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The Effects of Guided Imagery on Fear of Re-Injury in Intercollegiate Athletes Who Underwent Anterior Cruciate Ligament Reconstruction Surgery

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The fear of re-injury, also known as kinesiophobia, commonly prevents athletes from returning to sport following injury (Ahern & Lohr, 1997). Guided imagery is a psychological intervention that can be used to potentially aid athletes in overcoming kinesiophobia (Green, 1993). There is limited research on how guided imagery can be beneficial during an athlete's rehabilitation process. This study intends to explore the effects of guided imagery on the fear of re-injury in intercollegiate athletes who underwent anterior cruciate ligament reconstruction surgery. We hypothesize that athletes who receive guided imagery intervention along with their physical therapy will have lower scores on the Tampa Scale for Kinesiophobia compared to athletes who do not receive any psychological intervention.

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Injuries are an unfortunate side effect of recreational and competitive sports. On average, about seven million sport related injuries occur a year (Conn, Annett, & Gilchrist, 2003). The severity of an injury can range from a minor bruise to a career ending injury. A type of injury that can prematurely end a career is a tear of the anterior cruciate ligament, commonly referred to as the ACL (Kvist, Ek, Sporrstedt, & Good, 2005). The anterior cruciate ligament is found inside the knee and is pulled tight to prevent hyperextension when the knee is extended (McKinley, Dean O'Loughlin, & Stouter Bidle, 2013).

Sports that involve movements such as twisting, pivoting and cutting often result in anterior cruciate ligament ruptures (Fadale & Hulstyn, 1997). Surgery is

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often used to repair the torn ligament and return the individual to prior injury level. The goal of ACL reconstruction is to reattach the torn ligament using graft tissue in order to reinstate normal knee joint function and stability (Fadale & Hulstyn, 1997). However, the healing process does not end after the surgery is complete; patients must engage in 6-12 months of intense rehabilitation with a thorough regimen (Arden, Taylor, Feller, & Webster, 2012; Myklebust & Bahr, 2006). For example, during the first three weeks after surgery, the patient must wear a knee brace at all times and full weight bearing activities are not permitted (Arden, Taylor, Feller, & Webster, 2012). At around twelve weeks post-surgery, the patient should be able to engage in full weight bearing activity. Although there is a significant improvement in knee function following surgery, 47% of patients do not return to pre-injury level of activity (Lee, Abdul Karim, & Chong Chang, 2008).

There may be a key psychological component when returning to sport following serious injury (Bianco, Malo, & Orlick, 1998; Morrey, Stuart, Smith, & Wiese-Bjornstal, 1999). The psychological state of an athlete returning to sport is often overlooked. The athlete may be

physically healed, but psychologically may not be ready to return to pre-injury level of sport (Podlog & Eklund, 2004; Podlog & Eklund, 2005; Morrey et al., 1999). Brewer, Linder, and Phelps (1995) suggest that situational and personal factors may help explain why some athletes are not psychologically ready to return to pre-injury level activities. Some of these factors include personal control over recovery, current injury status, and pain level. These findings emphasize how difficult it is to pinpoint one factor that will affect an athlete's psychological response to injury; in fact, athletes often experience a combination of factors. Along with situational factors, past research suggests that negative mood is associated with lower levels in athletes' confidence when returning to sport (Tripp, Ebel-Lam, Stanish, & Brewer, 2007).

Additionally, one factor that has consistently predicted why athletes do not return to pre-injury level after ACL reconstruction and rehabilitation is fear of re-injury (Ahern & Lohr, 1997; Arden, Taylor, Feller, & Webster, 2012; Bianco et al., 2013; Flanigan, Everhart, Pedroza, Smith, & Kaeding, 2013; Kvist et al., 2005; Leddy, Lambert, & Ogles, 1994; Lee et al., 2008; Podlog & Eklund, 2004; Podlog & Eklund, 2006; Tripp et al., 2007; Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1994). Kori, Miller, and Todd (1990) coined the term kinesiophobia, defined as "an irrational and debilitating fear of physical movement resulting from a feeling of vulnerability to painful injury and re-injury" (p.37). Flanigan et al. (2013) interviewed athletes who underwent ACL reconstruction surgery to identify reasons as to why they did not return to sport. Results indicated that 38 out of 73 participants did not return to pre-injury activity following surgery due to kinesiophobia. For example, Earvin "Magic" Johnson once said, "I had lost a