to male, athletes, contact ACL injuries are frequent in both genders in certain sports. Sport participation in general increases athletes' risk of ACL injury in addition to neuromuscular and biomechanical abnormalities. Although the frequency of ACL tears is not as high as other sport-related injuries, the slow physical recovery following surgery combined with the significant loss of time in sport and psychological distress experienced across rehabilitation makes this population of athletes ideal for interventions targeting the psychological consequences of injury.

Theories on Psychological Response to Sport Injury

Initial research into athletes' psychological responses to injury relied upon stage-based models of development, in particular Kubler-Ross' (1969) stages of grief. In their review, Brewer et al. (1994) found a lack of empirical support from both cross-sectional (Brewer, Linder, and Phelps, 1992) and longitudinal (Connelly, 1991; Uemukai, 1993) studies for such stage-based theories. For instance, whereas Kubler-Ross (1969)'s five stage model suggested

that all injured athletes would experience denial, anger, bargaining, depression and acceptance, Uemukai (1993) found that depression followed anger, and denial and bargaining did not vary over the course of injured athletes rehabilitation. Additionally, injured athletes' emotional response were not correlated with duration of time since injury occurrence (r = .02 for total mood disturbance and r = .11 for depression), which contradicts the idea suggested in stage theories that all injured athletes progress through a series of emotional stages over time (Brewer et al., 1992).

To address the limitations of stage-based theories, Brewer (1994) proposed a cognitive appraisal model (CAM) that offered an explanation for why athletes' emotional responses to injury varied over time and in intensity. The CAM proposed that athletes' appraisals or interpretations of their injury determine how they respond emotionally (e.g., anger, depression, relief) post-injury. Their emotional response, in turn, impacts behavioral outcomes in the injury rehabilitation process (e.g., adherence to rehabilitation, use or disuse of social support). According to this model, the cognitive appraisal process plays a central role in determining athletes' psychological reactions. Consistent with Lazarus and Folkman's transactional model of stress and coping (Lazarus, 1984a), cognitive appraisals are categorized as either primary (i.e., assessment of the initial stress they personally experience associated with the injury; Lazarus, 1984b) or secondary (i.e., assessment of which coping options are available and the likelihood that one can effectively cope with the stressor or the stress an event produces; Lazarus, 1984a). Both appraisals occur simultaneously and can influence one another. Further, positive cognitive appraisals tend to invoke positive feelings such as

happiness, relief, and satisfaction, whereas negative appraisals tend to bring about negative feelings such as sadness, anxiety, and fear (Clement, Arvinen-Barrow, & Fetty, 2015).

For example, a female athlete who tears her ACL and plans to go through a standard ACL surgery may initially evaluate her injury as both serious and very stressful (e.g., negative primary appraisal), perceiving the demands of her injury to be higher than what she may be capable of handling (i.e., negative secondary appraisal). This type of evaluation can foster feelings of helplessness and sadness, as well as the fear of not knowing if she will ever regain the strength she previously had in her knee (e.g., emotional reactions). She may also feel anxiety related to not knowing how to cope with these negative feelings and about reinjuring herself if she was to return to sport. In turn, these reactions can contribute to athletes isolating themselves from their teammates and friends, as well as not adhering to or over adhering to performing their daily rehabilitation exercises which can delay their physical recovery and possibly deter them from returning to sport (Bianco, Malo, & Orlick, 1999; Gould, Udry, Bridges, & Beck, 1997). Thus, the way in which athletes perceive their injuries is more critical to understanding their emotional responses, such as fear of the unknown, depression, anger, grief, than the fact that the injury occurred (Walker & Heaney, 2013).

Within this model, the cognitive appraisal processes are influenced by both personal factors (i.e., injury history, trait anxiety, self-motivation, rehabilitation self-efficacy, self-esteem, coping skills, psychological investment in sport, and personality factors [e.g., extraversion, neuroticism]) and situational factors (i.e., medical prognosis, social support for rehabilitation, impairment of sport performance, physician-rated current injury status, injury severity, duration of injury, impairment of daily activities, and life stress). For instance, among female

collegiate athletes who were examined three days postinjury, after controlling for injury duration, negative life event stress was the strongest predictor of emotional disturbance (e.g., stress, anxiety) after injury (Petrie, Falkstein, & Brewer, 1997). Additionally, among eight injured athletes (four men and four women) ages 18 to 22 years, the athletes initial cognitive appraisals of their injuries were negative and primarily influenced by perceived severity and ability to return to sport, supporting the dynamic influence of personal and situational factors on athletes' psychological response to sport injury (Albinson & Petrie, 2003; Clement et al., 2015).

Expanding upon Brewer's (1994) model, Wiese-Bjornstal, Smith, Shaffer, and Morrey (1998) proposed an integrated model of psychological response to sport injury and rehabilitation. This model is considered integrative because it draws from Brewer's (1994) cognitive appraisal model (Brewer, 1994), as well as a grief process model (Evan & Hardy, 1995). Wiese-Bjornstal et al. (1998) suggested that some of the personal and situational variables shown to predispose athletes to sport injury (e.g., history of stressors, coping resources, personality characteristics) continue to impact athletes postinjury by influencing their cognitive appraisals, and emotional and behavioral responses, which in turn impact their recovery outcomes (e.g., rehabilitation adherence, physical recovery; Albinson & Petrie, 2003; Williams & Andersen 1998). Further, Wiese-Bjornstal et al. (1998) posited that these interactions were bidirectional, although they acknowledged that cognitive appraisals would be likely to affect emotions, emotions affect behaviors, and behaviors affect cognitive appraisals. For example, positive cognitive appraisal (Lampton, Lambert, & Yost, 1996), injury coping ability

(Daly et al., 1995), and rehabilitation self-efficacy (Taylor & May, 1996) are all positively associated with adherence to sport injury rehabilitation programs.

More specifically, this model provides a clear explanation for athletes' responses to serious sport injury as well as rehabilitation. Athletes' psychological responses to their sport injury can be divided into three different phases: initial reactions to injury (including after diagnosis), reactions during rehabilitation, and reactions to return to sport (Clement et al., 2015). Athletes' initial reactions (i.e., cognitive appraisals) to their injury are frequently negative and primarily influenced by the perceived severity of the injury, length of rehabilitation required, and their assessment of the likelihood that they will return to sport. These negative thoughts can lead to negative emotions such as being upset, angry, and hysterical (Clement et al., 2015; Hedgpeth & Gieck, 2004). For example, athletes who perceive their injury to be severe or expect to be away from their sport for an extensive period of time (or both), tend to report negative cognitive appraisals, such as fear and anxiety that they will never be able to recover or return to sport, whereas athletes who perceive their injury to be less severe have more positive appraisals, are hopeful that they could return to sport, and view the injury as a momentary setback (Clement et al., 2015). The most common behavioral response athletes' exhibit in the early stage of the injury process is seeking social support from family members, teammates, athletic trainers, and physicians (Clement et al., 2015; Yang et al., 2010). Further, athletes tend to experience the greatest fluctuation in mood during the initial stage of the injury-recovery process (Leddy, Lambert, & Ogles, 1994; Udry, 1997) and in some cases at six months when they are contemplating returning to play (Morrey, Stuart, Smith, & Wiese-Bjornstal, 1999).

Once athletes receive a diagnosis for their injury and become fully aware of their injury severity (i.e., personal factor); they frequently reappraise their injury and report experiencing heightened anxiety and fear. Athletes often vary in their cognitive and emotional response to the diagnosis, ranging from positive to negative outlooks (Clement et al., 2015). Johnston and Carroll (1998) found that among injured athletes who viewed their injury as a challenge they could overcome they experienced encouragement and confidence in returning to sport. In contrast, the athletes who had a negative outlook after learning of their diagnosis reported negative emotions such as anger, and confusion. In sum, athletes' emotional responses tend to be influenced by their appraisal of their diagnosis and whether or not they believe they will have a full recovery (Johnston & Carroll, 1998; Smith, Scott, O'Fallon, & Young, 1990, McDonald & Hardy, 1990).

Athletes' willingness to commit to rehabilitation, as well as the value they give to the rehabilitation process, influences their cognitive, emotional, and behavioral reactions to injury rehabilitation (Carson & Polman, 2008; Clement et al., 2015; Johnston & Carroll, 1998). Clement et al. (2015) found that the most common emotional reaction to rehabilitation is frustration, though athletes also reported being hesitant and cautious. Similarly, Johnston and Carroll (1998) observed that athletes who reported a high fear of reinjury also had certain behavioral responses, including but not limited to being hesitant, not giving 100% effort, and being wary of injury-provoking situations (e.g., during rehabilitation and in sporting contexts). They also found that athletes who had positively appraised their injury rehabilitation reported feeling happiness and relief, which fostered increased adherence to rehabilitation. In contrast, athletes who had negative appraisals reported feeling frustration, which led to hesitancy and

cautiousness toward completing exercises in their rehabilitation program. Further, Carson and Polman (2008) found that during rehabilitation injured athletes tended to seek more social support from the staff in charge of rehabilitation as opposed to family. Injured athletes may find that emotional and informational support from athletic trainers, physicians, or professionals familiar with the rehabilitation process is more helpful for managing stress associated with their injury compared to what is offered by family and significant others (Yang et al., 2010).

Cognitive appraisals, such as athletes perceived severity of their injury, length of rehabilitation required, and their assessment of the likelihood that they will return to sport (e.g., cognitive appraisals) influences their emotional responses, that in turn shapes how they respond behaviorally to rehabilitation as well as in sport (Clement et al., 2015). Thus, the way athletes perceive their injury rather than the fact that the injury occurred has a critical role in understanding athletes' emotional responses, such as depression, reinjury anxiety and grief (Brewer, 1994; Walker & Heaney, 2013). Consistent with Brewer's cognitive appraisal (1994) and Wiese-Bjornstal et al.'s (1998) integrated models, the process of psychosocial response to sport injury is also influenced by distinct personal (e.g., severity of injury diagnosis) and situational (e.g., source of social support) factors that in turn influence recovery outcomes (e.g., rehabilitation adherence). Overall, both models emphasize the critical role of cognitive appraisal in influencing athletes' emotional response that in turn impacts their behavioral response to sport injury and rehabilitation.

Psychological Response to Sport Injury and Rehabilitation

Approximately 5% to 13% of injured athletes experience clinically meaningful levels of

psychological distress, including re-injury anxiety (Draper & Ladd, 1993; Kvist et al., 2005), depressive symptoms (Tripp, Ebel-Lam, Stanish, Brewer, & Birchard, 2011; Christino et al., 2015) and negative cognitive appraisals (Clement et al., 2015). All of these forms of distress may interfere with athletes' rehabilitation outcomes (e.g., knee strength, laxity, pain; Cupal & Brewer, 2001) and the likelihood of them returning to preinjury levels of activity (Brewer, Linder, & Phelps, 1995; Podlog & Eklund, 2006).

Reinjury anxiety. Reinjury anxiety is one of the most common psychological reactions experienced by injured athletes (Anderson, 2001; Cassidy, 2006, Driediger, Hall, & Callow, 2006, Gallagher & Gardner, 2007; Kvist, Ek, Sporrstedt, & Good, 2005; Tripp, Ebel-Lam, Stanish, & Brewer, 2007), as well as the most commonly cited reason presented by athletes for not returning to sport post ACL surgery injury (Ardern et al., 2011a; McCullough et al., 2012). Reinjury anxiety or fear of reinjury, both used synonymously within the sport injury literature, is defined as an irrational and debilitating fear or anxiety that physical movements will result in painful reinjury (Kori, Miller, & Todd, 1990; Tripp et al., 2011). Reinjury anxiety is associated with decreased physical performance (e.g., knee functioning in everyday tasks and in sport; Poulsen et al., 2003; Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995), as well as increased reluctance toward engaging in activities that could lead to reinjury (Kvist et al., 2005; Tripp et al., 2011; Vlaeyen et al., 1995). Kvist et al. (2005) found that, in a sample of 62 athletes (32 men, 28 women) who underwent ACL surgery three to four years prior, the 33 (53%) athletes ages 18 to 37 years who returned to their pre-injury activity level reported lower reinjury anxiety (Tampa Scale of Kinesiophobia) compared to the athletes who did not return to their preinjury level. Further, high fear of reinjury was negatively correlated with knee-related quality

of life (Knee Injury and Osteoarthritis Outcome Score [KOOS]; r = -.50, p < .05). Relatedly, in a sample of 49 recreational-level athletes (M_{age} = 29.15 years) who had undergone ACL surgery one year prior, Tripp et al. (2011) found fear of re-injury was the only significant predictor (β = -.40, p = .01) of whether athletes had returned to sporting activity or resumed their level of activity prior to injury. In this study, athletes' fear of reinjury scores were negatively associated with their confidence in their ability to return to sport (Sport Self-Confidence Inventory; r = -.60, p < .01).

One explanation for these results is that fear of re-injury may be associated with physiological changes that can decrease athletes' sport performance and contribute to lower confidence in returning to sport (Poulsen et al., 2003). For example, reinjury anxiety is associated with increased muscular tension around the injured site, and over arousal of the autonomic nervous system (e.g., increased heart rate and neurochemical changes), which can both contribute to increased risk of actual re-injury (Heil, 1993; Walker, Thatcher, & Lavallee, 2010; Williams & Anderson, 1998). Fear of reinjury also is associated with psychological changes including skill-related losses (e.g., diminishing concentration and increasing distractibility), decreased self-confidence, and increased pain awareness (Chase, Magyar, & Drake, 2005; Heil, 1993; Tripp et al., 2007). Overall, both psychological and physiological responses to reinjury anxiety contribute to athletes falling into a cycle of inactivity that may lead to reductions in body strength and flexibility, and can result in athletes experiencing greater pain when active, reinforcing the reinjury anxiety that perpetuates continued avoidance (Kori et al., 1990).

Depressive symptoms. In addition to reinjury anxiety, athletes experience other types of emotional distress including depressive symptoms (Brewer et al., 2000; Brewer, Linder, & Phelps, 1995; Daly et al., 1995; Mainwaring et al., 2010; Morrey et al., 1999; Smith, Scott, & Wiese, 1990). According to the *Diagnostic and Statistical Manual of Mental Disorders* [5th ed.] (*DSM–V*; American Psychiatric Association [APA], 2013), depressive symptoms include significant weight loss or change in appetite, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or excessive guilt, diminished ability to concentrate, and recurrent thoughts of death. To meet a diagnosis for Major Depressive Disorder (MDD), which can comprise a single or recurrent episode, individuals must exhibit five or more symptoms that are present nearly daily during the same two-week period, represent a change from previous functioning, and where at least one of the symptoms is either depressed mood or loss of interest in pleasurable activities. Other diagnoses include minor depression or depressive disorder NOS, when individuals' symptoms do not meet all the criteria for MDD and include experiencing two to four of the symptoms previously described, one of them needing to be depressed or irritable mood. Depressed mood can include symptoms of sadness, unhappiness or blue feelings for most days or an unspecified amount of time.

Although the majority of previous studies (Smith, Scott, & Wiese, 1990; Smith et al., 1993; Tripp et al., 2011) do not indicate the presence of a clinical diagnosis of depression among athletes post-ACL surgery, there is evidence suggesting that ACL injured athletes experience elevated levels of depressive symptoms in comparison to athletes with other sport-related injuries (Mainwaring et al., 2010; Morrey et al. 1999). For example, among 23 injured athletes (M_{age} = 21.2 years; concussed = 16; ACL injuries = 7), ACL injured athletes reported

experiencing greater depressive symptoms over 24 weeks compared to athletes who sustained concussions (Mainwaring et al., 2010), supporting the idea that there are different patterns of emotional distress associated with different sport injuries. Further, ACL injured athletes exhibited seven times more depressive symptoms 11 days post-surgery compared to their baseline scores (i.e., pre-season medical assessment); at four days post-injury, the concussed athletes showed elevated depression scores three times greater than their scores at baseline, but the elevations resolved within one week post injury. The researchers attributed these differences in depressive symptoms to an ACL injury being severe enough that it typically requires surgery, which limits mobility, entails a long course of rehabilitation, and delays the athlete's return to sport. Relatedly, the decreases in physical conditioning and reduction in endorphins that generally are an after effect of sport injury can be difficult for athletes to manage and can increase their risk of experiencing depressive symptoms (Smith, Scott, & Wiese, 1990; Williams & Roepke, 1993). Severity of sport injury has been related significantly to athletes' negative mood states, suggesting that athletes who require surgery following sport injury may be more vulnerable to depressed mood than athletes who have less severe sport injuries (Smith et al., 1990; Smith et al., 1993; Tripp et al., 2011).

Elevated depressive symptoms are also associated with reduced likelihood of athletes returning to sport post-ACL surgery. For example, Tripp et al., (2011) found after controlling for current activity level and education, the negative affect (Shortened Profile of Mood States; S-POMS) reported by the athletes one year post ACL surgery was a significant predictor ($\beta = -.32$, $p < .05$) of lower confidence in their ability to return to sport. Similarly, in a qualitative study of 17 non-professional female athletes between ages 19 to 33 years who had undergone ACL

surgery, Thing (2006) found that the athletes consistently felt frustrated and impatient when not participating in their sports. Further, the majority of these women played handball beginning at age 6 and reported their identities being closely aligned with the image of themselves as active athletes, and feeling connected with their teammates. Many of the athletes reported feeling isolated because they did not receive support from their club team, which is a risk factor for depression, and reducing their desire to return to sport after completing their rehabilitation. Overall, the extended length of time needed for recovery from ACL surgery can result in loss of athletic identity, as well as increase in depressive symptoms (Thing, 2006).

Summary. Although there are many psychological responses to sport injury, among athletes who have had ACL surgery, negative cognitive appraisals, reinjury anxiety and depressive symptoms tend to be elevated and inversely related to their psychological and physical recovery. Psychological interventions with athletes post-ACL surgery have effectively targeted psychological and physical factors, including reinjury anxiety (Cupal & Brewer, 2001; Evans et al., 2000) and perception of pain (Cupal & Brewer, 2001; Maddison et al., 2006), which impact rehabilitation outcomes such as knee strength and laxity (Cupal & Brewer, 2001; Maddison et al., 2012). Future research examining the impact of psychological interventions on athletes post-ACL surgery should continue to examine these outcome variables, but also target athletes' cognitive appraisals (Clement et al., 2015) and depressive symptoms (Ford and Gordon, 1999; Tripp et al., 2011). Further, no previous psychological intervention with athletes post-ACL surgery has quantitatively measured athletes' confidence in returning to sport despite this variable being one of the primary factors by which athletes evaluate the success of their

ACL surgery (Myer et al., 2006; Thing, 2006). Finally, Brewer (1994) and Wiese-Bjornstal et al.'s (1998) models of psychological response to sport injury, recovery, and rehabilitation outcomes provide theoretical support for cognitive (i.e., cognitive appraisal), emotional (i.e., reinjury anxiety, depressive symptoms; & confidence in returning to sport) and behavioral (i.e., knee functioning) variables being targeted in future psychological interventions with athletes post-ACL surgery (Albinson & Petrie, 2003, Cupal & Brewer, 2001; Daly, Brewer, Van Raalte, Petitpas, & Sklar, 1995, Podlog & Eklund, 2008). Before describing the current intervention in more depth, psychological interventions previously conducted to help athletes cope with these psychological and physical consequences of sport injury will be reviewed.

Psychological Interventions

Although physical therapy has been shown to help athletes post-ACL surgery with behavioral responses, such as improving knee strength, range of motion, flexibility, weight bearing abilities, and other physical factors that should enable them to be physically ready to return to sport (Cupal & Brewer, 2001; Myer et al., 2006), these protocols normally do not address athletes' cognitive and emotional responses to the injury, surgery, and recovery. For many athletes, sport injury is a distressing setback, an event often appraised as impeding progress toward desired goals (Mosewich, Crocker, & Kowalski, 2014). Various psychological interventions have been designed to help injured athletes address different emotional reactions to sport injury, including re-injury anxiety and loss of confidence. Such studies have found support for GS (Cupal & Brewer, 2001; Mosewich et al., 2014; Podlog & Eklund, 2009), and using imagery paired with relaxation (Cupal & Brewer, 2001; Maddison et al., 2011) during the rehabilitation process. These studies provide support for the idea that psychological

interventions, such as GS and imagery and relaxation, help athletes beyond what they receive from their physical therapists and athletic trainers in their recovery post ACL surgery.

Goal setting. Goals can be defined as attaining a specific level or proficiency on a task, usually within a specified time period (Locke, Shaw, Saari, and Latham, 1981). Within the applied sport psychology field, goals are divided into three different categories: outcome, performance, and process goals. Outcome goals refer to achieving a desired result in relation to another competitor, such as winning a competition or returning to sport post-injury faster than a teammate. Performance goals are focused on athletes' actual performances and improving in relation to personal standards, such as being able to increase their number of one legged hops from 3 to 5 by next week. Process goals are completely under the athletes' control; they are the small steps that they can take to work toward achieving one's performance and outcome goals, such as using a one person trampoline for controlled alternate leg hops when the knees are up to it. Evans et al. (2000) highlighted the importance of goals remaining flexible so that unpredictable swelling, soreness, and pain do not represent a setback for the injured athletes.

Given the length of the rehabilitation process following ACL surgery, psychological interventions have focused on athletes setting more process and performance goals as opposed to outcome goals to help them feel more motivated during their rehabilitation (Cupal & Brewer, 2001). Research has consistently supported the benefits of setting achievable goals that break the rehabilitation up into manageable steps and increase the recognition of progress during rehabilitation (Mosewich et al., 2014; Podlog & Eklund, 2009). For instance, Podlog and Eklund (2009) found that among 12 elite athletes interviewed over a six to eight month period, the injured athletes who adjusted their goals during the rehabilitation process reported feeling

more successful during their return to sport compared to the injured athletes who did not adjust their goals. Mosewich et al. (2014) highlighted in their interviews with five high-performance female athletes that setting and readjusting goals are strong coping mechanisms for helping athletes deal with setbacks, such as serious sport injury. Lastly, Evans, Hardy, and Fleming (2000) provided qualitative support through semi-structure interviews for the use of goal-setting among three injured rugby players, particularly process goals that helped these athletes focus their attention on specific features of a given task, and performance goals that provided structure and specific targets for athletes' rehabilitation. Overall, GS tended to increase athletes' rehabilitation adherence and motivation during the early to mid-phases of rehabilitation.

The majority of GS interventions conducted with injured athletes have included helping athletes set both short-term process and performance goals directed toward rehabilitation as well as long-term outcome goals focused on completing rehabilitation and returning to sport (Evans et al., 2000; Mosewich et al., 2014; Podlog & Eklund, 2009). All studies emphasized the importance of frequently adjusting the athletes' goals to fit their progress in physical rehabilitation and any shifts in their motivation or long term goals, such as a male athlete deciding half way through rehabilitation that he does not want to return to sport and instead he wants to focus on completing his rehabilitation (Evans et al. 2000). Additionally, all previous studies have evaluated the success of GS interventions through qualitative semi-structured interviews with the injured athletes. Future GS interventions with injured athletes should continue to include setting process and performance goals that provide structure and motivation for achieving specific milestones in injured athletes' rehabilitation, adjusting goals

as needed, and customizing the goals to fit the individual's needs and reflect their progress in physical rehabilitation.

Imagery. Imagery is a psychotherapeutic intervention defined as creating sensory rich images within one's mind (Abdoli, Rahzani, Safai, & Sattari, 2012). The two most common areas in which imagery is used to improve physical and psychological outcomes is within medical (Abdoli et al., 2012; Menzies, Lyon, Elswick, McCain, & Gray, 2014) and sport performance (Macintyre & Moran, 2007; Morris, Spittle, & Perry, 2004; Post, Muncie, & Simpson, 2012) contexts. Within medical contexts, researchers have examined the frequency that individuals use imagery to help with post-operative factors such as pain management, stress and anxiety (Sng et al., 2012; Mauer, Burnett, Oulette, Ironson, & Dandes, 1999). For example, Sng et al. (2012) found in a qualitative study that Singaporean children ages 6 to 12 years used imagery as a type of distraction to help relieve their pain following a variety of surgeries on body parts such as back, joints and faces. Distraction techniques for reducing pain, including imagery, were the most frequently used strategies among the children. Relatedly, among 60 children aged 8 to 12 years who had undergone appendectomy or upper/lower limb surgery, the children who listened to a 20 minute imagery and relaxation script reported experiencing less pain compared to the children who received standard care (Polkki et al., 2008).

Moreover, medical researchers have conducted interventions where imagery often is paired with relaxation to help individuals cope with cancer (Liossi & Hatira, 1999), joint replacement surgery (Lin, 2011), fibromyalgia (Menzies et al., 2014), inflammatory bowel disease (IBD; Mizrahi et al., 2012), burns (Patterson & Ptacek, 1997), and tension induced headaches (Abdoli et al., 2012; Shiri et al., 2013). For instance, Menzies et al. (2014) conducted

a 10-week guided imagery intervention that was intended to impact self-efficacy towards managing one's health status, perceived stress, and bio-behavioral factors (e.g., fatigue, pain, mood, and level of protein in blood associated with the immune system) in 72 patients diagnosed with fibromyalgia. The guided imagery included three 20 minute recordings that athletes listened to at least once daily during the 10 weeks. The first session was a basic guided relaxation script intended as an introduction to imagery, the second asked the athletes to image a pleasant scene and image themselves feeling safe and secure, and the last session focused on imaging their immune system successfully healing their body. From baseline to 10 weeks, the individuals in the guided imagery (IM) group reported greater self-efficacy toward managing their health and decreases in perceived stress, fatigue, pain severity and depression compared to the control group. There were no significant changes, however, in the level of protein in the patents' blood or any other bio-behavioral factor.

Within sport, imagery paired with relaxation is frequently used by athletes, coaches, and sport psychologists to enhance skill acquisition (Hall, Mack, Paivio, & Hausenblas, 1998; Morris et al., 2004), performance (Macintyre & Moran, 2007; Post, Muncie, & Simpson, 2012), mental toughness (Mattie & Munroe-Chandler, 2012), motivation (Munroe et al., 2000), and self-confidence (Evans, Jones, & Mullen, 2004), and to regulate anxiety and stress (Weinberg, Butt, Knight, Burke, & Jackson, 2003). For instance, in a sample of 151 varsity athletes (M_{age} = 20.70 years) participating in a variety of sports (i.e., ice hockey, volleyball, basketball, American football, curling, and track and field), Mattie and Munroe-Chandler (2012) found that the athletes use of motivational general mastery imagery significantly predicted four dimensions of mental toughness (i.e., control, commitment, challenge, and confidence β = .45 - .53). Further,

imagery interventions have improved athletes' performances in basketball free-throw shooting (Post, Wrisberg, & Mullins, 2010), field hockey penalty flicks (Smith, Wright, Allsopp, & Westhead, 2007, study 1), gymnastic routines (Smith et al., 2007, study 2), bunker shots in golf (Smith, Wright, & Cantwell, 2008), timed swimming routines (Post, Muncie, & Simpson, 2012) and elite canoe-slalom (Macintyre & Moran, 2007).

Although imagery is an effective strategy for performance enhancement among athletes involved in a variety of sports (Macintyre & Moran, 2007; Post, Muncie, & Simpson, 2012), it also can be used to help athletes cope with the psychological consequences of sport injury that subsequently can hinder their sport performance or result in athletes not returning to sport. Imagery paired with relaxation has shown to be effective in reducing injured athletes re-injury anxiety (Cupal & Brewer, 2001; Maddison et al., 2012), experience of pain (Cupal & Brewer, 2001; Maddison et al., 2006; Driediger et al., 2006), and improving speed of physical healing (Cupal & Brewer, 2001). Additionally, through qualitative interviews, Evans et al. (2000) found that frequent use of imagery was associated with improved confidence in returning to sport among injured athletes.

More specifically, Evans et al. (2000) interviewed three rugby players in their mid-twenties who had undergone surgery to repair a sport-related injury (i.e., dislocated shoulder, fractured fibia and tibia, or torn ACL); each participated in a minimum of three months of rehabilitation and they verbally reported several psychological consequences, such as reinjury anxiety, which had a negative effect on their happiness and overall psychological well-being (Evans, et al., 2000). The athletes participated in a multi-modal intervention, which included providing social support, as well as basic training in GS and in guided imagery. The social

support was provided through face to face and phone consultations between athletes and physiotherapists, as well as researchers helping athletes reflect on rehabilitation adherence, setbacks, and the possible causes, perceived progress, physical and psychological symptoms, and personal and profession pressures that may be interfering with their rehabilitation. The athletes completed daily self-reflection diaries that provided information for the consultations, and practiced cognitive specific imagery (e.g., imagining oneself successfully performing in game situations and in the situation in which they had previously been injured) over the course of three months. Their results indicated that the imagery intervention was associated with reduced reinjury anxiety, increased confidence in overall level of fitness and in returning to sport.

Further, Cupal and Brewer (2001) conducted a 24 week guided imagery intervention with 30 recreational to competitive level athletes who had undergone ACL surgery (age range = 18 to 50 years). Athletes' reinjury anxiety, perception of pain, and knee strength were measured by self-report and concentric-eccentric ligament activity at two weeks and again 24 weeks post-surgery. Athletes were randomly assigned to either an imagery, placebo (i.e., received attention, encouragement, and support from the clinician at the sports medicine facility), or control group (e.g., received a standard course of physical therapy). The athletes in the IM group received 10 imagery sessions that were conducted by a clinician trained in relaxation, guided imagery, and self-hypnosis at a clinic close to the athletes' sports medicine facility; sessions occurred approximately every two weeks over the course of six months. Each imagery session was designed to provide mental rehearsal of the physical rehabilitation goals that were part of the athletes' physical therapy rehabilitation. There were four common

elements to each session: several minutes of relaxation through diaphragmatic breathing, imaging the specific physiological processes at work during each stage of recovery (e.g., edema, pain, inflammation), suggesting positive emotional coping responses (e.g., belief in knee flexibility improving with time), and using a variety of imagery modalities to increase the vividness of the mental images (e.g., internal, external, visual, kinesthetic). The athletes were provided with recordings of their weekly sessions (10 to 15 minutes) and asked to listen to them once daily before the next session. Additionally, during the first session the athletes' watched videotapes of their surgical procedure (from an arthroscopic perspective), which served as a visual baseline.

At 24 weeks post-surgery, IM group had significantly greater knee strength than the placebo (Cohen's $d = 1.56$, $p < .003$) and control group (Cohen's $d = 1.19$, $p < .02$), accounting for 35% of the variance in knee strength. The IM group also had lower reinjury anxiety than the placebo (Cohen's $d = -3.19$, $p < .001$) and control groups (Cohen's $d = -2.2$, $p < .001$), accounting for 62% of the variance in reduction of re-injury anxiety. Lastly, the IM group reported significantly lower perception of pain than the placebo (Cohen's $d = -2.42$, $p < .001$) and control groups (Cohen's $d = -1.88$, $p < .01$), accounting for 76% of the variance in the overall reduction of pain. The researchers provided several explanations for the positive impact of the imagery intervention including the athletes reporting that they believed their rate of recovery was within their control (Laubach et al., 1996). Further, the researchers found that knee strength was correlated with both reduced reinjury anxiety ($r = .53$, $p < .003$), as well as reduced pain ($r = .46$, $p < .01$) over the course of rehabilitation, suggesting that reduction in these two factors could be associated with improvement in rehabilitation outcomes (i.e., knee strength). Finally,

the authors suggested that the positive effect of the imagery intervention on rehabilitation outcomes also may have been mediated through physiological processes, such as tissue regeneration-repair and immune-inflammatory responses, which both would contribute toward physical healing (Bresler, 1984).

Maddison et al. (2012) examined 21 individuals from New Zealand who had undergone ACL surgery (M_{age} = 34.86 years) and who were randomly assigned to an IM group or to a standard rehabilitation group (i.e., control group). In this study, Maddison et al. (2012) expanded upon Cupal and Brewer (2001) by examining neurobiological stress response factors (i.e., adrenaline, dopamine and norepinephrine levels), rehabilitation self-efficacy (Athletic Injury Self-Efficacy Questionnaire; AISEQ), and rehabilitation imagery (Athletic Injury Imagery Questionnaire-2; AIIQ-2), in addition to knee strength and laxity, on five different occasions: pre-surgery, two, six, 12 and 24 weeks post-surgery. Individuals assigned to the IM group participated in nine face to face imagery sessions spaced approximately two weeks apart over the course of six months; imagery sessions were conducted by trained research assistants in athletes' homes.

The content of the imagery sessions were a replication of Cupal and Brewer (2001) with the exception that Maddison et al. (2012) conducted only nine sessions over the course of six months. Each session began with a brief relaxation exercise, followed by mental rehearsal of specific physiological processes and rehabilitation exercises in line with the athlete's stage of physical recovery, including suggestions to promote positive coping with injury, using varied imagery modalities (e.g., visual and kinesthetic) to facilitate creating vivid mental images, and providing athletes with recordings (10 to 15 minutes) of the imagery sessions to listen to

between sessions. At six months post-operation, the athletes' in the guided IM group experienced reduced knee laxity (i.e., ligament looseness commonly associated with pain) compared to the control group ($p < .05$). At Weeks 2, 6, and 12, athletes in the IM group experienced lower levels of noradrenaline and dopamine, both associated with reduction in stress levels, compared to the control group ($p < .05$). Athletes in the intervention group reported using significantly more motivation, cognitive, and healing imagery compared to the athletes' in the control group ($p < .01$), supporting the internal validity of the imagery intervention. Across both the intervention and control group, athletes' rehabilitation self-efficacy reduced over time, which the authors attributed to the athletes having unrealistically high efficacious beliefs pre-operatively that eventually decreased to more realistic levels of self-efficacy. Inconsistent with Cupal and Brewer (2001), however, Maddison et al. (2012) did not find improvement in knee strength for the IM group over the six months. They suggested that this difference may have been due to variations in rehabilitation protocols between the United States and New Zealand. A second explanation offered by Maddison et al. (2012) was that athletes' motivation, commitment, and effort during rehabilitation could be covariates that influenced the relationship between athletes reduced stress and knee strength. Additionally, the changes in both noradrenaline and dopamine levels over the course of the intervention were related to reduced knee laxity, supporting other studies that posit an association between stress and delays in physical healing (Glaser et al., 1999; Kiecolt-Glaser et al., 2002).

In a related intervention, 58 athletes (M_{age} = 30 years; 68% male; 32% female) who underwent ACL surgery because they injured themselves playing rugby (32%), soccer (18%), snow sports (11%), netball (8%), water sports (5%), and miscellaneous activities (26%), were

randomly assigned to a modeling intervention or a control group (Maddison et al., 2006). All athletes completed self-report measures for pain (single item; Jensen, Karoly, & Braver, 1986), state anxiety (state-trait anxiety inventory; STAI), rehabilitation self-efficacy (i.e., crutches self-efficacy, walking self-efficacy, exercise self-efficacy), and functional milestones (i.e., crutch usage, knee assessment, range of motion) on five occasions: baseline (i.e., during initial surgical consultation), preoperative period (i.e., one day prior to their operation), pre-discharge (i.e., before being released from the hospital); two, and six weeks postoperative.

Athletes assigned to the modeling intervention watched videos at pre-discharge, two, and six weeks postoperative, whereas the control group simply completed the measures at those times. The pre-discharge video (nine minutes) showed an individual performing rehabilitation exercises to improve extension, flexion and walking with and without crutches reflecting the preoperative through the two week post-operative time period. The video shown at two and six weeks (seven minutes) documented an individual having greater range of motion, cycling on a stationary bicycle, and stair climbing intended to represent what would be occurring physically during those post-operative periods. To enhance the relatability and motivational effects of the videos, the researchers used four models (two men and two women) of similar age to the athletes, asked each to list the types of problems they faced during different stages of the rehabilitation process (e.g., pain, frustration, transport, motivation) and to provide strategies they used to overcome these issues (e.g., use of appropriate analgesia, setting goals, and having adequate social support). The models also revealed their original expectations and actual progress regarding functional outcomes from the rehabilitation.

For both groups, reported pain experience increased from the preoperative to the pre-discharge period and then decreased at two weeks. The modeling group showed greater efficacy to perform rehabilitation exercises (Cohen's d = .47, p < .05), use crutches (Cohen's d = .53, p < .01), and walk (Cohen's d = .05, p = .01) after seeing the modeling film compared to the control group at pre-discharge only. Further the modeling condition reported being on crutches significantly less time (Cohen's d = .94, p < .01) and having better knee functioning scores (i.e., less disability; η^2 = .11 p = .01) than the control group over the course of the six week intervention. These results provide support for a modeling intervention, which is similar to imagery, being associated with improved rehabilitation outcomes (i.e. rehabilitation self-efficacy, knee functioning, and pain experience).

Driediger et al. (2006) conducted a semi-structured interview with 10 athletes (M_{age} = 21.7 years) whose injuries ranged from sprained ankle to a torn ACL. In addition to the interview, the researchers asked the athletes to complete the Athletic Injury Imagery Questionnaire-2 (AIIQ-2) to evaluate their use of motivational, cognitive, and healing imagery in their rehabilitation and pain management. The athletes reported believing that the imagery used in conjunction with their rehabilitation improved their physical healing. For instance, athletes reported using cognitive imagery to learn and properly perform rehabilitation exercises; motivational imagery (e.g., imagining being fully recovered) to increase their mental toughness, as well as to foster having a positive attitude; and healing imagery (e.g., imagining positive images of internal physiological processes) to aid in the recovery process. The athletes also described using imagery for pain management, imagining the pain dispersing throughout their body so it felt more within their control, and viewing the imagery as a distraction from the

pain. During rehabilitation, athletes reported using imagery for 5 to 30 seconds, depending on the task, immediately before performing a rehabilitation exercise. They also reported believing that the imagery was most effective in strengthening their injured body part during rehabilitation as opposed to during training or competition. The athletes preferred using positive imagery during which they visualized themselves in the future unaffected by their injury in contrast to negative imagery where they imagined not returning to their sport and experiencing an increase in reinjury anxiety as well as depressive symptoms. When visualizing themselves performing a rehabilitation exercise, they reported not including their surroundings, such as the physiotherapists, though they did imagine their competition surroundings at times. Finally, the athletes reported using several different types of imagery including: visual, auditory (e.g., incorporating sound into the images), kinesthetic (e.g., imagining the feelings associated with certain movements), imagery of past events (e.g., imagining movement or feelings to provide themselves with a guideline of what to expect), and imagery of the athlete's health (e.g., imagining themselves as healthy competitors). Athletes reported using the kinesthetic imagery most frequently because it reminded them of how their body felt when it was in top form and increased their motivation to get their body back to their pre-injury physical standards.

In summary, imagery has helped individuals address several post-operative factors including pain management, stress, and anxiety within medical contexts (Sng et al., 2012; Mauer, et al., 1999). More recently, guided imagery paired with relaxation has been found to be an effective way to help athletes manage the psychological consequences of serious sport

injury, prevent future injury, and facilitate the ultimate return to sport among adolescent and adult athletes (Cupal & Brewer, 2001; Driediger et al. 2006; Maddison et al., 2006; 2012).

A major strength of some previous imagery interventions has been the inclusion of a control group (e.g., group of athletes who do not receive the intervention; Cupal & Brewer, 2001; Maddison et al., 2006; Maddison et al., 2012). Additionally, several studies limited the focus to one type of injury (i.e., ACL) and randomly assigned the athletes to the group conditions, thus controlling for extraneous variables and emphasizing the impact of the intervention on athletes' physical and psychological outcomes (Cupal & Brewer, 2001; Maddison et al., 2006; Maddison et al., 2012). Cupal and Brewer (2001) controlled for the amount of attention and encouragement athletes received from sport medicine staff, providing further support for the efficacy of imagery interventions in improving athletes' psychological and physical well-being post ACL surgery. Further, Maddison et al. (2012) replicated Cupal and Brewer's (2001) study in New Zealand and found similar positive effects of the imagery intervention on neurobiological factors, as well as rehabilitation self-efficacy, providing evidence for imagery interventions having a broad and positive impact on psychological, rehabilitation, and physical factors.

In contrast, other studies (Driediger et al., 2006; Evan et al., 2000) did not use a control group and instead put all of the athletes through a multi-modal intervention (e.g., GS, imagery, social support) and reported the athletes experienced reduced reinjury anxiety, increased confidence in overall level of fitness and in returning to sport. No previous study has examined the impact of an imagery intervention compared to another empirically supported psychological intervention intended to help athletes cope with the consequences of serious

sport injury. Imagery, like any other mental skill, takes time to learn and some athletes may have a difficult time acquiring it. Thus future research could examine the relative efficacy of different psychological interventions. A relatively new intervention in the field of applied sport psychology that has promise for helping athletes cope with stress and pain management within the sport domain is mindfulness (Mosewich et al., 2014). This approach, in conjunction with self-compassion, may be a viable intervention for assisting athletes post-ACL surgery.

Mindfulness. Mindfulness is grounded in Buddhist religion and philosophy where it was first defined as paying attention in a sustained and particular way -- intentionally, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994). Mindfulness is one of many forms of Buddhist meditation practice that involves: (1) systematically regulating one's attention and energy; (2) influencing and possible transforming the quality of one's experience; (3) realizing the full range of one's humanity, and (4) recognizing one's relationships to others and the world (Kabat-Zinn, 2012). Over the past two decades the application of mindfulness in medicine, education, neuroscience, and psychology has grown exponentially, from fewer than 50 studies in the late 1990's to over 350 publications by 2010. Mindfulness was first introduced to Western culture in 1979 through the University of Massachusetts's stress reduction clinic where they developed a Mindfulness Based Stress Reduction (MBSR) program that gained an international reputation for improving the lives of thousands of people who struggled with stress (Williams & Kabat-Zinn, 2011). Mindfulness can easily be generalized to everyday life experiences, yet researchers are still exploring how much training is required before individuals can adopt a more mindful lifestyle and reap the benefits of this improved quality of life (Williams & Kabat-Zinn, 2011).

The majority of interventions conducted in medical settings are based on MBSR, which was originally developed by Jon Kabat Zinn (1996) as a systematic, patient-focused educational approach that promotes the use of mindfulness meditation to help people learn how to take better care of themselves and to live healthier lives. The basic structure of MBSR is an 8 week program with weekly classes ranging in length from 2.5 – 3.5 hours, daily homework assignments (30 – 45 minutes), individual and group dialogue about the weekly exercises, and one all day mindfulness meditation retreat. The content of the weekly classes included both formal (e.g., body scan, walking meditation) and informal (e.g., awareness of breathing, deliberate awareness of performing routine activities) meditations. MBSR helps individuals develop specific attitudinal qualities (Santorelli, 2014), such as non-judging (e.g., stepping back from the constant stream of judging and reacting to inner and outer experiences), patience (e.g., understanding and accepting that sometimes things must unfold in their own time), a beginner's mind (e.g., a mind that is willing to see everything as if for the first time), trust (e.g., developing a basic trust in yourself and your feelings), non-striving (e.g., non-doing and paying attention to whatever is happening), acceptance or acknowledgement (e.g., taking each moment as it comes and being with it fully, as it is), and letting go or letting be (e.g., non-attachment to thoughts, feelings, and, experiences, accepting things as they are).

In addition to MBSR program, mindfulness as a technique has been integrated into many therapeutic interventions, including acceptance and commitment therapy (ACT; Hayes et al., 1999) and dialectical behavior therapy (Linehan 1993), and has been used to target a diverse range of clinical problems, such as major depressive disorder and generalized anxiety disorder (Ames, Richardson, Payne, Smith, & Leigh, 2014; Hoge et al., 2015; Roemer & Orsillo,

2002; Segal, Williams, GSC, & Teasdale, 2002). Mindfulness techniques include developing a mindful (non-judgmental), present moment acceptance and awareness of internal experiences, such as thoughts, feelings and physical sensations, rather than attempting to control, suppress or change one's thoughts and feelings (Gardner & Moore, 2004; Mosewich, 2013). To be non-judgmental is to notice internal and external stimuli that enter one's awareness, but not evaluate them as good, bad, right, or wrong (Gardner & Moore, 2004). For individuals who are new to mindfulness, the act of being non-judgmental or non-evaluative toward oneself, as well as remaining aware of the present moment, can be very difficult (Kabat-Zinn, 2012) and may require consistent and disciplined practice (Gardner & Moore, 2004).

Further, several researchers have begun to examine the mechanisms, or therapeutic processes, through which mindfulness interventions lead to beneficial physical and psychological outcomes for adolescents and adults (Hoge et al., 2015; Pearson, Brown, Bravo, & Witkiewitz, 2015). One mechanism is dispositional mindfulness defined as the tendency to be aware of one's present-moment experiences with a non-judgmental attitude (Bishop et al., 2004; Hoge et al., 2015). In support, increases in dispositional mindfulness accounted for reductions in anxiety and stress following a mindfulness-based intervention among patients with anxiety disorders (Vollestad et al., 2011). Additionally, results from two randomized wait list controlled studies among adults with general psychological distress (e.g., depressive and anxiety symptoms) who went through an eight week MBSR program revealed that mindfulness partially mediated improvements in quality of life and reductions in stress (Baer et al., 2012; Nyklicek & Kuijpers, 2008).

Another causal mechanism in mindfulness-based treatments is decentering, which is defined as the metacognitive capacity to observe one's thoughts, feelings, memories, and psychological events that arise in the mind. Decentering fosters individuals being able to cope with intense emotions and the associated maladaptive rumination by adopting a more distanced perspective from one's internal experience. For example, this skill involves recognizing that one's thoughts, feelings and urges are not permanent aspects of the self or accurate representation of reality, but instead they are viewed as transient interval experiences (Fresco et al, 2007; Segal et al., 2002). Some researchers have equated mindfulness with decentering; however, mindfulness fosters developing enhanced awareness of internal and external stimuli like decentering, but it is also coupled with having an attitude of nonjudgment. Thus, the emphasis on enhanced awareness paired with non-reactivity within mindfulness can foster the development of decentering amongst individuals.

Mindfulness in medical settings. Mindfulness has been used extensively within medical settings (Schmidt et al. 2011; Morone, Lynch, Greco, Tindle, & Weiner, 2008b; Mosewich et al., 2014; Roemer & Orsillo, 2002). Clinical trials in medical contexts show that mindfulness improves mood, sleep, concentration, and quality of life among individuals with fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raysz, and Kesper, 2007; Schmidt et al., 2011), lower-back pain (Morone et al., 2008), irritable bowel syndrome (IBS; Gaylord et al. 2011), Generalized Anxiety Disorder (GAD; Hoge et al., 2015; Roemer & Orsillo, 2002), depression (Ames et al., 2014; Dobkin & Zhao, 2011; Goldin et al., 2012) and medical illnesses, including multiple sclerosis and cancer (Van Den Hurk et al. 2015).

Grossman et al. (2007) examined 58 females with fibromyalgia who were quasi-randomly assigned (i.e., based on time of enrollment) to either an eight week MBSR (Kabat-Zinn et al., 1992) group or an active control group. In line with the standard protocol, each week athletes partook in a 2.5 hour session along with 30 to 45 minute weekly homework that included various types of formal mindfulness practice, mindful awareness of dynamic yoga postures, mindfulness in stressful situations, and social interactions. Additionally, the athletes went on one all day retreat that combined previously used and newly introduced mindfulness exercises. Lastly, one hour interviews were conducted before and after completing the MBSR intervention to facilitate rapport between athletes and instructors and to help patients formulate realistic individual goals for the intervention. The MBSR group was run by two female instructors who had five years of previous experience teaching MBSR, as well as experience working with fibromyalgia patients. The active control group was designed to be similar to the MBSR group in terms of amount of social support, weekly educational discussions, length of homework assignments, and pre-post intervention interviews. The active control group went through eight weeks of Jacobson Progressive Muscle Relaxation training (PMR) and fibromyalgia- specific gentle stretching exercises (Bigelow, 2000), which served as counterparts to the mindfulness and yoga elements of MBSR. The results revealed patients in the MBSR intervention experiencing a significant improvement in relation to perceived pain, ability to cope with pain, and in quality of life subscales including anxiety, depression, and somatic complaints (Cohen's *d's* = 0.40 – 1.10) compared to the active control group. Moreover after three years, the MBSR patients reported maintaining the benefits across the same measures (Cohen's *d's* = 0.50 – .65).

Schmidt et al. (2011) attempted to replicate this study with 177 female fibromyalgia patients and placed athletes into the MBSR group, an active control group, or a waitlist control group (e.g., no intervention). They did not find significant differences between any of the groups utilizing the quality of life subscales at eight weeks (i.e., physical functioning, ability to relax and enjoy life, positive affect, negative affect, social contact, and social integration). However, from baseline to short-term follow-up (e.g., 16 weeks from baseline) there was significant improvement on seven secondary outcome variables (i.e., fibromyalgia impact, depressive symptoms, state and trait anxiety symptoms, sensory pain, affective pain, quality of sleep, and physical symptoms) for the mindfulness group (Cohen's *d* = 0.19 to 0.50), improvement on affective pain perception and physical complaints for the waitlist control (Cohen's *d* = -0.08 to 0.25), and improved physical complaints, affective pain, and quality of sleep in the active control group (Cohen's *d* = -.09 to .30). Within group differences on the quality of life subscales was only found for the mindfulness group from base line to short -term follow-up (*p* = 0.02, Cohen's *d* = 0.39). In other words, Schmidt et al. (2011) found some support for the MBSR program improving quality of life factors for FMS patients over time but not when compared to the two control groups.

A meta-analysis of the six studies conducted before 2013 with fibromyalgia patients (FMS) revealed that patients in MBSR interventions experienced short term improvement in quality of life (Cohen's *d* = -0.35, *p* = .002) and pain (Cohen's *d* = -0.23, *p* = .04) compared to usual care; and short-term improvements in quality of life (Cohen's *d* = -.32, *p* = .02) and pain (Cohen's *d* = -0.44, *p* = .002) when compared to an active control intervention (Lauche, Cramer, Dobos, Langhorst, & Schmidt, 2013). Based on the evidence from the review, only a weak

recommendation can be given for FMS patients to receive MBSR. One of the primary limitations noted by the authors was that no study has compared MBSR to other therapeutic approaches or examined potential long-term effects from participating in the MBSR program. Only three of the studies did adequate randomization and allocation concealment; additionally, not all of these studies did between group comparisons despite having a randomized controlled study design. Lastly, MBSR is designed to help individuals develop coping strategies based on being mindful and accepting pain, but not to reduce the intensity of pain or other physical complaints, which may be more prevalent amongst FMS patients. The majority of these studies examined intensity of pain rather than experience or coping with pain, thus the results may not accurately reflect the potential effect that the MBSR intervention could have on FMS patients (Lauche et al., 2013).

Strong evidence exists, however, for mindfulness-based interventions designed to help adolescents and adults cope with anxiety (Hoge et al., 2015; Roemer & Orsillo, 2002) and depressive symptoms (Abela, Brozina, & Haigh, 2002; Teasdale et al., 2000). Mindfulness can be used to increase awareness of individual's cycles of rumination, associated with depression amongst young people (Abela et al., 2002), which can reduce an individual's experience or risk for depression (Teasdale et al., 2000). Further, by increasing awareness of experiencing emotions and remaining non-reactive through mindfulness, individuals are likely to experience reduction in stress and anxiety levels. Hoge et al. (2014) examined 38 adolescents and adults (M_{age} = 37.6 years) with Generalized Anxiety Disorder (GAD) who were randomly assigned to either a slightly modified MBSR or stress management education (SME) condition. The eight week MBSR program was slightly modified to fit this clinical population with the retreat being

shortened to four hours, and home exercises being reduced from 40 to 20 minutes. The SME course focused on improving overall health and wellness through receiving education on diet, exercise, sleep, time management, and resilience, excluding any meditation or mind-body intervention. The SME course also included home exercises, as we as, a half day retreat during which they learned more stress reduction exercises. Results revealed that both decentering and mindfulness mediate the effect of MBSR on symptoms of GAD. More specifically, decentering mediated the relationship between MBSR and reductions in anxiety scores, and increases in awareness and non-reactivity (e.g., dispositional mindfulness) mediated the relations between MBSR and reduction in worrying. One explanation offered by the researchers for the findings was that viewing one's internal experiences as temporary (e.g., decentering) buffers individuals from the distress associated with physical signs of anxiety (Hoge et al., 2014) as well as distress associated with physical pain (McCracken et al., 2013). Overall, these findings provide some explanations for the therapeutic processes that contribute to mindfulness-based interventions helping individuals cope with psychological distress.

Mindfulness based cognitive therapy (MBCT; Segal et al., 2002), which uses core cognitive behavioral principles (e.g., education about depression) while sustaining the mindfulness practice of holding thoughts and feelings in awareness rather than making an effort to change them or reacting to them, and has helped individuals cope with depressive symptoms. Moreover, MBCT is based on the theory that individuals who have a history of depression become distressed and they revert back to their negative automatic cognitive processes that can then trigger the onset of a depressive episode. MBCT has been shown to be effective in reducing risk of relapse for individuals who experience recurrent depressive

symptoms or suffer from Major Depressive Disorder (Segal, 2002). Ames et al. (2014) conducted an eight week MBCT intervention adapted from the 12-week MBCT children protocol (MBCT-C; Semple & Lee, 2008) with 11 adolescents aged 12 to 18 years who had received psychological treatment for a mood and anxiety disorder, but they continued to experience residual symptoms of depression. The mindfulness intervention was designed to be as accessible as possible to young people by providing a choice of simple sensory exercises, such as the use of visual illusions to illustrate processes of describing and judging, as well as directing attention. Each week the adolescents were taught a different exercise, such as three minute breathing, body scan, mindful smelling, and mindful walking, and they were asked to practice each exercise at home before the next session. Following completion of the interview, qualitative results revealed that the adolescents experienced reduced depressive symptoms and rumination, alongside improvement in mindfulness skills and quality of life. More specifically, the adolescents described the MBCT program as increasing their awareness and facilitating distance from the strong thoughts and emotions that contributed toward their depressive symptoms. The adolescents also reported struggling with home practice and longer formal meditations (e.g., greater than 15 minutes); thus, Semple and Lee (2008) recommended that future researchers planning to conduct mindfulness interventions with adolescent groups design exercises that can easily be applied to every-day life and encourage greater home practice.

In summary, within medical settings mindfulness has effectively helped individuals cope with a variety of stressors and pain associated with a range of medical and mental health

illnesses, including fibromyalgia (Grossman et al., 2007; Schmidt et al., 2011), chronic pain (Morone et al., 2008), GAD (Hoge et al., 2015), and clinical depression (Ames et al., 2014).

Some of the limitations of previous studies include the lack of research comparing mindfulness based interventions to other empirically supported therapeutic approaches (Ames et al., 2014; Lauche et al., 2013). Additionally, several studies had very small samples (Ames et al., 2014) and did not include a control group (Ames et al., 2014; Hoge et al., 2015).

Strengths of previous studies include some researchers examining the longitudinal effects of a mindfulness-based intervention and finding that up to three years post-intervention individuals' continue to receive benefits towards managing pain, anxiety, depressive and somatic symptoms (Grossman et al., 2007). Additionally, one study compared the MBSR intervention to a stress management education program and found support for decentering and dispositional mindfulness as mediators of mindfulness and positive physical and psychological outcomes, such as reduced anxiety and experience of physical pain (Hoge et al., 2015). Given the effectiveness of mindfulness in helping individuals cope with a variety of mental and physical health issues, such as anxiety and depression, as well as distress from physical pain, it is not surprising that this approach has been used in helping athletes improve their sport performance and has strong potential for helping athletes manage sport injury (Gardner & Moore, 2013; Mosewich et al. 2014).

***Mindfulness in sports*.** Within the context of sport the most common application of mindfulness-based interventions is for performance enhancement (Edwards, Kingston, Hardy, & Gould, 2002; Gardner & Moore 2004; Roemer & Orsillo, 2002). For example, Gardner and Moore (2004) utilized case examples to support the effectiveness of using a Mindfulness

Acceptance Commitment (MAC) approach to performance enhancement among athletes. Rather than trying to control, eliminate or suppress negative thoughts and emotions as suggested by traditional cognitive behavioral based approaches (CBT; Whelan, Mahoney, & Meyers, 1991), MAC helps athletes achieve optimal performance through mindful strategies such as developing present-moment acceptance of their internal experiences (e.g., thoughts, feelings, and physical sensations) as well as reinforcement of valued goals and enhanced attention to external cues, responses and contingencies that contribute toward optimal performance (Gardner & Moore, 2004). Further, the MAC approach for performance enhancement is adapted from the clinical models of acceptance and commitment therapy (ACT; Hayes, Strosahl, K. D., & Wilson 1999) and MBCT (Segal et al., 2002). ACT is an empirically-based psychological intervention that relies upon acceptance, mindfulness, and behavior-change strategies to help increase individuals' psychological flexibility (Hayes & Strosahl, 2004). One of ACT's goals is to help individuals be present with what occurs in their lives rather than avoidant and to learn how to behave in accordance with their values (Hayes et al., 1999).

Based on the effectiveness of mindfulness with helping patients in medical contexts with pain management, depressive symptoms, and anxiety; sport psychology researchers have suggested that mindfulness may be an effective intervention for helping injured athletes cope with similar symptoms related to sport injury (Ford & Gordon, 1999; Kvist et al., 2005; Mosewich et al., 2014). For example, Mosewich et al. (2014) interviewed five female athletes in their mid-twenties who competed at the university, national or international levels, about setbacks they had experienced in their athletic careers, including poor performance, performance plateau, and sport injury. In relation to sport injury, the athletes reported

experiencing loss of confidence in returning to sport, fear of re-injury, loss of sport skills, physical fitness, and not meeting coach/teammate expectations.

Mosewich et al. (2014) suggested that mindfulness would likely help athletes in managing their emotional response to sport injury and assist with both pain and stress management that could positively influence their physical and psychological recovery. He also suggested athletes practice self-compassion to help challenge negative thinking and self-criticism that athletes frequently experience following sport injury. Whereas mindfulness and self-compassion are distinct, treating oneself with self-compassion can contribute toward adopting a mindful perspective (Neff, 2003). For example, a person must acknowledge, as oppose to avoid, painful feelings in order to feel compassion for themselves; additionally, one must not over identify with feelings either and have enough mental space to be able to extend kindness and recognize the broader human context of one's experience (Scheff, 1981). Self-compassion therefore includes having skills in mindful disposition, as well as decentering which are causal mechanisms for the positive effect of mindfulness on individual's psychological well-being. Therefore, it is not surprising that researchers, such as Germer and Neff (2013) developed a Mindful Self-Compassion (MSC) intervention that has strong potential for helping athletes manage their psychological response to serious sport injury.

MSC integrates the empirically supported mindfulness exercises from MBSR with self-compassion. The structure of MSC is the same as MBSR, athletes meeting once a week for 2.5-3.5 hours for eight weeks, weekly homework assignments, and a half day silent meditation retreat. MSC is different, though, in that the weekly formal and informal meditation exercises

include a focus on self-compassion, such as identifying the inner critic, compassionate body scan, or self-compassionate letter writing (Germer & Neff, 2013).

Similar to mindfulness, self-compassion (Neff, 2003) is an important Buddhist concept that has over time become integrated into western psychology. A person who has high self-compassion acknowledges that suffering, failure and inadequacies are part of the human condition, and that all people, including oneself, are worthy of compassion. Self-compassion is distinct from being self-centered or having self-pity, which are both based on feeling disconnected from others and can lead to dwelling on and over identifying with personal problems. In contrast, the process of self-compassion requires individuals to use metacognitive activities that foster recognizing that others in the world can be experiencing similar or perhaps worse struggles (e.g., related experience of the self and others). Thus, self-compassion can break the cycle of self-absorption and over-identification, which is commonly associated with symptoms of depression and anxiety, by increasing feelings of interconnectedness and self-kindness. Additionally, self-compassion helps put one's personal experiences into greater perspective and provides greater clarity on one's suffering, which could help one deal with any type of personal struggle including sport injury. Self-compassion, therefore, is comprised of three components: self-kindness (i.e., being kind and understanding as opposed to being overly critical with oneself), common humanity (understanding that others can relate to one's experience), and mindfulness (being in the present moment and being nonjudgmental of one's thoughts, feelings, and experiences).

Relatedly, self-compassion exercises have been found to reduce individual's depressive symptoms, promote positive states of mind, and buffer the effects of negative self-evaluation

(Neff, 2009; Neff & McGehee, 2010). For example, Neff and McGehee (2010) found in a sample of 235 adolescents and 287 young adults that higher levels of self-compassion were associated with lower depression (r = -.51 to -.60) and less anxiety (r = -.67 to -.73) as well as with greater feelings of social connectedness (r = .43 to .51). In a related study, Neff and Germer (2013) examined the effectiveness of an eight week MSC intervention with 21 adults (M_{age} = 51.26 years) and found that adults in the intervention group experienced increases in self-compassion, mindfulness, and well-being (e.g., life satisfaction, happiness, depression, anxiety and stress) compared to the control group at the end of the eight week program, as well as at six months and one year follow-ups. More specifically, this program raised adults' level of self-compassion by 43%; a review of five MBSR studies yielded an average increase of 19% (Neff, 2003a; 2007; Robins, Keng, Ekblad, & Brantley, 2012; Shapiro et al., 2007; Shapiro, Brown, Thoresen, & Plante, 2011) and three MBCT studies yielded an average increase of 9% (Kuyken et al., 2010; Lee & Bang, 2010; Rimes & Wingrove, 2011) on the self-compassion scale (Neff, 2003a). These findings suggest that MSC provides specialized tools that go beyond what individuals learn in other mindfulness based interventions (Germer & Neff, 2013).

In support of applying MSC to the sport context, Mosewich et al. (2009, 2011) showed that self-compassion influences regulation of emotions and cognitions among athletes. For instance, Mosewich et al. (2011) found that among 151 young female athletes (M_{age} = 15.1 years), self-compassion was negatively related to fear of failure, fear of negative evaluation and shame proneness, and positively correlated with two emotions considered to be adaptive -- shame-free guilt proneness and authentic pride. Moreover, where shame includes a negative self-evaluation, common among injured athletes, self-kindness reflects an understanding

toward oneself in instances of pain or failure (Neff, 2003b). Because athletes may generalize their loss of physical abilities during their rehabilitation to their entire athletic identity (Hedgpeth & Gieck, 2004), the mindfulness components of self-compassion can help them hold painful thoughts and feelings in awareness without over-identifying with them and thus losing their sense of themselves as athletes (Neff 2003b). Further, self-compassion can provide an opportunity for athletes to evaluate the self without self-condemnation, allowing for more accurate perceptions of situations and potentially a better ability to change maladaptive thoughts, feelings, or behaviors (Neff, 2003). In addition, common humanity may be especially useful in dealing with the feelings of isolation and of lack of understanding from others (Thing, 2006) that tend to accompany sport injury, both of which have been associated with depressive symptoms (Poulin, Hand, & Boudreau, 2005).

Overall, previous research provides support for mindfulness and self-compassion effectively reducing individuals depressive and anxiety symptoms, increasing their feelings of connectedness to others, and improving life satisfaction (Neff & Germer, 2013; Neff & McGehee, 2010). Research also supports self-compassion effectively helping athletes regulate emotions, such as fear of failure and fear of negative evaluation (Mosewich et al., 2011). Additionally, mindfulness and self-compassion has effectively helped individuals not over identify with painful feelings, which in the context of sport injury could buffer against loss of athletic identity or loss of confidence in returning to sport (Neff, 2003).

Limitations of self-compassion research include several studies not including a control group, as well as not using random assignment to condition (Neff & Germer, 2013). Additionally, despite self-compassion being an effective tool for regulating difficult emotions,

few studies have examined the impact of self-compassion on non-injured athletes (Ferguson, Kowalski, Mack, & Sabiston, 2014; Mosewich, Crocker, Kowalski, & DeLongis, 2013; Reis et al., 2015) and no study has examined the impact on injured athletes. Whereas there is limited research that has examined the impact of the MSC program on athletes, previous research supporting the effectiveness of both self-compassion and mindfulness in helping athletes regulate difficult emotions and deal with negative self-appraisals provides evidence that the MSC could have a positive impact on athletes post-ACL surgery.

APPENDIX B

RECRUITMENT MATERIAL

Return to sport: Improving athletes confidence and mindset post-ACL surgery

Why This Study?
- Physical therapy is standard for post-surgical rehabilitation, though such protocols normally do NOT address directly athletes' psychological responses to the injury, surgery, and recovery, such as anxiety, depression, and loss of confidence.

Eligibility:
- A medical diagnosis of a torn ACL that will require surgical repair. No age limit.
- Currently involved in an organized sport for a minimum of 4 to 6 hours of training and competition per week (e.g., high school, club, or collegiate level)

Time Commitment for Participants:
- Eligible athletes will participate in eight 30 minute sessions (first four sessions will be in person) during their first four months post-surgery. Participants will be asked to complete brief surveys (15 minutes) four times during the first 4 months and again at 6 and 9 months.
- The first session will occur during the 2 to 7 days prior to surgery.

FREE Benefits for Participants:
- Participants will be randomly assigned to one of three psychological interventions and asked to comply with the protocol and to complete all sessions and assignments. Participants will receive this service, which has been valued at $1000, at NO COST.
- Participants can earn up to $90 for their participation in this study.

Potential Optimal Performance Benefits:
Decreases in perception of pain
- Decreases in reinjury anxiety
- Decreases in depressive symptoms
- Improvement in knee functioning
- Increased confidence in returning to sport after physically ready
- Improvements in ability to cope with the physical and psychological challenges associated with rehab
- ENHANCED SPORT PERFORMANCE

Contact Us to Determine Eligibility:
If you are interested in being evaluated further to determine whether you (or your son or daughter) may participate, please contact the University of North Texas Center for Sport Psychology and Performance Excellence. A member of the research staff will answer any questions you may have, discuss your eligibility to participate, and enroll you in the program. Remember, the first session of the study must occur in the 2 to 7 days prior to surgery. If your surgery is already scheduled, please contact us immediately. This study has been approved by the University of North Texas' Institution Review Board for Human Subjects Research.

Contact Sheet

University of North Texas Center for Sport Psychology and Performance Excellence contact sheet for:

Return to Sport: Improving Athletes' Confidence and Mindset Post-ACL Surgery

Name of Patient:

Name of Parent or Guardian:

Email (Patient):

Email (Parent, if applicable):

Phone #:

Home:

Cell (Patient and Parent):

Home Address:

Date of Patient's Surgery:

Patient's assigned Surgeon:

***Your first appointment needs to take place 3 to 7 days before your scheduled surgery.

Please contact us soon if your surgery is already scheduled!

Screening Questions

The following questions were asked over the phone with the parents or in person with an adult (18 years and older):

1. Is your son/daughter planning to return to sport following their surgery and rehabilitation? Y N

2. In your son/daughter's lifetime have he/she ever been diagnosed; or has he/she been treated in the last year for:

- Major Depression Disorder (MDD) Y N
- Attention Deficit/Hyperactivity Disorder (ADHD) Y N
- A learning disability Y N
    - If yes, what type?_____
- Anxiety disorder Y N
- Autism Y N
- Psychotic episode Y N
- Personality disorder Y N
    - If parent or adult participant answers "Yes" to any of the above questions ask the following follow-up question:
        - When did the diagnosis occur?
        - Are they currently getting treatment (any medication)?
    - A participant will be excluded ONLY if the parent or adult participant reports YES (i.e., MDD, Anxiety disorder, Autism, psychotic episode, personality disorder) and the participant is CURRENTLY experiencing symptoms and NOT CURRENTLY receiving treatment.
        - The researcher will then provide the participant with resources (UNT Psychology clinic) for receiving counseling and tell the participant/parent that they're not eligible for this study at this time.

Ask participant in person:
Do you currently have another physical trauma or injury beyond the knee injury (e.g., concussion)? Y N

If yes, what _____

Will this additional injury extend your physical rehabilitation beyond 6 months?

Y N

Do you have previous experience practicing goal setting? Y N

Do you have previous experience practicing Imagery? Y N

Do you have previous experience practicing mindful self-compassion? Y N

If YES, how have you used (GS, IM, or MSC) in the past?_____

How often do you currently practice these activities?

(daily, weekly, monthly, less than once a month)

ELIGIBILITY: Y N

READ → Review limitations: This program requires effort, energy and time, just like your physical rehabilitation. This program does not provide a quick fix without putting in the required effort, energy and time. Are you willing to commit to your assigned group protocol for the next four months, and to complete the brief follow-up surveys at six, nine, and 12 months post-surgery?

APPENDIX C

GOAL SETTING SHEETS – ALL CONDITIONS

RETURN TO SPORT:

Pre-surgery Meeting

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Long Term Goals:

Pre-Surgery Goals:

Performance & Process Goals for 7 days Following Surgery:

RETURN TO SPORT:

Session 2

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 1 to 2 weeks post-surgery include: Focusing on maintaining full passive knee extension, gradually increasing knee flexion (0 to 90 degrees), diminishing swelling and pain, muscle training, and increasing patellar mobility

***Also think about goals you can set related to the attitude and thoughts you want to be

having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 1 to 2 weeks post-surgery:

_____

_____

_____

_____

_____

_____

RETURN TO SPORT:

Session 3

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 2 to 4 weeks post-surgery include: Similar to last week's goals, focusing on maintaining full passive knee extension, gradually increasing knee flexion (0 to 90 degrees), diminishing swelling and pain, muscle training, and increasing patellar mobility. In addition, appreciating any additional freedoms you may have (e.g., able to shower with knee), and getting the stitches taken out.

***Also think about goals you can set related to the attitude and thoughts you want to be

having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 2 to 4 weeks post-surgery:

_____

_____

_____

_____

_____

_____

RETURN TO SPORT:

Session 4

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 4 to 7 weeks post-surgery include: emphasis will be on continuing to improve knee range of motion (0 to 125 degree knee bend), light cycling, eliminating all pain and inflammation during activities, improving lower extremity strength, muscle endurance, balance, and continuing to restore limb confidence and function

***Also think about goals you can set related to the attitude and thoughts you want to be

having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 4 to 7 weeks post-surgery:

_____

_____

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_____

_____

RETURN TO SPORT:

Session 5

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 7 to 10 weeks post-surgery include: Similar to your goals over the past three weeks, emphasis will be on continuing to improve knee range of motion (0 to 125 degree knee bend), light cycling, eliminating all pain and inflammation during activities, balance, improving upon knee strength, and continuing to restore confidence in limb functioning.

***Also think about goals you can set related to the attitude and thoughts you want to be

having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 7 to 10 weeks post-surgery:

_____

_____

_____

_____

_____

_____

RETURN TO SPORT:

Session 6

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 10 to 13 weeks post-surgery include: goals will likely focus on reinstalling confidence in the knee and ACL being integrated into the leg, quadriceps strength improving, no pain or swelling, walking without a limp, and continuing to cycle.

***Also think about goals you can set related to the attitude and thoughts you want to be

having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 10 to 13 weeks post-surgery:

_____

_____

_____

_____

_____

_____

RETURN TO SPORT:

Session 7

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation 13 to 16 weeks post-surgery include: enhanced muscular power and endurance, improved neuromuscular control, progression to light jogging, and continuing to increase lower extremity strength.

***Also think about goals you can set related to the attitude and thoughts you want to be having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for 13 to 16 weeks post-surgery:

_____

_____

_____

_____

_____

_____

RETURN TO SPORT:

Session 8

Improving Athletes' Confidence and Mindset Post-ACL Surgery

Typical tasks you will likely be completing with your physical therapist in rehabilitation after 16 weeks: the athlete's knee should have regained full range of motion, knee strength should be at the same level of what it was prior to injury, the athlete should be beginning to do more sport specific movements, and feeling confident and motivated about returning to sport in a few more months.

***Also think about goals you can set related to the attitude and thoughts you want to be having during this time period.

Long Term Goals:

_____

_____

_____

_____

Performance & Process Goals for continued recovery!

_____

_____

_____

_____

_____

_____

APPENDIX D

GOAL SETTING PROTOCOL

Goal Setting Protocol

Pre-Surgery session Overview

Time Length: 45 minutes

Materials:

- Computer
- Consent/assent forms
- Screening interview questions
- Payment sheet

Online Materials:

- Psychological measures (baseline) - link
- Demographics questionnaire – link
- Download Braeden Intro video
- All 8 goal setting sheets

*Bring hard copy of questionnaires in case of internet problems
*Give Goal Sheets to participants according to the session

Supplemental materials:

- Release form (participant 18 and still living at home)

***Researchers receive potential participant's paperwork (contact sheet) and randomly assign them to one of the three interventions (stratified by gender)

<u>Pre-surgery session (SESSION 1) Begin Here!</u>

*Signature for Consent/Assent/Release forms (if applicable) – review basic description of study in consent form
*Screening interview (yes/no questions)
***PARTICIPANT COMPLETES ONLINE SURVEY (15 min)
(General Introduction: 5 minutes)
Thank you for agreeing to be part of this study. You have been assigned a GS intervention designed to help you cope effectively with the challenges associated with having ACL surgery. Over our 8 meetings (4 in person) together, you will learn a variety of mental skills and tools that will help you in your recovery and rehabilitation, and help you feel more confident when you return to your sport once you are physically healed. Here are some tips for getting the most out of this program
TOP 10 TIPS FOR GETTING THE MOST OUT OF THIS PROGRAM: (<u>*Researcher talk participants through study and asks if they have any questions*</u>)

- Show up for the first FOUR sessions.

- Show up a few minutes early to every session.
- Stay engaged the entire session.
- Remain connected with the researcher through emails/texts.
- Complete activities and questionnaires when asked.
- Do all the assigned practice exercises.
- Be open to the new ideas and experiences you will have in this program.
- Try the new activities/exercises that will be presented to you.
- Challenge yourself.

SHOW BRIEF VIDEO OF BRAEDEN

Now that you have seen a video of an athlete who positively benefited from this study let's talk about goal setting to help you prepare for your upcoming surgery.

<u>PART I. Goal setting:</u>

(Introduction: 5 minutes)

I. Have you used goal setting before? How did it help you?

II. Goal setting can help you by providing you with direction, motivation and awareness of progress you're making in physical rehabilitation, which ultimately can help you feel more confident.

III. [Describe several different types of goals you can set]

- Outcome goal: comparing self to others (not practical for recovery), such as "I can recover faster than my friend or family member"
- Performance goal: focused on performance improvement based on your personal standards, such as "I want to increase the number of times I practice my rehabilitation exercises from 3 to 5 by next week (supported by my PT)"
- Process goal: are the small steps you can take to work towards your outcome and performance goals, such as "I want to maintain a positive attitude each time I go to rehabilitation over the next week"

***Process and performance goals are going to be the most helpful in motivating you during your physical rehabilitation

(Goal setting exercise: 5 minutes)

1. Talk patient through setting their longterm goal – ask athlete to write down a long term goal, suggest "returning to play with confidence as well as minimal fear and anxiety of reinjury by 8 months post-surgery" – minimum of one

(Ask the following questions to help them set their Pre-surgery and post-surgery goals)

How are you feeling about your upcoming surgery? (normalize thoughts and feelings) . Have you had any friends or teammates go through the same surgery…if so, have you talked to them about their experience?

What have you been told to expect immediately post-surgery and in the 3-5 days following surgery? (if they don't know, provide a basic description of emotional physical challenges they

may experience during this time period and then introduce the two tools)

2. Talk patient through setting their Pre-surgery goal (adapt depending on how many days they have before surgery) – minimum of two
    - Pre-surgery goals: Individualized to each athlete. He or she ***may*** already have PT exercises (e.g., doing some leg strengthening exercises) and how he or she wants to feel and think in relation to the upcoming surgery (e.g., maintain a positive attitude, confident, relaxed going into the surgery).
    - *MSC only: have them set goals about practicing mindful breathing*

1. Talk patient through setting their Post-surgery goals: provide basic description of what will happen after surgery – minimum of two
    - Basic description: *You will likely meet with a PT after surgery and prior to being released. The PT will give you a set of exercises to do as well as instruct you on how to use the crutches and CPM (if the surgeons assign this to them)).*
    - Post-Surgery goals (2-7 days post-surgery): EX. Doing what has been assigned by the PT for the 7 days following my surgery. Encourage them not to overdue it, just follow the instructions of the PT.
    - *MSC only: have them set goals about practicing mindful breathing (every day)*

1. Talk about where they will put these goals so they can see them every day (e.g., bathroom, next to bed, in the bag they take to physical rehabilitation).
1. Emphasize that each week he/she will set process and performance goals (short-term) that
will serve as stepping stones toward achieving his/her long term goal.

HW INSTRUCTIONS:

1. Work toward the goals they set over the next week
2. Answer text message on Sunday asking whether they worked toward their goals this week?

**Inform them that we will text them after their surgery to see how they're doing and send

reminder text messages to them (and their parents, if applicable) about following their goals.

Remind them - on Sunday and ask whether they have been working toward their goals

Session 2 Overview

Time Length: 30 minutes

Materials:

- Computer

- Release for athletes to give to their PTs*
- Envelope; copy of signed consent form
- Note pad to write notes (goals)

Online Materials:

- Handout that they take home

SESSION 2 (1 week post-surgery) → Begin Here

(Introduction: 5 minutes)

How are you doing today?

What have you been experiencing/thinking/feeling over the past week?

How was working toward your goals this week?

** 1 week Questionnaire - LINK

What other goals would you like to list for the next few weeks?

Update Rehabilitation goals (5 minutes)

- EX. Focusing on maintaining full passive knee extension, gradually increasing knee flexion (0 to 90 degrees), diminishing swelling and pain, muscle training, and increasing patellar mobility
- Emphasize PROCESS GOALS (feeling more energized going to rehab; practicing exercises # times per week etc.)

HW INSTRUCTIONS:

1. Work toward your goals over the next week
2. Answer text message on Sunday asking whether they worked toward their goals this week?

SET UP APPOINTMENT FOR 1 WEEK FROM NOW

**Remind them that we will continue sending reminder text messages to them (and their parents, if applicable) about working toward their goals. Text them on Sunday and ask whether they have been working toward their goals

Session 3 Overview

Time Length: 30 minutes

Materials:

- Computer
- Note pad to write notes (goals)

Online Materials:

- Handout that they take home

<u>SESSION 3 (2 weeks) → Begin here</u>

(Introduction: 5 minutes)

How are you doing today?

What have you been experiencing/thinking/feeling over the past week?

How was working toward your goals this week?

** 2 week Questionnaire - LINK

What other goals would you like to list for the next few weeks?

Update Rehabilitation goals (5 minutes)

- EX. Similar to last week's goals, focusing on maintaining full passive knee extension, gradually increasing knee flexion (0 to 90 degrees), diminishing swelling and

pain, muscle training, and increasing patellar mobility. In addition, appreciating any additional freedoms you may have (e.g., able to shower with knee), and getting the stitches taken out.

- More process goals - being more energized when they go to rehab, getting to rehab early, practicing exercises at home

HW INSTRUCTIONS:

1. Work toward your goals over the next week
2. Answer text message on Sunday asking whether they worked toward their goals this week?

SET UP APPOINTMENT FOR 2 WEEK FROM NOW

**Remind them that we will continue sending reminder text messages to them (and their parents, if applicable) about working toward their goals. Text them on Sunday and ask whether they have been working toward their goals

Session 4 Overview

Time Length: 30 minutes

Materials:

- Notepad to write notes (goals)

Materials:

- Handout that they take home

**Give them their handouts for SESSION 5 - 8 (EMAIL parent and client the goal sheets for Session 5-8)

SESSION 4 (4 weeks) → Begin here

(Introduction: 5 minutes)
How are you doing today?
How was working toward your goals this week?
What other goals would you like to list for the next few weeks?

Update Goal sheet (5 minutes)

**Inform them that this will be your LAST in person meeting. The rest of your communication will be through text message primarily and email for sending goal sheets. You will continue sending reminder text messages to the patient and parent.
** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)
***Give them goals sheets for session 5 - 8. Tell them that they can adjust their goals before we talk three weeks from now if they see fit. We will help them set their new goals in three weeks.

HW INSTRUCTIONS:

1. Work toward your goals over the next THREE weeks, make sure they're posted
2. Answer text message EACH Sunday asking whether they worked toward their goals this week?
3. Phone call in three weeks

GOAL SETTING – SESSION 5 – 7

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their session (10 to 15 minute phone call); remind them to have their goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – 1-2 days before phone call (SESSION 5 ONLY)

Hi_____,

On _____I will call you and we will complete your next goal sheet together. Please remember to post the goals we write up in a place where you will frequently see it. Feel free to adjust your goals as you see fit over the next 3 weeks.

I appreciate you completing this 15 minute survey on your phone or a computer before we talk.

https://unt.az1.qualtrics.com/SE/?SID=SV_9FZF5SyZUL1sOUJ

(Your Identification code is: AT0##)

I look forward to talking with you soon!

Best,

_____

EMAIL – Day of phone call (SESSION 6-7)

Hi_____,

Today I will call you and we will complete your next goal sheet together. Please remember to post the goals we write today up in a place where you will frequently see it. Feel free to adjust your goals as you see fit over the next 3 weeks.

I look forward to talking with you soon!

Best,

_____

5th - 7th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 5th - 7th session goals (5 minutes)

o If they do not have the session goal sheet ready then have them grab a piece of paper and write down their goals as they speak with you

o make sure to take notes on their goals so you can remind them

HW INSTRUCTIONS:

- Work toward their goals over the next 3 week
- Answer text message on Sunday asking whether they worked toward their goals this week.

**Remind them that we will continue checking in every Sunday and sending one weekly reminder to work toward their goals each week

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

GOAL SETTING – SESSION 8

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their session (10 to 15 minute phone call); remind them to have their goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – Day of phone call

Hi_____,

Today I will call you and we will complete your last goal sheet together. Please remember to post the goals we will write today up in a place where you will frequently see it.

Feel free to adjust your goals as you see fit over the next 2 months.

I appreciate you completing this 15 minute survey on your phone or a computer before we talk.

https://unt.az1.qualtrics.com/SE/?SID=SV_8cPNeXoT48yvttP

(Your Identification code is: AT0##)

I look forward to talking with you later today!

Best,

_____

8th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 8th session goals (5 minutes)

o If they do not have the 8th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o make sure to take notes on their goals so you can remind them

HW INSTRUCTIONS:

- Continue working toward their goals over the next 2 months and adjusting their goals as needed

- We will contact you at the six month point to check in about your progress!

APPENDIX E

MINDFUL SELF-COMPASSION PROTOCOL

Pre-Surgery session Overview

Time Length: 1 hour

Materials:

- Computer
- Consent/assent forms
- Screening interview questions
- Payment sheet
- Headphones
- All 8 goal setting sheets
- 3x5 inch cards
- Link for Audio – Mindful breathing

*Give Goal Sheets to participants according to the session

Online Materials:

- Psychological measures (baseline) - link
- Demographics questionnaire – link
- Download Braeden's Intro video

*Bring hard copy of questionnaires in case of internet problems

Supplemental materials:

- Release form (participant 18 and still living at home)

EXERCISES

- Mindful breathing exercise
- Self-compassion mantra

***Researchers receive potential participant's paperwork (contact sheet) and randomly assign them to one of the three interventions (stratified by gender)

<u>Pre-surgery session (SESSION 1) Begin Here!</u>

*Signature for Consent/Assent/Release forms (if applicable) – review basic description of study in consent form

*Screening interview (yes/no questions)

*PARTICIPANT COMPLETES ONLINE SURVEY (15 min)

(General Introduction: 5 minutes)

Thank you for agreeing to be part of this study. You have been assigned to MSC intervention designed to help you cope effectively with the challenges associated with having ACL surgery. Over our 8 meetings (4 in person) together, you will learn a variety of mental skills and tools that will help you in your recovery and rehabilitation, and help you feel more confident when you return to your sport once you are physically healed. Here are some tips for getting the most out of this program

TOP 10 TIPS FOR GETTING THE MOST OUT OF THIS PROGRAM: (*Researcher talk participants through study and asks if they have any questions*)

- Show up for the first FOUR sessions.
- Show up a few minutes early to every session.
- Stay engaged the entire session.
- Remain connected with the researcher through emails/texts.
- Complete activities and questionnaires when asked.
- Do all the assigned practice exercises.
- Be open to the new ideas and experiences you will have in this program.
- Try the new activities/exercises that will be presented to you.
- Challenge yourself.

SHOW BRIEF VIDEO OF BRAEDEN

What did you think of the video? (Less than 1 minute)

So, to begin, we are going to focus on goal setting, something we will do at the beginning of every session we have.

PART I. Goal setting:

(Introduction: 5 minutes)

I. Have you used goal setting before? How did it help you?

II. Goal setting can help you by providing you with direction, motivation and awareness of progress you're making in physical rehabilitation, which ultimately can help you feel more confident.

III. [Describe several different types of goals you can set]

- Outcome goal: comparing self to others (not practical for recovery), such as “I can recover faster than my friend or family member”
- Performance goal: focused on performance improvement based on your personal standards, such as “I want to increase the number of times I practice my rehabilitation exercises from 3 to 5 by next week (supported by my PT)”
- Process goal: are the small steps you can take to work towards your outcome and performance goals, such as “I want to maintain a positive attitude each time I go to rehabilitation over the next week”

***Process and performance goals are going to be the most helpful in motivating you during your physical rehabilitation

(Goal setting exercise: 5 minutes)

1. Talk patient through setting their longterm goal – ask athlete to write down a long term goal, suggest “returning to play with confidence as well as minimal fear and anxiety of reinjury by 8 months post-surgery” – minimum of one

(Ask the following questions to help them set their Pre-surgery and post-surgery goals)

How are you feeling about your upcoming surgery? (*normalize thoughts and feelings*)

What have you been told to expect immediately post-surgery and in the 3-5 days following surgery? (*if they don’t know, provide a basic description of emotional physical challenges they may experience during this time period and then introduce the two tools*)

2. Talk patient through setting their Pre-surgery goal (adapt depending on how many days they have before surgery) – minimum of two

- Pre-surgery goals: Individualized to each athlete. He or she ***may*** already have PT exercises (e.g., doing some leg strengthening exercises) and how he or she wants to feel and think in relation to the upcoming surgery (e.g., maintain a positive attitude, confident, relaxed going into the surgery).
- *MSC only: have them set goals about practicing mindful breathing as needed to cope with anxiety they might be feeling prior to their surgery*

3. Talk patient through setting their Post-surgery goals: provide basic description of what will happen after surgery – minimum of two
   - Basic description: *You will likely meet with a PT after surgery and prior to being released. The PT will give you a set of exercises to do as well as instruct you on how to use the crutches and CPM (if the surgeons assign this to them)).*
   - Post-Surgery goals (2-7 days post-surgery): EX. Doing what has been assigned by the PT for the 7 days following my surgery. Encourage them not to overdo it, just follow the instructions of the PT.
   - *MSC only: have them set goals about practicing mindful breathing every day following their surgery (until next session)*
4. Talk about where they will put these goals so they can see them every day (e.g., bathroom, next to bed, in the bag they take to physical rehabilitation).
5. Emphasize that each week he/she will set process and performance goals (short-term) that will serve as stepping stones toward achieving his/her long term goal.

PART II. Introduce Mindful Self-Compassion (MSC) –

(Introduction to MSC: 2 minutes)

MSC can be broken down into three key components: developing an understanding that you are not alone in what you are experiencing, becoming more aware of your body and what you're thinking and feeling in the moment, and being understanding and kind, as opposed to critical, toward yourself. MSC has effectively helped competitive athletes (including professional and Olympic athletes) cope with the effects of stressful situations, such as sport injury. It can reduce your feelings of depression, anxiety, and can improve your attentional focus, and confidence about returning to sport post injury.

So, given that you are likely to have some physical pain and discomfort post-surgery and that you may feel irritated and down, I am going to teach you a mindful breathing exercise that you can use immediately following and in the days after your surgery to cope more effectively with all that you will be thinking and feeling. Do you have any questions?

<u>PART III. Mindful breathing (exercise 1)</u>

(Introduction: 2 minutes)
Often when we feel tension, anxiety, and discomfort we cope by numbing or disconnecting ourselves from our bodies. You may have done this in sport during tough workouts (just try ignoring the pain). But this is not an effective strategy. Being mindful allows you to be aware of and accept your current thoughts and feelings without becoming overwhelmed by them.

So let's try the mindful breathing exercise now. I am now going to play a recording for you which is your first mindful exercise…

(Processing: 2 minutes)
What was that experience like for you?
What did you notice in the present moment when you were focusing on your breath?
What distracting thoughts or feelings came into your head?
What was it like for you to simply let those thoughts/feelings pass by?

(How to Apply this: 2 minutes)
So, let's discuss some of the ways you can use this tool in your recovery…
(Mindful Breathing: 6 min 30 sec): (Participants will listen to an audio file - below is the detailed script in case the audio doesn't work) – instruct athletes to close their eyes for first time

Sit in a comfortable position. You may choose to close your eyes or keep them open, which ever feels more comfortable for you. If you are feeling tired, it may help to keep your eyes open. Now if you've decided to gently close your eyes…what is your experience right now? What are you thinking about? What are you feeling? What sensations are present in your body…just take a moment to become aware of what you are thinking, feeling, and sensing.
Pay attention to how your body feels in this moment…how you feel as you sit…your feet, your hands, and your arms.

Begin by gently moving your attention to the process of breathing. Simply observe each breath as it happens – notice the rise and fall of your chest or abdomen with each breath, the sensation of the breath as it enters and leaves your body(not everyone will necessarily be breathing through their nose). Really feel what it is like to breathe.

As you breathe, you may want to put your hand on your abdomen to physically monitor your breath. As you continue to breathe, pay attention to the physical sensations that occur as you breathe in deeply…how your abdomen and chest expands and how they deflate each time you breathe out. Just experience the sensations of the breath…just let your breath be natural, and uncontrolled. Just allow your experience to be what it is without a need to change it in any way. At some point, you may find that your mind wanders – caught by thoughts, feelings, noises in the room or bodily sensations. This is perfectly normal…it's just what the mind does. When you notice that this happens, know that this is okay, and simply acknowledge the distraction. Then, gently bring your attention back to your breath and the feelings in your abdomen as you continue to breath.

Whenever your mind wanders, congratulate yourself each time on your ability to bring yourself back to the moment, back to your breathing…simply continuing to noticing the physical sensations that come with your breathing. Take a few moments to yourself, just to really feel connected with the present moment as best you can. Use your breath as an anchor to the present moment whenever you notice that your mind has wandered.

[Allow participants 30-45 seconds before moving to the next step].

Now, expand your awareness from the breath into the room around you. When you feel comfortable doing so, open your eyes.
how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following):

1. During the day when you are feeling overwhelmed or struggling with your feelings, such as when you are feeling frustrated that you're injury, unhappy that you can't practice with your teammates, or just sad about your situation
2. When you are feeling tense or just physically uncomfortable and you want to Relax
3. When you're experiencing physical pain and want to make it feel more Manageable
4. At night as you are trying to go to sleep…this may help you fall asleep

PART IV. Self-Compassion Mantra (exercise 2)

(Introduction/exercise: 5 minutes): *All spoken verbally*

Now that I've introduced you to mindful breathing, I want to share one more tool with you. This tool is shorter and you can use it throughout the day anytime. It's a set of phrases that can bring you comfort and relief. So, here is the mantra…

1. I am struggling right now…

2. Other athletes who have torn their ACLs have struggled too…

3. I am going to accept myself as I struggle…

4. And I am going to be kind to myself as I do…

(*Hand athlete note card with this mantra written on it and give them a second to look at it*)

Now I am going to have you practice using your mantra. Close your eyes for a moment and think about a time when you felt like you were struggling with your injury…when you may have been feeling overwhelmed by the news that you tore your ACL, scared you would not ever play again, anxious about the surgery, etc. Try your best to bring those thoughts and feelings into the present moment…right now as we are sitting together.

Give yourself permission to really experience the struggle…all the thoughts and feelings you were having…as you do, just repeat the mantra to yourself…

[10 SECONDS]

(Processing: 2 minutes)
Describe the thoughts and feelings you were able to recall when you were struggling?

How strongly did you experience these in the moment?

What happened to your thoughts and feelings as you said the mantra?

**This mantra is powerful because it helps you be aware of what is happening in the moment, it helps you remember that you are not alone in your struggles (or pain), and it reminds you to be kind (rather than critical) as you work through your recovery.

(How to apply this: 2 minutes)

So, let's discuss some of the ways you can use this tool in your recovery…how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following): (Same as the mindful breathing)

1. During the day when you are feeling overwhelmed or struggling with your feelings, such as when you are feeling frustrated that you're injury, unhappy that you can't practice with your teammates, or just sad about your situation
2. When you are feeling tense or just physically uncomfortable and you want to Relax
3. When you're experiencing physical pain and want to make it feel more Manageable
4. At night as you are trying to go to sleep…this may help you fall asleep.

HW INSTRUCTIONS:

1. Hand athlete a 3x5 CARD with the mantra and have them put it in their phone so they can read it out loud or to themselves anytime they're experiencing a moment of struggle following their surgery (if you haven't already)
2. Listen to the mindful breathing at least ONCE EVERY DAY after the surgery *(suggest setting an alarm in their phones)*
3. Place their goal sheet where they will see it every day as a reminder of what they are working toward. Work toward their goals over the next week

4. Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Inform them that we will text them after their surgery to see how they're doing and send reminder text messages to them (and their parents, if applicable) about practicing the mindful breathing and using the mantra over the next week.

*SET UP NEXT APPOINTMENT FOR 1 WEEK FROM THIS SESSION

Session 2 Overview

Time Length: 30 minutes

Materials:

- Computer
- Audio – Leaves on a Stream (basic)
- Release for athletes to give to their PTs*

Online Materials:

- Goal setting sheet - link

EXERCISE

- Leaves on a stream

SESSION 2 (1 week post-surgery) → Begin Here

(Introduction: 5 minutes)

How are you doing today?
What have you been experiencing/thinking/feeling over the past week?
How was working toward your goals this week?
** 1 week Questionnaire – LINK (10 minutes)
What other goals would you like to list for the next few weeks?
Update goal sheet (5 minutes)

PART II. Follow – up on MSC (2 minute)

How was practicing the mindful breathing over the past week?

How did it help you? (discuss obstacles if there are any)

Did you use the mantra at any point?

PART I. Decentering (Leaves on a Stream)

(Introduction to Leaves on a stream: 2 minutes)

Although you can continue to use the tools you learned last week, I am going to introduce a new one to you today and then ask that you practice it this upcoming week. This tool is similar to the mindful breathing but is more specific to helping you cope with any difficult feelings (frustrations, anger) you may be having. Like mindful breathing, you will focus on your breath as a means of relaxing, but we are also going to include some imagery to help you learn to let go of your thoughts and feelings and stay focused in the present moment. Let's try it.

(Leaves on a Stream: 10 min): (Participants will listen to an audio file - below is the detailed script)

Now, I'd like you to focus on your breathing …your breathing in …and out. Noticing the consistency and calming nature of your breath.

As you inhale…it's like you are breathing in feelings of calmness, feelings of relaxation…as you exhale, you are letting go of any feelings of tightness or tension you might have in your body.

Just continue to focus on your breathing…and what it feels like as your body becomes more relaxed…as your body becomes warmer…and heavier. It's almost as if your body is sinking into the ground.

Continue to focus on your breathing, noticing how it is becoming slower…how your mind is clear and your focus is just on your body and breath.

Now that you're in a relaxed state I am going to begin the visualization…

Visualize yourself sitting beside a gently flowing stream with leaves floating along the surface of the water.

[Pause 10 seconds]

What color are the leaves that are in the stream?...Can you hear the stream as it flows by you?... Do you feel the wetness of the bank where you sit?...What can you smell?...

For the next few minutes, take each thought that enters your mind and place it on a leaf… let it float by. Do this with each thought – pleasurable, painful, or neutral. Even if you have joyous or enthusiastic thoughts, place them on a leaf and let them float by.

If your thoughts momentarily stop, continue to watch the stream. Sooner or later, your thoughts will start up again.

[Pause 20 seconds]

Allow the stream to flow at its own pace. Don't try to speed it up and rush your thoughts along. You're not trying to rush the leaves along or "get rid" of your thoughts. You are allowing them to come and go at their own pace.

Now I want you to think of one thought you are having about your injury that is distressing to you: "_____", practice placing this thought on a leaf and letting it pass.

[Pause 10 seconds]

If a leaf gets stuck, allow it to hang around until it's ready to float by. If the thought comes up again, watch it float by another time.

[Pause 20 seconds]

Now I want you to think of another thought you are having about your injury that is distressing to you "_____", practice placing this thought on a leaf and watching if flow down the river along with all your other thoughts.

[Pause 10 seconds]

If other difficult or painful feelings arises, simply acknowledge them. Say to yourself, "I notice myself having a feeling of frustration/impatience/boredom." Place those thoughts and feelings on leaves and allow them float along.

[Pause 20 seconds]

From time to time, your thoughts may hook you and distract you from being fully present in this exercise. This is normal. As soon as you realize that you have become sidetracked, gently bring your attention back to the visualization exercise.

[Pause for 1 minute]

Now when you're ready you can open your eyes…

(Processing: 2 minutes)
Describe the stream you were able to visualize (see, hear, feel, smell)?
Describe the thoughts and feelings you were able to recall when you were struggling?

What happened to your thoughts and feelings after you placed them on the leaf?

(How to apply this: 2 minutes)

How do you think you might use this exercise over the next week? (give the athletes a chance to come up with some ideas, but then offer the following):

- This exercise can help you anytime you're experiencing a difficult emotion , which could be when you're sitting at home frustrated about being immobile, feeling left out by your team, doing you rehabilitation exercises
- If you have been using mindful breathing at night to help you fall asleep, you can continue to do that. But, then practice this exercise during the day when you are awake.

<u>HW INSTRUCTIONS:</u>

1. Listen to this exercise (leaves on a stream) at least three times over the next week. You can apply this anytime you're experiencing a difficult emotion, which could be when you're feeling frustrated about your injury, unhappy that you can't practice with your teammates, or just sad about your situation

2. As I already mentioned, you can continue to use your mindful breathing and mantra any time you want.

3. Work toward your goals over the next week

4. Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Remind them that we will continue sending reminder text messages to them (and their parents, if applicable) about practicing their assigned exercise this week

Session 3 Overview

Time Length: 30 minutes

Materials:

- Computer
- Audio – Stone Centering Exercise
- 3x5 inch cards

Online Materials:

- Goal setting sheet - link

EXERCISE:

- compassionate imagery writing exercise
- stone centering exercise

PART I. (Introduction: 5 minutes)
How are you doing today?
What have you been experiencing/thinking/feeling over the past week?
How was working toward your goals this week?

** 2 week Questionnaire – LINK – if they have not already done it

What other goals would you like to list for the next few weeks?

Update Rehabilitation goal sheet (5 minutes)

PART II. Follow – up on Leaves on a Stream exercise (2 minutes)

How was practicing the Leaves on a Stream session over the past week?

How did it help you? (discuss obstacles if there are any)

Did you use any of the other exercises? (mindful breathing, mantra)

PART III. Introduction to Compassionate Writing exercise
(Exercise: 5 minutes)

In general, many athletes tend to be hard on themselves because they believe it will make them tougher and ultimately, better performers. Though pushing yourself can be motivating, there comes a point where being self-critical becomes more damaging than helpful…particularly in relation to recovering from a sport injury. Thus, it's important to learn how to hold yourself to high expectations, but do so in a positive way where you treat yourself kindly. Such an approach can help you be more motivated to do your rehabilitation exercises as well as impact your speed of physical recovery.

This next exercise will help challenge that self-critical nature. Let's try it.

Please take a moment to write down the name of a person who has been a true source of support to you and who has provided you with comfort when you have struggled with your current injury or when you have really gotten down on yourself in relation to your injury? This person could be a family member, friend, physical therapist, teammate, coach…just someone who has been compassionate, comforting, and has provided you with unconditional support when you have been down on (or critical of) yourself.

Now that you have identified this person I want you to think of the situations when you have been critical of yourself and what they have said to you when they provided you with comfort (at least 2 phrases). Can you share what they said to you with me? How did you feel when this person said these things to you?

- *Help the athlete determine which phrases have been most comforting and help the athlete phrase them in a general ways so they can be applied to different situations that might arise in the future.*

So, it seems like these two phrases have been particularly comforting to you…I'd like you to write each one on one of these cards OR write in their phone.

Over the next two weeks I want you to keep these cards with you (or make sure you look at your phone) and read the statements to yourself whenever you notice that you are being self-critical of yourself, your injury, or your progress.

Like the MANTRA you developed when we first met, these phrases can help you remember that you are not alone in your recovery, that people do care about you, and that you can be kind to yourself when you are struggling (even if our first instinct is to get down on ourselves). Now you have several ways you can talk to yourself that will help you cope with distress.

<u>PART II. Stone centering exercise</u>

(Introduction: 2 minutes)
This next tool I'm going to introduce to you will improve your attentional focus and help you manage feelings of stress or discomfort related to your surgery. Sometimes a physical object can center us, help us bring our focus and attention back to the present moment which can serve as a distraction from other thoughts and feelings. This tool will likely be particularly beneficial during your rehabilitation. It can be hard to sustain attention and focus when you are uncomfortable, in pain, or even bored…when we feel these emotions we often distance or distract ourselves and don't really attend to what is going on in front of us. Your Physical Therapist is going to be hard sometimes and you'll hurt and be uncomfortable…so this tool can help you focus on the task at hand. Remember, the better your focus while doing your rehabilitation exercises, the better and quicker your recovery.

(Stone Centering Exercise: 5:45 minutes) – play audio recording

- *Begin by holding the stone you were given in the palm of your hand.*

- *Sit down in a comfortable position. You may choose to place your hands by your side or whichever position is most comfortable for you.*

- *I want you to begin letting go of all the stressors in your day (pause), the only thing you need to do in this moment is focus on the sound of my voice. There is nowhere else where you need to be and nothing that you need to do.*

- *Begin by gently moving your attention to the process of breathing. Simply observe each breath as it happens – noticing the rise and fall of your chest or abdomen with each breath, the sensation of the breath as it enters and leaves your body. Really feel what it is like to breathe.*

[Pause 10 seconds]

- *Now I'd like you to move your attention to the stone held in either your left or right hand.*

- *Take a moment to appreciate this object. How does the object feel in your hand?*

[Pause 20 seconds]

- *At some point, you may find that your mind wanders – caught by thoughts, feelings, noises in the room or bodily sensations. This is perfectly normal…it's just what the mind does. When you notice that this happens, know that this is okay, simply acknowledge the distraction. Then, gently bring your attention back to observing the stone in your hand…*

- *Now look closely at the stone. Notice its shape…. Its texture… its color…its weight.*

- *Notice the intricate details of this stone, the crevices, lines, how no side of this stone is exactly like any other stone.*

- *As you closely analyze this stone notice how you're feeling right now.*

- *If your mind wanders, not to worry, just bring your attention gently back to the object in your hand.*

- *Now I want you to gently close your eyes and take three more deep breaths while holding this stone. Letting out all the tension in your body each time that you exhale.*

- *Remember that you can use this stone whenever you are experiencing a moment of stress or discomfort related to your surgery. This stone brings your focus and attention back to the present moment and can serve as a distraction from other thoughts and feelings.*

- *When you're ready, bring your attention back to the room and open your eyes.*

(Processing: 2 minutes)
Describe your experience (thoughts/feelings) during this exercise?

What did you notice about the stone?

(How to apply this: 2 minutes)

How do you think you might use these two exercises? (give the athletes a chance to come up with some ideas, but then offer the following):

- These exercises can be particularly helpful to practice before going to rehabilitation, which can remind you to focus specifically on your body during each rehabilitation exercise and to be kind to yourself.
- You can also use these when you're experiencing a difficult emotion, such as boredom, frustration or pain.
- Focusing on the stone can help you relax and let go of any struggles you may be experiencing.

<u>HW INSTRUCTIONS:</u>

- Listen to this exercise (stone centering) at least three times over the next week. Look at your two phrases as needed. You can apply these anytime you're experiencing a difficult emotion. Also, you can continue to use your other tools, such as your mantra or your mindful breathing.
- Work toward their goals over the next week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?
- You can continue using any of the previous exercises that you have found helpful

**Remind them that we will continue sending reminder text messages to them (and their parents, if applicable) about practicing their assigned exercise this week

*SET UP NEXT APPOINTMENT FOR 2 WEEKS FROM THIS SESSION

Session 4 Overview

Time Length: 30 minutes

Materials:

- Computer
- Audio – Soften allow soothe

Online Materials:

- Goal setting sheet - link

EXERCISE:

- Soften allow soothe

PART I. (Introduction: 5 minutes)
How are you doing today?
How was working toward your goals this week?
What other goals would you like to list for the next few weeks?

Update Rehabilitation goal sheet (5 minutes)

PART II. Follow – up on Stone Centering Exercise (2 minutes)

How was practicing the stone centering exercise this past week?

How did it help you? (discuss obstacles if there are any)

Did you use any of the other exercises? (mindful breathing, mantra, two phrases)

PART III. Introduction to Soften-Allow-soothe
(Exercise: 5 minutes)

This week's exercise focuses on managing discomfort and frustration specifically related to rebuilding the strength and improving the functioning of your knee….it provides you with an exercise you can use to relax the muscles surrounding your knee which can assist your knee in its healing and strengthening.

PART IV. Session 4 – (Text participant LINK and play recording)

Please find a comfortable position and close your eyes. Begin now by bringing your attention again to the process of breathing. Simply observe each breath as it happens – noticing the rise and fall of your chest or abdomen with each breath, the sensation of the breath as it enters and leaves your body. Really feel what it is like to breathe.

Take a few moments to yourself, just to really feel connected with the present moment as best you can. Use your breath as an anchor to the present moment whenever you notice that your mind has wandered.

[pause 10 seconds]

With each exhale practice letting go of all the tension in your body Now take three more relaxing breaths*

[pause 10 seconds]

Now that you're in a relaxed state, I am going to ask you to recall a time when you felt physical pain or stress since your surgery which caused you mild to moderate discomfort.

[pause 10 seconds]

Now see if you can name the strongest emotion – a difficult emotion associated with the situation: anger? Sadness? Frustration? Fear? Repeat just the name of the emotion to yourself in a gentle, understanding voice, as if you were comforting a friend.

Now expand your awareness to your knee. Focus on the muscle tension or any achy feeling surrounding your knee.

Try your best right now to let the muscles in that location relax, like you're applying heat to a sore muscle. Say quietly to yourself, "soft, soft, soft", to enhance the process. Remember that you are not trying to make the sensation go away- you're just trying to acknowledge and relax the location.

Soothe yourself for struggling in this way. Put your hands over your knee and feel your body breathe. Perhaps kind words arise in your mind, such as what you might say to a teammate who is struggling, "this is a painful experience right now, I want to be here for you" It may help to think of your hands as being similar to the ice you have been putting on your knee to help it heal.

Say kindly to yourself, "soothe….soothe….soothe."

Allow the discomfort to be there. Abandon the wish for the feeling to disappear. Let the discomfort come and go as it pleases, like you do during a difficult workout. Repeat to yourself, "allow…allow…allow."

Now repeat all three to yourself in your mind…"Soften, soothe, and allow." "soften, soothe, and allow." You can use these three words like a mantra, reminding yourself how to treat yourself when you are struggling.

If you experience too much discomfort with an emotion, stay with your breath until you feel better.

[pause 10 seconds]

When you're ready, begin noticing the sounds in the room and slowly open your eyes.

(Processing: 2 minutes)

Describe your experience (thoughts/feelings) during this exercise?
What did you notice when you focused your attention on your knee and surrounding muscles during this exercise?

(How to apply this: 2 minutes)

How do you think you might use this exercise? (give the athletes a chance to come up with some ideas, but then offer the following):

- This exercise can be particularly helpful to practice when you're experiencing a difficult emotion, such as boredom, frustration or pain (especially if related to rehabilitation or not being healthy enough yet to return to sport)
- It can also help you learn how to better relax the muscles surrounding and lining your knee when you're feeling tension which can speed up your physical recovery

<u>HW INSTRUCTIONS:</u>

- Listen to this exercise (soften, allow, soothe) at least three times over the next week. You can apply this anytime you're experiencing a difficult emotion. Also, you can continue to use your other tools, such as your mantra or your mindful breathing.
- Work toward their goals over the next week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?
- You can continue using any of the previous exercises that you have found helpful

**Remind them that we will continue sending reminder text messages to them (and their parents, if applicable) about practicing their assigned exercise this week

<u>** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes);</u> at this time you will process practicing soften, allow, soothe, over the past 3 weeks, make sure they received the next MSC exercise, and help them write their next set of goals.

MSC – SESSION 5

Session 5 Overview Online Materials: ● Email ● Introduction to exercise ● Audio: Compassionate Body Scan ● Goal setting sheet - link

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their 5th session (10 to 15 minute phone call); to have their 5th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – 1-2 days before phone call

Hi_____,

Attached is the exercise we will review during our phone call on _____.

This week's exercise focuses on reminding yourself of how you will feel once you're ready to return to sport. This exercise will help you remain focused over the next few weeks to continue doing your rehabilitation and knowing that your body is doing its job to heal you properly. In addition, feel free to use any of the previous exercises that you have found helpful!

Before we talk, I appreciate you completing this 15 minute survey on your phone or a computer.

https://unt.az1.qualtrics.com/SE/?SID=SV_9FZF5SyZUL1sOUJ

(Your Identification code is: AT0##)

I look forward to talking with you soon!

Best,_____

5th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 5th session goals (5 minutes)

o If they do not have the 5th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's exercise focuses on reminding yourself of how you will feel once you're ready to return to sport. This exercise will help you remain focused over the next few weeks to continue doing your rehabilitation and knowing that your body is doing its job to heal you properly

How do you think you might use this exercise? (2 minutes)

- If you're feeling discomfort, stress or experiencing any doubts about returning to sport.
- Each time you practice this it will help you feel confident about returning to sport once you're physically healed.
- This exercise will help you remain focused over the next few weeks to continue doing your rehabilitation and knowing that your body is doing its job to heal you properly.

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Listen to this exercise at least three times per week.
- Work toward their goals over the next 3 week. Make sure they're posted in a visible location!
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Make sure they have the email; text them the link with the NEW recording

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 5 (10 weeks; Self-compassion letter writing)– email and text link

Relaxation (2 minutes):

I want you to begin by closing your eyes and letting go of all the stressors in your day (pause), the only thing you need to do in this moment is focus on the sound of my voice.

Now, I'd like you to focus on your breathing …your breathing in …and out. Noticing the consistency and calming nature of your breath.

As you inhale…it's like you are breathing in feelings of calmness, feelings of relaxation…as you exhale, you are letting go of any feelings of tightness or tension you might have in your body.

Just continue to focus on your breathing…and what it feels like as your body becomes more relaxed…as your body becomes warmer…and heavier. It's almost as if your body is sinking into the ground.

Continue to focus on your breathing, noticing how it is becoming slower…how your mind is clear and your focus is just on your body and breath.

Now that you're in a relaxed state I want you to think for a minute about your future…about 8 months after your surgery. Your knee is completely healed and you feel ready to return to sport.

[Pause 20 seconds]

As you continue to think of yourself at 8 months, I want you to pay particular attention to how strong you feel physically. You have completed all of your physical rehabilitation and through

this you have regained strength in your arms, chest, stomach, quadriceps, hamstrings, knees and calves. Your body feels stronger than it did prior to your injury.

Now take a moment to look down at your previously injured knee and express appreciation. You may decide to place one or both hands on this knee.

Allow your hands to be like conductors sending warmth deep into your knee. Communicate to your knee how grateful you are that it has healed so successfully. You may tell yourself I am thankful for my body healing my knee effectively. I am also grateful for the effort I put into helping my knee heal and for the people who have supported me throughout this healing process.

[pause 15 seconds]

You can sense that the ACL is now completely integrated into your bone and that your muscles surrounding your knee have become stronger. Just like all the other muscles in your body you have confidence that your knee will remain strong and dependable for you as you return to sport.

[pause 10 seconds]

Take a note right now to notice how you feel in this moment? Are you excited, happy, a combination of multiple emotions. However you're feeling try accepting it in this moment.

[pause 30 seconds]

Now when you're ready you can open your eyes.

MSC – SESSION 6

Session 6 Overview

Online Materials:

- Email:
- Introduction to exercise
- Audio: Self-compassion letter writing
- Goal setting sheet - link

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their 6th session (10 to 15 minute phone call); to have their 6th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – Day of phone call

Hi_____,

Attached is the exercise we will review during our phone call today.

This week's exercise focuses on increasing your awareness of your body and providing you with a technique to learn how to relax your muscles and release tension. It is another exercise you can use to help relax the muscles surrounding your knee and to enhance your muscle control which can improve the quality of your rehabilitation and increase your confidence in regaining strength in your knee.

Please practice this exercise at least 3 times per week. Also please remember to post the goals we will write today up in a place where you will frequently see it. Feel free to adjust your goals

as you see fit over the next 3 weeks. In addition, feel free to use any of the previous exercises that you have found helpful!

I appreciate you completing the 20 minute survey I will send you at the beginning of next week.

I look forward to talking with you later today!

Best,

_____

6th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 6th session goals (5 minutes)

o If they do not have the 6th session goal sheet ready then have them grab a piece of paper and write down their goals as they speak with you

o make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's exercise focuses on increasing your awareness of your body and providing you with a technique to learn how to relax your muscles and release tension. It is another exercise you can use to help relax the muscles surrounding your knee and to enhance your muscle control which can improve the quality of your rehabilitation and increase your confidence in regaining strength in your knee.

How do you think you might use this exercise? (2 minutes)

- There are going to be times over the next few weeks when you're still experiencing soreness and discomfort in different parts of your body. By learning how to intentionally relax and show kindness towards these parts of your body, you will enhance your muscle control which can later translate into improved muscle coordination in sport and when you're doing your daily rehabilitation exercises.
- It can help you feel more confident in your healing knee regaining strength by noticing the similarities between your healing and uninjured knee.

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Listen to this exercise (compassionate body scan) at least three times per week. It is slightly longer than the previous exercises; however listening to it will really help your body continue healing effectively and increase your confidence in your knee being stronger than it was prior to injury.
- Work toward your goals over the next 3 week
- Feel free to use any of the previous exercises that you have found helpful!
- Please answer the text messages we send you on Sunday asking whether you worked toward your goals this week and how often you practiced your assigned exercise this week?

**Remind them that we will continue checking in every Sunday and sending one weekly reminder to work toward their goals each week

**Make sure they have the email and text them the link with the NEW recording

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 6 Compassionate Body Scan – email and text link

Get in a comfortable position and close your eyes. Now, I'd like you to focus on your breathing …your breathing in …and out. Noticing the consistency and calming nature of your breath.

As you inhale…it's like you are breathing in feelings of calmness, feelings of relaxation…as you exhale, you are letting go of any feelings of tightness or tension you might have in your body.

Just continue to focus on your breathing…and what it feels like as your body becomes more relaxed…as your body becomes warmer…and heavier. It's almost as if your body is sinking into the ground.

Continue to focus on your breathing, noticing how it is becoming slower…how your mind is clear and your focus is just on your body and breath.

[10 seconds]

Now I'd like you to shift your attention to getting in touch with your body, how it feels right here in the present moment. See if you can feel the weight of your seat on the cushion or of your back on the couch. Just notice all of your body's sensation, any prickling, tingling, heaviness, pressure, lightness you may feel. Just feel your body just as it is right now…

So what you're going to be doing is moving your attention and awareness to different parts of your body, from the crown of your head down to the toes, as you go through different parts giving yourself compassion by saying something kind or understanding for any pain or tension you may feel there. Or perhaps for any shame or feelings of inadequacies you have about certain body parts.

So starting with the crown of your head just notice what sensations are there…see if you can tune into that point just between the air above your head and where your skull starts. Again is

there any tingling or sensation there, if so just notice it, if you experience no sensation or numbness see if you can be fully present and experience that

Then become aware of your facial muscles…you have 100 muscles in your face that work hard to help you express your emotions. If you feel any tension or stress in any of your facial muscles try relaxing and soothing them.

Then become aware of the back of your head, any sensations there. If you have any headache or pain. Just practice being kind or compassionate to the fact that you aren't feeling perhaps as you would like. Or if no sensation is there, just feel whatever sensation is happening right now…

Now become aware of how your neck feels. Again noticing any tension or tightness. Our neck holds up your heavy head and holds a lot of tension. So just relax the neck muscles and soothe and comfort any points of pain you may be experiencing…

Dropping down into your shoulders. A lot of emotional tension, fear, stress may be held in your shoulders. Athletes almost always feel some sort of tension there. So first just notice how you feel, what the sensation is like…is it hot, cold, tight, or dull. Take a moment to have compassion for the stress of being shoulders in your body. They take on a lot for you. Just soothe and comfort any feelings of pain, tension or distress you may have.

Now survey your arms, from where your arms enter your shoulders to your wrists – you can explore both arms at the same time. Explore the fronts, sides and backs of the arms. Gradually make your way to the elbows and wrists – moving deeply into each of the joints. Again noticing any tension or tightness and trying to relax each of these muscles.

Now become aware of both hands. Notice if they're clenched or tense and intentionally make an effort to relax both hands. Allow all the tension in your arms and hands to run out through your fingertips.

Then take note of your entire back stretching from the top all the way down to just above your butt. Take note of any sensations you may feel. Often athletes may hold tension in their middle or lower back. Pay particular tension to any part of your back that is tight and try again to relax those muscles. Allow your body to sink into the couch or bed in which you're lying. Practice being kind or compassionate toward any feelings you're experiencing.

Move your attention now to your chest as it rises and falls. There may be sensations made by the clothing against your skin as the chest rises and falls with each breath. You may become aware of the sensation of your beating heart. Let yourself become fully aware of each sensation as it arises.

Now, become aware of your quads and hamstrings -- allow your awareness to hover around this region of the body. Make sure to note any location of tension or soreness and try to consciously relax those muscles.

Move your attention now to your uninjured knee. Pay particular attention to how your uninjured knee feels on the surface as well as inside the joint. Take note of its strength and how all the tendons are interwoven together to work in unison so this knee can function. Notice any other sensations within this knee like its lightness, how relaxed the surrounding muscles feel, and how strong it feels.

Now I would like you to move your attention to your injured knee. Again paying particular attention to how your healing knee feels. You may still notice some tightness, which is normal.

You can sense that your ACL has become integrated into your knee just like your uninjured knee. You feel confident that this knee has regained strength and that it is going to continue building strength over the upcoming weeks as you heal. Congratulate the muscles and tendons in your knee for all the healing they have been doing since your surgery. Thank your knee for all the hard work it has done in rehabilitation. Your knee is finally beginning to feel stronger and that feels good.

Moving on, bring your attention to both calves and shin muscles. Again noticing any tension in these muscles and making a conscious effort to relax them. Allow any tightness to release out through both of your feet.

Allow both legs including your feet to relax and sink into the couch or bed on which you're lying. Sometimes we tense muscles without realizing it, so taking the time to intentionally relax each muscle can produce a sense of relief. Accept how you're feeling in this moment, whatever it may be.

Before we end this exercise I want you to spend a moment appreciating your body as a whole. There is a lot that your body does without your conscious awareness to keep you healthy and strong. Thank your body for remaining faithful during this tough process and feel grateful for the progress you have made thus far during your rehabilitation. Each day you're feeling stronger and more confident in your new ACL.

When you're ready you can now open your eyes feeling relaxed, strong, and confident in your body.

MSC – SESSION 7

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their 7th session (10 to 15 minute phone call); to have their 7th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – Day of phone call

Hi_____,

Attached is the exercise we will review during our phone call today.

This week's exercise focuses again on increasing body awareness, more specifically increasing your awareness of your leg and knee working in sync as you walk mindfully. This provides you with an exercise you can use to help you improve the quality of your rehabilitation, ability to focus, and again speed up your physical recovery.

Please practice this exercise at least 3 times per week. Also please remember to post the goals we will write today up in a place where you will frequently see it. Feel free to adjust your goals as you see fit over the next 3 weeks.

I will continue checking in on how often you're practicing this exercise every Sunday. Feel free to use any of the previous exercises that you have found helpful!

Best,

_____

7th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 7th session goals (5 minutes)

o If they do not have the 5th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o Make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's exercise focuses again on increasing body awareness, more specifically increasing your awareness of your legs and knee working in sync as you walk mindfully. For this exercise you will be standing and you can choose whether you would prefer to wear shoes or be barefoot. This provides you with an exercise you can use to help you improve the quality of your rehabilitation, ability to focus, and again speed up your physical recovery.

How do you think you might use this exercise? (2 minutes)

- You can apply this skill when you're jogging, jumping, or cycling for rehabilitation.
- Your ability to be mindful while you're doing any rehabilitation exercises will improve the quality of your performance during rehabilitation and again help you recover quicker.

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Listen to this exercise (mindful walking) at least three times per week.
- Work toward their goals over the next 3 week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Make sure they have the email; text them the link with the NEW recording

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 7- email and text link

Mindful walking

Stand solidly and comfortably on the ground with your eyes open and your hands by your sides. You may choose to wear shoes or remove your shoes during this exercise. Let's begin with mindful breathing. Gently move your attention to the process of breathing.* Simply observe each breath as it happens and really feel what it is like to breathe*…how your abdomen and chest expand as you breathe in and how they sink as you exhale.* Spend a few moments to take note of how your body feels and to become aware of your mental state.* Allow yourself to be centered and in the moment.*

When you are ready, focus on your right leg and the sensations of lifting that leg very slightly to begin the motion of walking…noting the muscles in your leg, what each one is doing, as you move ever so slightly.* Don't hurry your step…just allow it to happen naturally while you notice all that is happening in your leg.* As you step forward, focus on your right foot as it touches the ground.* Notice the pressure in your foot as it touches the ground…what part of your foot touches first*…the front of your foot? Your heel?*

Now as you move to take the step with your left leg, notice how the pressure and weight shifts in your right foot as you ready yourself to move.* Now as you move your left foot forward to make contact with the ground, repeat the procedure,* paying attention to the sensations in

your legs and feet as you move. Continue walking in the same manner, noticing the pattern of lifting, pushing, and dropping your feet as you walk.**

Notice the sensations in your body…at times, you may find that your mind wanders – caught up by your thoughts, your feelings, the sensations in your body, or noises in the room or in your surroundings. When you notice that this happens, know that this is okay,* and simply acknowledge the distraction.**

Then, gently bring your attention back to the present moment and refocus on your walking again. Remember, the goal of this exercise is to learn to pay attention to one thing at a time*…to be fully present in the moment and aware of what you are doing.* Now I'm going to give you a couple of minutes to simply walk mindfully.*

[Allow participants 2 MINUTES]

Now, allow yourself to notice your surroundings.

To end the practice, gradually come to a stop and become aware of the feeling of standing still again. Notice how you feel now, compared to how you felt when you started. * You can take your newfound awareness and calmness with you throughout the rest of the day*

MSC – SESSION 8

<u>Text Participant the week of their appointment (at least 2 days ahead):</u>

- Remind them of the time and day you had scheduled their 8th session (10 to 15 minute phone call); to have their 8th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

<u>EMAIL – Day of phone call</u>

Hi_____,

Attached is the exercise we will review during our phone call today.

We encourage you to continue practicing this exercise three times per week over the next two months. This exercise combines several skills from previous exercises and will serve as a review of the skills you have gained in mindfulness and attentional focus while participating in this study. These skills have likely helped you heal physically faster and have provided you with emotional support when you needed it. They will continue to help you in these same ways during the remainder of your recovery. You can also use any of the previous exercises we gave you over the next two months.

We will contact you in 6 months to hear about your progress!

Best,

_____

8th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 8th session goals (5 minutes)

o If they do not have the 5th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This exercise combines several skills from previous exercises and will serve as a review of the skills you have gained in mindfulness and attentional focus while participating in this study. These skills have likely helped you heal physically faster and have provided you with emotional support when you needed it. They will continue to help you in these same ways during the remainder of your recovery. You can also use any of the previous exercises we gave you over the next two months.

How do you think you might use this exercise? (2 minutes)

- It can remind you to hold onto feelings of confidence about returning to sport and to recognize, and then let go of feelings of doubt or fears about returning to sport.
- It can help you manage stress or feelings of frustration and impatience that may come up over the next few months
- Serve as a reminder of tools you can use to improve your performance in sport once you're physically healed.

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Recommend listening to this exercise at least three times per week over the next 2 months.
- Continue working toward their goals over the next 2 months and adjusting their goals as needed
- We will contact you in 6 months to hear about your progress!

**Make sure they have the email; text them the link with the NEW recording

<u>Session 8</u> (16 weeks post-surgery and beyond)– sent electronically

Relaxation (2 minutes)

Now I'd like you to sit in a comfortable position, placing your feet flat on the ground, arms resting on your side or in your lap, and close your eyes.

Begin by letting go of all the stressors in your day (pause), the only thing you need to do in this moment is focus on the sound of my voice.

Begin by gently moving your attention to the process of breathing. Simply observe each breath as it happens. You're breathing in …and out. Noticing the consistency and calming nature of your breath…

As you inhale…it's like you are breathing in feelings of calmness, feelings of relaxation…as you exhale, you are letting go of any feelings of tightness or tension you might have in your body… Just continue to focus on your breathing…and what it feels like as your body becomes more relaxed…as your body becomes warmer…and heavier. It's almost as if your body is sinking into the ground...

Continue to focus on your breathing, noticing how it is becoming slower…how your mind is clear and your focus is just on your body and breath…

Now that you're in a relaxed state I am going to begin the visualization:

I'd like you to visualize yourself sitting beside a gently flowing stream with leaves floating along the surface of the water. This might be the same stream you went to in the previous weeks exercise or it may be a completely different stream.

[Pause 10 SECONDS].

For the next few minutes, as you sit by the stream, take each thought that enters your mind and place it on a leaf… let it float by. Do this with each thought – pleasurable, painful, or neutral. Even if you have joyous or enthusiastic thoughts, place them on a leaf and let them float by…

[Pause 20 SECONDS].

If your thoughts momentarily stop, continue to watch the stream. Sooner or later, your thoughts will start up again.

[Pause 20 SECONDS].

Continue to allow the stream to flow at its own pace. Don't try to speed it up and rush your thoughts along. You're not trying to rush the leaves along or "get rid" of your thoughts. You are allowing them to come and go at their own pace…

Now I want you to think of one fear, anxiety, or negative thought you have about returning to sport: "_____", practice placing this thought on a leaf and letting it pass.

[Pause 10 SECONDS].

If a difficult or painful feeling arises while visualizing this negative thought on a leaf, simply acknowledge it. Say to yourself, "I notice myself having a feeling of fear/frustration/ impatience/anxiety." Place those feelings on leaves and allow them to float along.

Now I want you to think about feeling confident and excited about returning to sport. Place these thoughts on a few leaves but this time before putting them back in the stream hold them to your chest for a few moments. Allow yourself to feel the positive energy, to feel confident that your ACL will become fully integrated into your knee and that once you're physically healed you will be just as strong if not stronger as the athlete you were prior to injury.

[Pause 20 SECONDS].

Now, just as you've done with all your other thoughts and feelings, I'd like you to let those thoughts go and watch them float down the stream along with all your other thoughts.
From time to time, your thoughts may hook you and distract you from being fully present in this exercise. This is normal. As soon as you realize that you have become sidetracked, gently bring

your attention back to the visualization exercise and continue to place your thoughts on the leaves…Just continue this process until you hear my voice again.

[Pause 1 MINUTE].

Now, I'd like you to let go of the visualization and just focus again on my voice.

You will likely have lots of different thoughts and feelings related to returning to sport. All of these thoughts and feelings are perfectly normal. When you feel difficult emotions, such as fear or anxiety, it is important to know how to recognize these emotions and then practice letting them go. Remember if you're ever struggling with a difficult emotion, you can always use your mantra.

When you are ready you will come to full alertness with the deep knowing that you have done healing work and that you are well, healthy, and strong.

And so you will now say to yourself the following phrases beginning with 5, I may struggle at times when I think of returning to play (pause – wait for athlete to repeat statement), 4 other athletes who have had ACL surgery have struggled with this as well (pause), 3 as I struggle with these things I will accept myself for the strong athlete that I am (pause), 2 I will be kind to myself as I continue to work towards my return to sport (pause), and 1 I am safe, strong and know in a deep place that I am better than I ever was (pause)

APPENDIX F

IMAGERY PROTOCOL

Imagery Protocol

Pre-Surgery session Overview

Time Length: 40-45 minutes

Materials:

- Computer
- Consent/assent forms
- Screening interview questions - printed
- Payment sheet
- Headphones
- All 8 goal sheets
- Audio – Session 1 Imagery (*LINK ready on phone; edit in google drive so anyone with link can open it)*

*Give Goal Sheets to participants according to the session

Online Materials:

- Psychological measures (baseline) – *link OPEN on computer (extra copy printed)*
- Demographics questionnaire – *link OPEN on computer (extra copy printed)*
- Download Braeden Intro video

*Bring hard copy of questionnaires in case of internet problems

Supplemental materials:

- Release form (participant 18 and still living at home)

EXERCISE:

- First Imagery exercise

***Researchers receive potential participant's paperwork (contact sheet) and randomly assign them to one of the three interventions (stratified by gender)

Pre-surgery session (SESSION 1) → Begin Here!

*Signature for Consent/Assent/Release forms (if applicable) – review basic description of study in consent form

*Screening interview (yes/no questions)

*PARTICIPANT COMPLETES ONLINE SURVEY (15 min)

(General Introduction: 5 minutes)

Thank you for agreeing to be part of this study. You have been assigned to the IM intervention designed to help you cope effectively with the challenges associated with having ACL surgery. Over our 8 meetings (4 in person) together, you will learn a variety of imagery skills and tools that will help you in your recovery and rehabilitation, and help you feel more confident when

you return to your sport once you are physically healed. Here are some tips for getting the most out of this program

TOP 10 TIPS FOR GETTING THE MOST OUT OF THIS PROGRAM: (*Researcher talk participants through study and asks if they have any questions*)

- Show up for the first FOUR sessions.
- Show up a few minutes early to every session.
- Stay engaged the entire session.
- Remain connected with the researcher through emails/texts.
- Complete activities and questionnaires when asked.
- Do all the assigned practice exercises.
- Be open to the new ideas and experiences you will have in this program.
- Try the new activities/exercises that will be presented to you.
- Challenge yourself.

SHOW BRIEF VIDEO OF BRAEDEN

What did you think of the video? (less than 1 minute)

So, to begin, we are going to focus on goal setting, something we will do at the beginning of every session we have.

PART I. Goal setting:

(Introduction: 5 minutes)

I. Have you used goal setting before? How did it help you?

II. Goal setting can help you by providing you with direction, motivation and awareness of progress you're making in physical rehabilitation, which ultimately can help you feel more confident.

III. [Describe several different types of goals you can set]

- Outcome goal: comparing self to others (not practical for recovery), such as "I can recover faster than my friend or family member"
- Performance goal: focused on performance improvement based on your personal standards, such as "I want to increase the number of times I practice my rehabilitation exercises from 3 to 5 by next week (supported by my PT)"
- Process goal: are the small steps you can take to work towards your outcome and performance goals, such as "I want to maintain a positive attitude each time I go to rehabilitation over the next week"

***Process and performance goals are going to be the most helpful in motivating you during your physical rehabilitation

(Goal setting exercise: 5 minutes)

1. Talk patient through setting their longterm goal – ask athlete to write down a long term goal, suggest "returning to play with confidence as well as minimal fear and anxiety of reinjury by 8 months post-surgery" – minimum of one

(Ask the following questions to help them set their Pre-surgery and post-surgery goals)

How are you feeling about your upcoming surgery? (*normalize thoughts and feelings*).

What have you been told to expect immediately post-surgery and in the 3-5 days following surgery? (*if they don't know, provide a basic description of emotional physical challenges they may experience during this time period and then introduce the two tools*)

2. Talk patient through setting their Pre-surgery goal (adapt depending on how many days they have before surgery) – minimum of two

o Pre-surgery goals: Individualized to each athlete. He or she *may* already have PT exercises (e.g., doing some leg strengthening exercises) and how he or she wants to feel and think in relation to the upcoming surgery (e.g., maintain a positive attitude, confident, relaxed going into the surgery).

o *IM: have them set goals about practicing imagery as needed to cope with anxiety they might be feeling prior to their surgery*

3. Talk patient through setting their Post-surgery goals: provide basic description of what will happen after surgery – minimum of two

o Basic description: *You will likely meet with a PT after surgery and prior to being released. The PT will give you a set of exercises to do as well as instruct you on how to use the crutches and CPM (if the surgeons assign this to them)).*

o Post-Surgery goals (2-7 days post-surgery): EX. Doing what has been assigned by the PT for the 7 days following my surgery. Encourage them not to overdo it, just follow the instructions of the PT.

o *IM: have them set goals to practice imagery every day following their surgery (until next session)*

4. Talk about where they will put these goals so they can see them every day (e.g., bathroom, next to bed, in the bag they take to physical rehabilitation).

5. Emphasize that each week he/she will set process and performance goals (short-term) that will serve as stepping stones toward achieving his/her long term goal.

PART II. Introduce Imagery –

(Introduction to Imagery: 2 minutes)

IM involves creating sensory rich images within your mind. The more effort you make to activate all 5 senses while practicing your imagery, the greater the benefits will be. IM has effectively helped competitive athletes (including professional and Olympic athletes) cope with the effects of stressful situations, such as sport injury. It can help to reduce your feelings of depression, anxiety, and can improve your attentional focus, and confidence about returning to sport post injury.

So, given that you are likely to have some physical pain and discomfort post-surgery and that you may feel irritated and down, I want to give you a tool today that you can use immediately following and in the days after your surgery to cope more effectively with all that you will be thinking and feeling (*include feelings the athlete mentioned*). Do you have any questions?

I. Introduction to IM

So, this first imagery exercise you can use throughout the day anytime you might be struggling with feelings/thoughts of distress, discomfort, anxiety, pain…it can bring you relaxation, comfort, and relief. It can be a very powerful way to cope when you are experiencing distress or pain following your surgery.

Show client how to take a breath from their diaphragm (1 minute)

1. Imagery – Session 1 – (Text participant LINK and play recording)

Relaxation.

*Find a comfortable place to lie down. You might just want to close your eyes and allow your hands and arms to rest comfortably at your side. For the next few minutes there is no place that you need to go; nothing that you need to do, nothing that you have to accomplish, and no problem to solve. Everything is taken care of. You can just allow a feeling of peace and relaxation to come into your body and mind. * As you take a slow deep breath from your diaphragm, you can just hold it and then it let go easily out through your parted lips. Breathing in through your nose you can feel the expansion of your belly and then as you exhale you can feel the way it deflates. So you are feeling the rise of your body when you breathe in and the way your body just settles back down when you breathe out.*

*As you take a little deeper breath feel the tightness of the breath all the way up into your neck and shoulders and hold the breath. * Perhaps you can now just consciously drop your shoulders,*

*relax your neck muscles and exhale. * And as you are focusing on your breathing, you are breathing in oxygen, breathing in peace, breathing in healing. Every time you breathe out just allow yourself to let go of conflict, pain, tension, or difficulty. And as you breathe in you can just allow bringing in that rich oxygen and peace and you can again breathe out, sending warm energy to any part of your body that is tense, sore, or tight.*

*If you are experiencing some pain, pressure, or unwanted tightness you can now take another gentle, deep breath from your diaphragm and now, bringing each of your thumbs together, just barely touching, make tiny circular motions in a comforting way, all the while thinking, softly relaxing, softly relaxing, and so you can relax deeper into a place of more comfort and stillness, of letting go and releasing. ***

Imagery.

If you find you are still not as comfortable as you would like to be, begin now to imagine yourself going to a place that's very beautiful to you…very peaceful…very safe and secure . This might be a place that you've actually been to in your life, or it may be a place you've visited before in your imagination, or it can be a new place, or some combination. It doesn't really matter, as long as the place you are imagining is very beautiful to you…very peaceful…very safe.

A nice place to be for a few minutes. Allow yourself to imagine going there as best you can in your own way. And look around and notice what you imagine seeing in this special, quiet, peaceful place. Notice the colors and the shapes and the things that you see there. And so as

you notice what you see, notice if you imagine hearing any sounds in this special, peaceful place. Or whether it's just very quiet. You may even imagine an aroma, an odor, or a fragrance in this place. And you may not. It doesn't really matter. Just notice whether there's an aroma or fragrance in the air. Notice the temperature and the time of day and the season of the year.

And especially notice any feelings of peacefulness, relaxation, or comfort that you feel. And allow these feelings to be there. Allow yourself to relax into them and to feel that relaxation, that peacefulness. There is nothing else that you need to do right now and nowhere else to go.

Simply enjoying a few moments in this very beautiful and peaceful place. Find the spot where you feel most comfortable and allow yourself to get settled there. Simply enjoy a few quiet moments. Peaceful, relaxed, nothing to do, nowhere to go, enjoying the beauty and the safety. As you deeply relax in this place of beauty, peacefulness, and safety, you can allow your body to recharge and your mind as well – even your spirit. Just drawing from this sense of deep restfulness and comfort that's here. And if this is a pleasant experience, you should know that you can come back here and enjoy this anytime of your own choosing, simply by deciding to shift your attention to your inner world, allowing your breathing to get deep and comfortable, and imagining yourself coming to this place.

If your mind should wander or get distracted, simply take another breath or two and refocus your mind back into this beautiful, peaceful, and quiet place and let this be your focus of attention for these few minutes.

[30 second pause]

*** And so for now, I'm going to ask you to bring your attention back to your breathing. Notice how easily your chest rises and falls with each breath without you even trying. You might also notice how the couch or bed feels against your body, the feeling of gentle contact with your head, neck, back, legs. You might also notice the sound of my voice, sounds inside or outside the room, and when you are ready, you may open your eyes, feeling peaceful, rested, and energized.*

(Processing: 2 minutes)

What was that experience like for you?

What did you notice during the relaxation imagery?

(How to Apply this: 2 minutes)

So, let's discuss some of the ways you can use this tool in your recovery…

how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following):

1. During the day when you are feeling overwhelmed or struggling with your feelings, such as when you are feeling frustrated that you're injury, unhappy that you can't practice with your teammates, or just sad about your situation
2. When you are feeling tense or just physically uncomfortable and you want to relax
3. When you're experiencing physical pain and want to make it feel more manageable
4. At night as you are trying to go to sleep…this may help you fall asleep.

HW INSTRUCTIONS:

1. Listen to Imagery session at least ONCE PER DAY after the surgery *(suggest setting an alarm in their phones)*

2. Place their goal sheet where they will see it every day as a reminder of what they are working toward. Work toward their goals over the next week

3. Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their imagery exercise this week?

**Inform them that we will text them after their surgery to see how they're doing and send reminder text messages to them (and their parents, if applicable) about working toward their post-surgery goals and practicing the imagery session ONCE per day over the next week

*SET UP NEXT APPOINTMENT FOR 1 WEEK FROM THIS SESSION

Session 2 Overview

Time Length: 30 minutes

Materials:

· *Computer*

· *Audio – Session 2 Imagery (LINK ready on phone; edit in google drive so anyone with link can open it)*

Online Materials:

· *Psychological measures (1 week post)*

· *ACL reconstruction videos*

Give to participants:

· *1 week post - Goal Setting sheet*

EXERCISES: Imagery session

PART I. (Introduction: 5 minutes)

How are you doing today?

What have you been experiencing/thinking/feeling over the past week?

How was working toward your goals this week?

** 1 week Questionnaire – LINK (10 minutes)

What other goals would you like to list for the next few weeks?

Update goal sheet (5 minutes)

PART II. Follow – up on Imagery (2 minute)

How was practicing the imagery session over the past week?

How did it help you? (discuss obstacles if there are any)

PART III. Introduction to IM session (1 minute)

So, this next imagery exercise you can use throughout the day again anytime you might be struggling with feelings/thoughts of distress, discomfort, anxiety, pain, as well as before you do

any rehabilitation exercises…. it can bring you relaxation and assist with your healing process and concentration during your rehabilitation.

To help you in visualizing your knee I am going to show you a brief video displaying an animated version of your ACL surgery

****SHOW ACL reconstruction video (patella tendon OR hamstring) – 4 minutes*

https://www.youtube.com/watch?v=g96M0jRqn7k

(stop at 3:40, patella tendon)

https://www.youtube.com/watch?v=Xsq0sQp6DwU

(Start 37 seconds into video, hamstring)

Keeping the images of the video in your mind, now you will listen to the next imagery session.

PART IV. Session 2 (12:45) – (Text participant LINK and play recording)

*So to begin, please find a comfortable place to lie down. Close your eyes and allow your hands and arms to rest comfortably at your side. With your eyes closed you can just begin to relax, allowing that same feeling of peace and relaxation as before to come into your body and mind. You can begin again by taking a gentle, deep breath, breathing in through your nose gently and then allowing the breath to escape through your parted lips. * You can think about relaxing from the top of your head all the way down to your toes each time you exhale. For the time being, focus just on your breathing and once again notice its rhythm.*

*Relax your breathing as you breathe in fully, feeling your stomach rise with the breath in, and feeling your chest and stomach fall with each breath out. * And with each breath out, you are releasing any unwanted tightness, soreness, or tenseness. Just sending it out with the breath. You can actually gently immerse yourself in this process of relaxing, of settling in, and you can just let all the muscles in your face to relax, especially around your jaw, your temples, and your eyes.*

In this comfortable place, you can allow yourself to now just drop down inside. Take another long, gentle breath, and release it slowly. You are ready for healing. And in this session, you will begin to practice strengthening your muscles, first in your mind and then you will do it both in your mind and actually with your muscles at the same time.

**Focus your attention now on your healing knee, allow yourself to become fully aware of its shape, its size, its depth, the feel of your knee. First, in your mind visualize your quadricep muscles contracting just like it would if you were to actually tighten it. See and feel mentally that contraction, strong and hard, when you lift your leg. Every time you picture lifting your leg in your mind, picture feeling this strong contraction, seeing the muscle grow tight and hard in your mind. Now, picture the muscle letting go of this contraction, seeing it smooth out as you relax it. By imagining this, it is as though you are going to actually make your quadricep contract, just by thinking about it with the power of your mind. Then, when you actually lift your*

*leg in physical therapy or any other time you're doing your exercises, at the same time I want you to picture in your mind your quadricep contracting. **

*You can bring your focus now back again to your breathing. Feel how relaxed and restful your body is. Perhaps you might want to just allow your body to take over its job of healing the entire joint and accepting this new tissue gratefully as part of its self. Go ahead and zero in on your healing knee, center your attention there for just a moment. * Acknowledge your new ligament as a very special and tightly connected part of your whole body and just notice once again, as you focus on your knee, the size and the feel of that knee. * Remember what a healthy ACL ligament looks like, this ACL ligament has now been replaced, imagine it moving back and forth inside the knee, imagine moving your leg slowly out and back, view the tightness of that swollen joint as well as the scar tissue as normal and protective, it feels larger than your other knee because of the protective fluid in the joint.*

*In your mind, allow yourself now to gently force the knee to bend and flex against this tightness, * picture yourself moving your leg up and down on the wall, sliding it gently up and bending it as you move it down the wall. Each time you move your leg gently up and down, see in your mind how your new ligament bends and flexes easily inside your knee. It feels so good to your ligament to stretch back and forth, strong, resilient, and healthy.*

*** So then as you find yourself actually doing some exercises during rehabilitation such as lifting your leg or sliding your feet up and down on the wall or stretching, as you do at the very same*

*time, picture in your mind the back of your kneecap as well hydrated and lubricated with lots of clear healthy fluid. Visualize that with each activity you are stimulating the back of the kneecap to provide this fluid cushion. As you move through your range of motion of extension and flexion, you may feel some discomfort and resistance. Think about this discomfort for just a moment, allow yourself to concentrate on this discomfort but perhaps this time allowing yourself to interpret this discomfort in a different way. Your knee is telling you that there is pressure, but it is good to move the knee gently back and forth against this pressure. * Even though there is resistance, you know this temporary swelling is protecting your entire joint. * As you hold a stretch, allow yourself to feel pain or discomfort as pressure. Feel this pressure and lean into it first in your mind, picture your pain and sensory nerves being activated and see small pieces of scar tissue releasing when you do this. The scar tissue is the normal response by your body to your surgery. Now, as you actually physically hold the stretch, you can see and feel these thin, white spindles, releasing, letting go, and dissolving. The muscle fibers are actually sliding more easily over themselves as you relax into the pressure. Now the pieces of scar tissue are releasing and are being carried and flushed away by your body. **

*Relax into the pain that has now been reduced to pressure, hold your stretch, relax a little more with a gentle breath in and a gentle breath out, breathing out into the pressure, feeling yourself stretch just a little more, relaxing just a little more. * Tell yourself every day my knee is strong, powerful, and flexible, it is feeling better and better every day. It is becoming stronger and more flexible and more supple with each passing day.*

** And so for now, I'm going to ask you to bring your attention back once again to your breathing, notice how easily your chest rises and falls with each breath without you even trying.*

** You might also notice how the couch feels against your body, the feeling of gentle contact with your head, neck, back, and legs. Notice the sound of my voice, sounds inside or outside the room, and when you are ready with soft eyes, you may open your eyes, feeling peaceful, rested, and energized.*

(Processing: 2 minutes)

What was that experience like for you?

What did you notice during the imagery?

(How to Apply this: 2 minutes)

So, let's discuss some of the ways you can use this tool in your recovery…

how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following):

1. Before you do your daily rehabilitation exercises

<u>Same as last week:</u>

2. During the day when you are feeling overwhelmed or struggling with your

3. feelings, such as when you are feeling frustrated that you're injury, unhappy that you can't practice with your teammates, or just sad about your situation

4. When you are feeling tense or just physically uncomfortable and you want to relax

5. When you're experiencing physical pain and want to make it feel more manageable

6. At night as you are trying to go to sleep…this may help you fall asleep.

HW INSTRUCTIONS:

· Listen to Imagery session at least THREE times before the next session *(suggest setting an alarm in their phones)*

· Place their goal sheet where they will see it every day as a reminder of what they are working toward. Work toward their goals over the next week

· Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their imagery exercise this week?

**Inform them that you will continue sending reminder text messages to the patient and parent.

** BEFORE THE NEXT SESSION you will email and text them the link to complete the 20 minute survey. The next session will only be 30 minutes, unless they have yet to complete the survey, then they will be asked to complete the survey during the next session (add 20 minutes)

*SET UP NEXT APPOINTMENT FOR 1 WEEK FROM THI

Session 3 Overview *Time Length: 30 minutes*

Materials:

· *Computer*

· *Audio – Session 3 Imagery (LINK ready on phone; edit in google drive so anyone with link can open it)*

Online Materials:

· *Psychological measures (2 week post)*

Give to participants:

· *2 week post - Goal Setting sheet*

EXERCISES

· *Imagery session*

PART I. (Introduction: 5 minutes)

How are you doing today?

What have you been experiencing/thinking/feeling over the past week?

How was working toward your goals this week?

** 2 week Questionnaire – LINK – if they have not already done it

What other goals would you like to list for the next few weeks?

Update Rehabilitation goal sheet (5 minutes)

PART II. Follow – up on Imagery (2 minutes)

How was practicing the imagery session over the past week?

How did it help you? (discuss obstacles if there are any)

PART III. Introduction to IM session (1 minute)

This week's imagery focusses again on the healing occurring within your knee and provides you with an exercise you can use to help you relax and focus your mind on your body healing quickly and effectively.

PART IV. Session 3 – (Text participant LINK and play recording)

*You might just close your eyes and allow a feeling of peace and relaxation to come into your body and mind. Again breathing in gently through your nose and then allowing the breath to escape through your parted lips. You can think about relaxing from the top of your head to the tip of your toes. And you can always feel free as you begin to breathe and to relax, to let your mind wander as it suits you. * And so now as you begin to focus just on your breathing, you once again notice its rhythm and relaxing your breathing as you breathe in fully, feeling your stomach rise with the breath in and feeling your chest and stomach fall with each breath out. * And with each breath out, you can just release any unwanted tenseness, soreness, or tightness, just*

*sending it out with the breath. Letting all the muscles in your face relax, and you will now be able to allow yourself to move to a deeper level of relaxation, more comfortable, more relaxed, more peaceful, more safe. * And if you notice any tension or any other sensation, you can just accept it, allowing it to come along with you now and you'll be surprised once again to discover that you are even more relaxed and comfortable. **

*Because you are so comfortable and peaceful, you are ready to accept a gift you will give yourself. It is a gift of a kind of energizing, similar to a gentle massage or warm sunbath. With your eyes still closed, I'd like you to imagine in the space somewhere above you, a small golden orb. ** It could be similar to that of a sun lamp or even a round shiny Christmas tree ornament, it might even be a miniature treasure chest, holding something wonderful for you inside. Allow one of these images that you like most to come into your mind as you notice how shiny and beautiful it appears, as you are looking at it in your imagination, you'd like very much to open it to see what there is inside for you. * You can see a warm glow coming from inside and you know it has something to do with this gift for you. And so you allow this small globe or ornament or tiny chest to open and when you do soft golden rays of light are cast upon your hair and face. * It is a sweet golden warmth, again like gentle sunshine on your face, feel those warm rays on your skin. And because this feels so good, you allow it now to move across your shoulders, coating your neck, your chest, and back. Moving on down your chest, through your torso, radiating out and down both of your arms, into your hands, and fingers. * You can feel its warmth as it moves into your abdomen, spreading slowly like warm honey, into your quadriceps, moving thoroughly and gently through your knees, across your buttock, down into*

your calves and thighs, your ankles, your feet, and finally gently into your toes. Feel in every part of your body this golden warmth.

**** Allow yourself now as you are relaxed and comfortable to see in your mind inside your knee. Your knee joint is returning to normal with all the surrounding tissue healing and intact. As you exercise your leg you are bringing rich warm blood to the cells that are carrying away any pieces of scar tissue or debris and giving your new ligament and the surrounding knee joint lots of oxygen and nutrients to heal completely. * Your new ligament is bending and flexing like a fat, shiny, strong cable. Tiny bands of strands that are twisted in a tight, perfect spiral. You might find yourself riding a stationary bike, and when you do, feel the pressure against your kneecap remembering that this pressure is normal and natural. Try to see the kneecap moving back and forth, up and down stimulating the release of fluids that coats and soothes your joint, making your knee function perfectly. Your kneecap is moving up and down, back and forth finding the perfect tracking. As you feel the discomfort of this motion when you are actually riding the bike, remember that it is really a feeling message from your knee to you that has a word written on it, the word is pressure. And as you focus on this pressure, you can see and feel in your mind your ligament moving and bending, stretching, strong, flexible, healthy. And your quadriceps are bending and pumping and gaining strength as well with each revolution, strength that is so necessary for your strong recovery. * As you exercise your knee back and forth and around each time you are on the bike, you are bringing the blood cells to the joint that are cleaning away all debris, flushing out the swelling you feel in your joint. Every time your leg goes in that circular motion, your kneecap is tracking exactly where it should be and your quadriceps are getting*

*stronger, pulling your kneecap back into its proper place. * Picture yourself riding the stationary bike now, and at the same time seeing your muscles and your kneecap moving in a perfect, healing, circular motion. You can picture this in your mind at the same time that you are actually exercising on the bike knowing this is what is happening inside your leg.*

** And so now you can allow yourself to refocus on your breathing. Take another deep, gentle breath and slowly, slowly let it out, releasing any left over tension that you may feel anywhere in your body. Allowing yourself to move to that exact proper level of tightness for you. * Take a moment now to feel this overall relaxation and when you are feeling particularly relaxed allow yourself to again picture your quadriceps contracting as well as your new ligaments stretching back and forth. Now attempt to feel what it feels like without actually doing it. * In your mind, see your affected leg. In just a moment I'm going to ask you to switch your concentration to just listen to whatever body wisdom is in your unaffected leg. Although this may feel awkward at first, it is important to allow yourself now to let your affected knee consult with the unaffected knee. Mentally just step back for a moment, just be an observer. Just watch how it moves, feel how strong it is, moving effortlessly and smoothly through its range of motion, feel what strength and wholeness feels like. * Now that you have done that, in your mind again imagine contracting both of your legs' quadriceps at the same time, do this mentally four times slowly. Now. ** On the fifth time, perform this task both mentally and physically and after the last contraction, doing it both mentally and physically, relax your legs. * I would like you to allow your unaffected knee to just take over, advising your affected knee, teaching it how to work and bend, stretch, and walk. You need do nothing to help this happen except to continue to focus on*

*both knees together at the same time and continue with your feelings of relaxation and warmth. * Take a few minutes to do that now. ** Tell yourself every day my knee is flexible and strong, my whole body is healthy and strong, I am healing quickly. Thank your body now for the healing, vitalizing energy that is here. You can now begin to see yourself and to feel yourself performing at your peak, happy, lively, pain free, content.*

** And once again I'm going to ask you now to bring your attention back to your breathing, noticing the quiet natural rhythm of your breathing, that wonderful relaxed feeling of breath coming in and going out without your even trying. Notice too a deep and gentle pulsing of your heart that steadies you, again all without your even thinking about it. ** And now allow yourself to begin to come back into the room feeling the chair against your body, the gentle contact. And again you may notice the sound of my voice, other sounds around you and when you are ready, you may open your eyes, feeling peaceful, rested, and alert.*

(Processing: 2 minutes)

What was that experience like for you?

What did you notice during the imagery?

(How to Apply this: 2 minutes)

So, let's discuss some of the ways you can use this tool in your recovery…

how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following):

- During the day when you are feeling overwhelmed or struggling with completing your rehabilitation exercises
- Before you do your daily rehabilitation exercises
- When you are feeling tense or just physically uncomfortable and you want to relax

HW INSTRUCTIONS:

· Listen to Imagery session at least THREE times per week for the next two weeks *(suggest setting an alarm in their phones)*

· Place their goal sheet where they will see it every day as a reminder of what they are working toward. Work toward their goals over the next week

· Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their imagery exercise this week?

**Inform them that you will continue sending reminder text messages to the patient and parent.

*SET UP NEXT APPOINTMENT FOR 2 WEEKS FROM THIS SESSION

Session 4 Overview

Time Length: 30 minutes

Materials:

· *Computer*

· *Audio – Session 4 Imagery (LINK ready on phone; edit in google drive so anyone with link can open it)*

Give to participants:

· *4 week post - Goal Setting sheet*

EXERCISES

· *Imagery session*

PART I. (Introduction: 5 minutes)

How are you doing today?

What have you been experiencing/thinking/feeling over the past week?

How was working toward your goals this week?

What other goals would you like to list for the next few weeks?

Update Rehabilitation goal sheet (5 minutes)

PART II. Follow – up on Imagery (2 minutes)

How was practicing the imagery session over the past week?

How did it help you? (discuss obstacles if there are any)

PART III. Introduction to IM session (1 minute)

This week's imagery focusses again on the healing, more specifically the interior of your joints and muscles healing…it provides you with an exercise you can use to help you relax and focus your mind on your body healing, and to assist with effectively completing your assigned rehabilitation at this time.

PART IV. Session 4 – (Text participant LINK and play recording)

*And so just now as you are in a comfortable position either lying down or seated, you can begin by taking a gentle deep breath, holding it and then releasing it through your parted lips. As always you can begin to move to this deeper level of relaxation through your breathing. Feeling free to let your mind wander as it suits you. ** And again you can now allow yourself to move to that deeper level of relaxation, more comfortable, more relaxed, more peaceful, more safe, more content.*

*** Focus your attention again on your knee, take another gentle breath in and as you exhale allow yourself to move easily and gently into an even deeper place of relaxation and peacefulness. This time so that you may take an imaginary journey.*

*As you exhale I'm going to ask you to imagine yourself as being able to shrink down to a very small size, you will be able to return to your original size after you are done with your pretend journey. But for now each time you exhale you can begin to feel yourself becoming smaller and smaller until you can actually fit into the palm of my hand. ** Now that you are tiny, before you is a tiny staircase leading down in front of you. It has 10 stairs numbered from 10 to 1. You will descend this staircase with no problem from your knee, step by step, counting down. As you do you will gradually grow even smaller until you can magically enter the world of your knee, where you can see it, touch it, experience it. Remember now what the inside of your knee looks like, for your journey will be a discovery inside this joint. You are standing on the step numbered 10, begin now to descend. You step down, 9, you notice the step is smaller than the one before so too is your foot smaller yet, and the rest of your body, 8, 7, 6, 5, 4, 3, 2, 1.*

*Near the bottom step you notice a red glow emanating from below, its warm and inviting and you are drawn to it. Step off and become suspended in the liquids of your body. You can breathe freely and easily as though floating in a safe, pressurized space suit. * You are perfectly safe and anytime that you are ready to leave you can return when you wish, immediately and you will assume your normal size. But for now begin to move down the corridor to the inside of your knee and see this incredible place. As it opens up, the corridor reveals caverns and folds. See how clean and supple, shiny and strong the muscles are. Before you, you can see the expanse of your kneecap. There's a warm light behind it casting a red glow all about you, softly illuminating everything near your knee. As you move closer you can begin to see a giant sweeping pink*

smoothness, which is your quadricep. Take a moment and admire how large and strong it has become with your exercising. You're near the edge of a cavern now where the light is brighter, here it's showing you more details in your surroundings. You pass near an artery, reach out to touch it, it is dark red and warm, feel it, it is pulsing with the rhythm of your heart. There are many arteries and veins like giant hoses, pumping healthy blood cells that bring nourishment and cleansing and healing to every part of your knee. Very near the light coming from the rear of the cavity lie two securely fixed ligaments, your ACL and your PCL. They are both glistening white and very flexible. You are reaching out now to feel how smooth the fat strong bands of the ACL are before you.

*Noticing that your ACL is particularly thick and strong looking, just like in the video it is shiny and ribbed with thick fibers running length wise in a nearly imperceptible spiral pattern. It is flexing and stretching and bending like a giant flexible cable. As you look at the fibers of the ACL the strands twirl and make an invincible pattern of power. * Now that you've checked out these ligaments, take another minute to look around you, touching, seeing, smelling, looking at whatever you want to. ** Now you may return to visit inside your knee whenever you desire, but for now it is time to return.*

You are magically back at the bottom of the staircase and will now begin to ascend the steps once again one at a time. 1, 2, as you look down at your feet you notice that your foot is beginning to grow larger as are the steps, 3, 4, 5, 6, 7, 8, 9, 10. You are at the top and you are nearly back to your full size. Sit or lie down again in your mind, take a long deep gentle breath,

*and then exhale out through parted lips and feel the chair or couch beneath you as you realize that you are fully returned to your normal size. * Notice how the chair or couch feels as it supports your back, buttocks, legs, arms, hands, neck, head. * Allow yourself to also notice how relaxed you feel after your journey. * You may begin to reconnect now with your present space, bringing your focus back to your breathing.*

*You might just also notice that while you were thinking about other things, your body has been breathing for you, you have been allowing it to use its wisdom and energy to do what it does so well and so it is when you relax an image that you are simply helping your body to do what it does naturally. Remind yourself that you are becoming healthy and whole, thank your body for its healing work as you begin to reconnect with its sensations. * When you are feeling ready and with soft eyes, you can open your eyes feeling refreshed, alert, and at peace.*

(Processing: 2 minutes)

What was that experience like for you?

What did you notice during the imagery?

(How to Apply this: 2 minutes)

So, let's discuss some of the ways you can use this tool in your recovery…

how do you think you might use it? (researchers will give the athletes a chance to come up with some ideas, but then offer the following):

- During the day when you are feeling overwhelmed or struggling with completing

your rehabilitation exercises

- Before you do your daily rehabilitation exercises
- When you are feeling tense or just physically uncomfortable and you want to relax

HW INSTRUCTIONS:

· Listen to Imagery session at least THREE times per week for the next two weeks *(suggest setting an alarm in their phones)*

· Place their goal sheet where they will see it every day as a reminder of what they are working toward. Work toward their goals over the next week

· Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their imagery exercise this week?

**Inform them that this will be your LAST in person meeting. The rest of your communication will be through text message primarily and email for sending the new recordings. You will continue sending reminder text messages to the patient and parent.

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes); at this time you will process practicing the imagery over the past 3 weeks, make sure they received the next imagery exercise, and help them write their next set of goals.

IMAGERY – SESSION 5

Session 5 Overview

Online Materials:

- Email
- Introduction to exercise
- Audio: Imagery exercise
- Goal setting sheet - link

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their 5th session (10 to 15 minute phone call); to have their 5th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – 1-2 days before phone call

Hi_____,

Attached is the exercise we will review during our phone call on _____.

This week's imagery focuses again on the healing, more specifically the tissue around your knee. It provides you with an exercise you can use to help you relax and to feel confident about how your body is healing itself effectively. You can also use this exercise when you're feeling soreness, fatigue or having any doubts about your knee healing.

Before we talk, I appreciate you completing this 15 minute survey on your phone or a computer.

https://unt.az1.qualtrics.com/SE/?SID=SV_9FZF5SyZUL1sOUJ

(Your Identification code is: AT0##)

I look forward to talking with you soon!

Best,_____

5th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 5th session goals (5 minutes)

o If they do not have the 5th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o Make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's imagery focuses again on the healing, more specifically the tissue around your knee. It provides you with an exercise you can use to help you relax and to feel confident about how your body is healing itself effectively. You can also use this exercise when you're feeling soreness, fatigue or having any doubts about your knee healing.

How do you think you might use this exercise? (2 minutes)

- Help you feel more confident in your knee healing properly
- During the day when you are feeling overwhelmed or struggling with completing your rehabilitation exercises
- Before you do your daily rehabilitation exercises
- When you are feeling tense or just physically uncomfortable and you want to relax

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Listen to the imagery exercise at least three times per week.
- Work toward their goals over the next 3 week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Remind them that we will continue checking in every Sunday and sending one weekly reminder to work toward their goals each week

**Make sure they have the email; text them the link with the NEW recording

** Make sure they have COMPLETED the Week 7 survey

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 5 – recording will be emailed and texted

*Beginning now with your eyes closed, you can begin to relax. Focus again on your breathing, notice the slow steady calming rhythm of your diaphragm, your lungs, your heart, your whole body. * With your eyes closed, it becomes easier and easier to become aware of things that you would have otherwise not noticed. And as you are inhaling that healing energy and exhaling any unwanted thoughts, feelings, or sensations, you can just send that breath out to every part of your body as warm energy that relaxes every muscle and fiber. * And as you relax even deeper with each breath in and each breath out you notice how comfortable and supported your body is starting to feel, as you follow my voice, letting that breathing process go automatically. You can feel all the muscles in your face, head, and neck relax, as you feel that wave of relaxation wash over you and flow down your body.***

And now you can focus your attention again on your healing knee. Remember how the inside of your knee looked and felt. Allow yourself to concentrate completely now on your knee as you feel a new energy inside it, feel the tender sore parts healing, moving, stretching, feel the warm blood circulating around the healing parts building new tissue that is strong and supple. Feel the warmth and energy caressing your knee in and out, around and around until it is well and totally healthy. As you are relaxed and safe, begin to visualize, to picture yourself returning to and

surpassing your previous strength. Indulge yourself now with a mental picture of what you look and feel like completely recovered. What are you doing? What are you wearing? Where are you? Who is with you?

Any time you begin to have doubts about your recovery or you feel soreness or fatigue, remember this image of pain free power of a place of complete healing and control. No matter what activity you choose, you need not be concerned in the future, for your knee is completely functional and limited in power only by how hard you work to make it stronger, both mentally and physically. With your new ligament, you are stronger, more powerful and have more endurance than perhaps even before you were injured. All the soft tissue in and around your knee joint is healing well, turning to a soft pink or white color. The soreness that you have felt in the past is melting away, literally as each day passes. Feel how strong and tight your new ligament is. Just like the small incisions on the outside of your knee are healing, so the graft, your ligament, the entire joint is healing on the inside.

*This healing is taking place like a beautiful pink rose bud, tight, compact and strong, with its petals all wound around in with its leaves tucked in tightly. Now beginning to open to heal from the inside, revealing itself and all its beauty. * Allow yourself to think about what it feels like when you ride a bike and do your exercises, place yourself mentally on a bike right now. As you picture yourself peddling, you feel the quadricep muscle getting stronger with the rotations, stronger and tighter when you do lifts and presses. If you find yourself actually doing grid exercises or shuffling back and forth or perhaps doing movements like figure eights, quick*

starting and stopping, take the time when you do this to feel how good it feels to the ligament, to bend and to stretch forward and backward and from side to side as you go through these motions.

*Think about your unaffected leg now, notice how the healing leg and knee is beginning to feel a lot more like that unaffected leg and knee. As you are riding a bike, close your eyes, see the inside of your knee going in a circular motion aligning and strengthening all components of your knee. Your stretchy strong cable of an ACL is pumping and this motion is bringing lots of oxygen and rich red blood cells to the entire area. * If perhaps you elevate your leg to ice after exercise or activity, look consciously at your unaffected knee and then actively visualize your healing knee returning to its proper size, looking just like your healing leg and knee, with quads hard and bulging, with the kneecap high, defined and free of all swelling. **

*You are in control of how well you are healing, your most important job right now is to allow the healing energy that you are seeing and feeling in your body do its best job as you exercise. Every time you relax an image you are maximizing your body's natural ability to heal. * Now might be a very good time to thank your body again for the healing, vitalizing energy that is there. Knowing that your body is working for you, restoring you to good health and endurance. When you are completely healed you will be stronger and in better shape than you ever were before. * Say to yourself every day, my knee is strong, powerful and flexible, my knee feels better every single day, it is becoming stronger and more flexible every day, I am strong, pain free and powerful.*

** And now bringing your attention back to your breathing you will once again notice how easily your chest rises and falls with each breath in a steady, easy motion. Your body has been breathing for you while you've been busy with other things. You might just thank your body for this inner wisdom that beats your heart and breathes your lungs without your even thinking about it. * And as you come back into the room, you can notice the sound of my voice as you feel your body against the surface of whatever you are sitting or lying on. Notice the sounds inside and outside the room. And when you are ready you may open your eyes, feeling excited and confident.*

IMAGERY – SESSION 6

<u>Text Participant the week of their appointment (at least 2 days ahead):</u>

- Remind them of the time and day you had scheduled their 6th session (10 to 15 minute phone call); to have their goal sheet ready at this time.
- Adjust time and day of phone call if needed

<u>EMAIL – Day of phone call</u>

Hi_____,

Attached is the exercise we will review during our phone call today.

This week's exercise focuses again on healing, more specifically recognizing the strength and flexibility of your new ACL. It is another exercise you can use to help relax and to build your confidence in your knee's flexibility and functioning.

Please practice this exercise at least 3 times per week. Also please remember to post the goals we will write today up in a place where you will frequently see it. Feel free to adjust your goals as you see fit over the next 3 weeks.

I will continue checking in on how often you're practicing this exercise every Sunday.

Best,

_____

<u>6th session Phone Call:</u>

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 6th session goals (5 minutes)

o If they do not have the 6th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o Make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's exercise focuses again on healing, more specifically recognizing the strength and flexibility of your new ACL. It is another exercise you can use to help relax and to build your confidence in your knees flexibility and functioning.

How do you think you might use this exercise? (2 minutes)

- It can continue to help you release stress or tension in your body
- It can help you be aware of similarities before your healing and injured knee which can continue to build your confidence in your healing knee regaining flexibility and strength

<u>HW INSTRUCTIONS: (2 minutes)</u>

- Listen to the imagery exercise at least three times per week.
- Work toward their goals over the next 3 week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?
- NEXT WEEK – complete the 20 minute survey you will email them

**Remind them that we will continue checking in every Sunday and sending one weekly reminder to work toward their goals each week

**Make sure they have the email; text them the link with the NEW recording

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 6

*With your eyes closed and focusing on your breathing, begin by shifting your weight so your body is supported and comfortable. Let your hands rest comfortably somewhere on your abdomen or legs. And now feel the rise of your body when you breathe in, and then feel how it flattens or settles back down as you breathe out. * As you breathe in, and out again allow the breath out to send warm energy to any part of your body that is tense, or sore, or tight, allowing yourself to gently move to a proper level of tightness for you. You can feel that breath going to all the tight places, warming and loosening, so that you feel again, that effortless calmness and letting go. So that you can allow that part of you that is powerful, wise, energetic, and relaxed to just be in charge as you simply relax. * Perhaps you will allow yourself to again clear your mental screen and prepare yourself for new visions. **

*You can allow your muscles to become even more warm and relaxed. And taking another gentle breath in and exhaling, clear your mind, releasing any left over tension. ** When you are done here you will remember all you need to, but for now clear your mind, prepare your body for complete healing and complete control.*

*Your knee is beginning to feel good, more normal in size yet more sensitive to a lot of external stress or torque you may place on it. This is good because the sensitivity is a good sign that all the nerves and muscles are working just as they should. You still feel some pressure inside the knee perhaps near the kneecap but this is normal and natural. The swelling you experience is protective and nurturing for your knee. As you are relaxed and thinking about your healing allow yourself to focus completely on both knees. Permit yourself to feel how your unaffected knee feels as you sit or lie there quietly. It probably feels smaller and cooler inside then your healing knee. It may feel more supple and strong, however it feels allow yourself to focus on your healing knee comparing it to your unaffected knee. **

*Permit yourself to transfer this healthy strong feeling to your healing knee, allow the nonaffected knee to advise and consult your healing knee telling it that this is how it is to look and to feel and to move. * Take a moment to allow this to happen now, quietly, almost without your even thinking about it. Perhaps letting yourself drift away for just a minute to a beautiful place of your choosing. * You are stronger and healthier every day and in a very short time you will be stronger than you ever were. Your new ligament is incredibly strong and thick, you may or may not find that there is still some resistance when you bend and flex your leg and again this is normal and natural even if you have to coax your leg to stretch that last bit by gently pulling back against your leg when it is bent or pushing gently down when it is out straight in front of you. * In your mind you can see and feel this stretching every time you actually flex and extend your knee, just as it feels good to you to stretch in the morning when you wake. **

*It feels so good to your entire leg to extend and flex. The more your ligament stretches the more easily you will move through your range of motion now that it is firmly entwined in your bones anchored and an integral part of your body, in fact if you extend and flex your knee when exhale you can relax physically and mentally right into that stretch, becoming even more flexible perhaps than you ever were before. * For the next few minutes, I would like you to indulge yourself with a picture of yourself as you look at home doing what you do there, at work, at school, inside the house, outside, outdoors, everywhere. You are moving and working and playing completely healed and performing at your peak. As you see and feel this in your mind take particular notice of your surroundings. ** What are you doing? What are you wearing at this time? How do you look? What expression is on your face? How does your body feel? Who is with you? You are happy, lively, content. You are in complete control and you are deciding what you can and cannot or want or do not want to do.*

** And so for now before you allow yourself to drift up completely to wakefulness it might be useful for you to take this opportunity to think about what you've experienced, perhaps an image or an understanding or thought or feeling and trust that you can use any insights later on, perhaps later today, or any other day in the future. And as you bring your focus back to your breathing, notice how quietly and easily you are breathing automatically without effort, you are quite aware of the feel of your body against whatever you're resting on and very aware of the sound of my voice, any sounds in the room or outside the room. * And now as you come to complete wakefulness, you may open your eyes when you are ready. With a confident anticipation, feeling stronger, peaceful, and centered.*

IMAGERY – SESSION 7

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled your 7th session (10 to 15 minute phone call); to have their 7th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – Day of phone call

Hi_____,

Attached is the exercise we will review during our phone call today.

This week's exercise focuses again on healing, more specifically the inside of your knee joint and visualizing each of the parts of your knee. It is another exercise you can use to help relax and to allow your body to continue healing effectively.

Please practice this exercise at least 3 times per week. Also please remember to post the goals we will write today up in a place where you will frequently see it. Feel free to adjust your goals as you see fit over the next 3 weeks.

I will continue checking in on how often you're practicing this exercise every Sunday.

Best,

_____

7th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 7th session goals (5 minutes)

o If they do not have the 7th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o Make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This week's exercise focuses again on healing, more specifically the inside of your knee joint and visualizing each of the parts of your knee. It is another exercise you can use to help relax and to allow your body to continue healing effectively.

How do you think you might use this exercise? (2 minutes)

- It can also help you learn how to better relax the muscles in your whole body as well as the muscles surrounding and lining your knee which can speed up your physical recovery
- It can help you learn how to release stress or tension in your body
- It can help you be aware of the progress your knee has made, building your confidence in your knee's ability to regain its strength."

HW INSTRUCTIONS: (2 minutes)

- Listen to the imagery exercise at least three times per week.
- Work toward their goals over the next 3 week
- Answer text message on Sunday asking whether they worked toward their goals this week and how often they practiced their assigned exercise this week?

**Remind them that we will continue checking in every Sunday and sending one weekly reminder to work toward their goals each week

**Make sure they have the email; text them the link with the NEW recording

** Set up a time to have a brief phone call with the patient 3 weeks from today (10 minutes)- you will text them a few days before the session to make sure the day and time still works

Session 7

I'd like you to engage the power of your imagination by gently allowing yourself to settle in, relax, and listen to what you're body has to tell you. Gently allowing your eyes to close, begin again by taking in gentle deep breaths. Breathing in that oxygen, peace, and healing. And then releasing and letting go, releasing, letting go with the breath out any tension, worry, concern,

*unwelcome thoughts or emotions. * Take another breath gently, allowing the freshness to fill up your inner space. And then, as you breathe out through parted lips, release the tension, feeling your breath going to all the tight places. * Every breath you breathe takes you deeper into a more relaxed state of mind and you realize you are totally in charge of your experience. And as you begin to relax more and more you find you are feeling very comfortable about this deeper special place, this place in you where you feel totally safe and relaxed. And as you relax you find it very easy to follow this imagery to enjoy your experience all the while feeling yourself move to a deeper level of relaxation and even though your eyes are closed to the outside world your mind's eye is alert, you may even feel a little lighter now in this state of deep relaxation. ** Allow your arms and legs to feel how they're feeling; now I'd like you to inhale very slowly. And then exhale very slowly. You may find that your hands and feet as well as your arms and legs are so relaxed that the warm, relaxed heaviness that you were feeling is now giving way to a wonderful lightness, particularly in your hands and feet.**

*And now perhaps once again, you'd allow yourself to notice how your healing knee feels. * And I'm going to ask you to imagine that once again as in our previous imagery that you are very, very tiny again and this time you want to take another look inside your knee to see how it is doing, but this time you are going to take with you on your journey a very special bucket and paint brush that you will use to paint or coat any muscle or ligament or tendon that feels the least bit sore or tender with a magically soothing liquid. **

*Your magical liquid can be of any color or consistency you think is best, it may be thick or thin, clear or colored, transparent or opaque, shiny, shimmery, sparkly, or plain. And of course you always have enough to do the job that is needed. * You may choose to go down the steps one at a time as before or perhaps you will just find yourself there inside the knee joint, ready to go to work. And of course just as before, you may return at any time you are completely safe. Take a few seconds now to go to this place inside your joint. First, shrinking to that tiny size in the palm of my hand by using the power of your breath and your imagination. ***

*You are now looking inside your knee joint, searching out any sore or tender places. But first notice how everything looks, what color are the tender or swollen spots? What is the temperature? Are these spots warm or cold? What do they feel like if you reach out to touch them? Whenever you spot one of these tender places and you know where these are, dip your brush into your bucket to coat it with your magical liquid, brush it on a place and it immediately soothes and heals the area upon contact. Take as much time as you desire to brush on this magical healing liquid to as many places as you want to, or to coat an area as many times as it feels good to do this. ***

And of course this is the same kind of thing that your body does on its own when it sends millions of oxygen rich blood cells to cleanse and soothe and help heal your knee but by using your paint brush with your magical liquid you are telling your body right now where it needs to concentrate its energy. And by doing this you are speeding the process along. When you are done with your job to your satisfaction, look around you to make sure you haven't missed any

spots. Take as much time as you need right now to check this out and to recoat or to coat anything you have missed. Look around again and spend as much time as you need to in this spot with your bucket and paintbrush.

*** And so for now, picking up your bucket and paintbrush, allow yourself to return to sitting comfortably in your chair or lying down on your couch or bed. * Of course you've returned to your normal size and you can feel this is so because of how your body feels against the chair. Take just a moment now to complete the process, feeling your head, neck, back, shoulders, buttocks, legs, against the chair and perhaps feeling your feet on the floor. * And so anytime that you are feeling soreness, swelling, tenderness, tightness particularly after you exercise you can go back in with your bucket and paint brush and then feel the soothing coolness that this brings. If you're icing your knee this is also a good time to take this journey, to feel this imagery. Thank your body again for its healing energy and its endurance. Begin now to reconnect with your present space, bringing your focus back to your breathing.*

You will notice again that while you have been busy with your task as always your body has breathed for you, knowing exactly what to do even though you were focusing on something else. You can begin to notice the sounds of the room, the smells, the feeling of your body against whatever you are resting. And when you are ready, you may open your eyes. You will feel refreshed, alert, in control and at peace.

IMAGERY – SESSION 8

Text Participant the week of their appointment (at least 2 days ahead):

- Remind them of the time and day you had scheduled their 8th session (10 to 15 minute phone call); to have their 8th session goal sheet ready at this time.
- Adjust time and day of phone call if needed

EMAIL – Day of phone call

Hi_____,

Attached is the exercise we will review during our phone call today.

We encourage you to continue practicing this exercise three times per week over the next two months. This imagery exercise focuses on your knee healing and increasing your confidence in returning to sport. This skill has likely helped you heal physically faster and to motivate you to complete your rehabilitation exercises which will continue to help you during the remainder of your recovery.

We will continue to check in every couple of weeks by text message and then contact you by phone at 6 months to hear about your progress!

Best,

_____

8th session Phone Call:

Introduction (2 minutes)

- How are you doing today?
- How was working toward your goals over the past three weeks?

Write 8th session goals (5 minutes)

o If they do not have the 8th session goal sheet ready then have them grab a spare piece of paper and write down their goals as they speak with you

o Make sure to take notes on their goals so you can remind them

Introduce their next Exercise (2 minute)

This imagery exercise focuses on your knee healing and increasing your confidence in returning to sport. This skill has likely helped you heal physically faster and to motivate you to complete your rehabilitation exercises which will continue to help you during the remainder of your recovery.

How do you think you might use this exercise? (2 minutes)

- It can help you feel motivated to continue doing your physical rehabilitation exercises
- When you are feeling tense or just physically uncomfortable and you want to relax
- It can help you feel confident about returning to sport once you're physically healed and help you manage frustrations about not being ready to return to sport yet.

HW INSTRUCTIONS: (2 minutes)

- Recommend listening to this exercise at least three times per week over the next 2 months.
- Continue working toward their goals over the next 2 months and adjusting their goals as needed
- We will contact you in 6 months to hear about your progress!

**Make sure they have the email; text them the link with the NEW recording

Session 8

*As you settle in, adjusting the weight of your body to fit what you're resting on comfortably there is nothing you need to do right now, no problem to solve, nothing to accomplish for the next few minutes. For everything is taken care of. Now you can allow your eyelids to gently close and begin to breathe in and out softly and easily. Briefly focus your attention again on your breathing and now at the same time on the rhythm of your heart * notice this deep, strong, gentle beating as you bring into your body and mind that fresh clear breath of oxygen. Feel how relaxing it is to release or let go of any staleness, fatigue, worry, or discomfort. With each breath in and then out allow yourself to begin to go down, down, down to that beautiful place of relaxation and peace. Notice again how each breath moves you ever so gently to that deeper place of comfort and peace and that now you can do this as slowly or quickly as you like. In this*

*place of deep comfort and letting go, you will be most in tune with the inner wisdom of your body.**

*In this relaxed place allow your mind to drift ahead to one year from now, a year may seem like a long time or it may be hard to see yourself without pain or limitations that you may be experiencing now but allow yourself to drift ahead about a year which is approximately a year and a half after your surgery. Using the power of your imagination go a little farther with this mental picture and allow yourself to see what you may be doing. Are you inside the house or in the outdoors? Are you performing your sport? See whatever activity you would like taking care again to notice what clothes you are wearing, what kind of day it is, and who is there with you, and how you look and feel. **

Allow yourself to feel how freely and easily and pain free you are moving as you see yourself completely healed. When you get up in the morning there is no stiffness or soreness, you're up and getting ready for the activities of the day before you even realize how good your knee feels. You didn't really notice it because it is functioning exactly as it is supposed to, working as one unit with your body without discomfort or restriction.

As you mentally return back to the place where you sit or lie down I wonder what your unaffected knee can tell your healing knee. As you may have experienced before they can talk to each other in this relaxed state. Not talking in the out loud sense but in a quiet, wise sense, the way that parts of the body relate to each other through the brain. Now that you are farther in

your recovery, what advice does the unaffected knee have for you or for your healing knee? It may be the same advice or it may be different. Being confident that you need not be consciously aware of any transfer of information between the two. Give up your conscious thinking, your awake control, for just a few moments.

*Step back, allow the wisdom of your unaffected knee to guide your healing knee. ** Since you are already peaceful and relaxed, now is a good time to once again thank your body for its healing, vitalizing energy. Your body is restoring you to good health, full of endurance, it is responsive to its own needs. Yes, it is responsive to its own needs and you can help it to do what it does so well when you help it by using your mind with relaxation and imagery. Remember you are seeing yourself a year from now, a year and a half or so after your ligament was replaced. There is much for your brain and other parts of your body to accomplish that requires time, things like tiny nerve endings reconnecting, your healing knee relearning its position, your new or relocated ligament feeling comfortable and accepted. Learning to be a strong team member with the rest of your knee. Strength, flexibility, confidence, and general healing are all yours with time and practice. Even if you are discouraged or feeling confined, this image of strength and endurance is extremely powerful and you will want to concentrate on this image as often as possible. Your body will believe and act on what you tell it. **

You have been exercising regularly so your muscles are tight and strong, you can go all day on your knee, walking, running, swimming, skiing, playing, hiking, shopping, or whatever physical activity you choose to do. You are confident in the strength of your knee because you know the

*ligament is solidly integrated with your bones. Your body has done an outstanding job of accepting it and welcoming it. And if you were to go inside your knee again, you would not be able to find the places where the ligament was attached because tissue and bone have become one and the same. **

*Take a look mentally at this union of tissue and bone, this incredibly strong bond right now. See how the thick, invincible, shiny cable of your ligament arches perfectly through your knee and then blends and melds into the gray of the bone. * In your mind see your ligament as a giant cable again, your fascinated as you see it bending and moving with ease. And as you watch it more closely you can just barely see each of the fibers that make up this wonderful part of your body winding their way into the microscopic openings in the bone where it attaches. Each of these fibers is so firmly entrenched in the bone that they are virtually fused with the bone. The further you go in your recovery, the stronger each of these fibers become locked with the femur and tibia and cannot let go. The point where tissue and bone join is indistinguishable. **

*This means that everything you used to do and even more is possible, whatever activity it was that you were doing when your original ligament was damaged cannot tear that ligament from the bone now for your new ligament sometimes two ligaments wound closely together is at least twice as strong and resilient as your original ligament. This means that very soon from now you can perform whatever motion or activity or exercise you desire without any fear or concern that you will ever hurt the ligament again. * You always want to keep those muscles strong around your knee so that you can be as active as you want but your new ligament is now*

*freeing you to return to the things you want and need to do without worrying about its stability or strength. * Say to yourself again, my knee is strong, powerful, and flexible. My knee feels better and better every day. I am strong and pain free and powerful.**

*And so feeling yourself back in that chair or lying down with soft eyes you can begin to come back into the room when you're ready. You may take your time to come to a place of alertness and peace and of course you will decide when you are ready to do this. For if you decide to remain in this state of deep relaxation and confidence, a little longer, you will simply delay my instructions just a little longer. * When you are ready you will come to full alertness with the deep knowing that you have done healing work that you are well, healthy, and strong.*

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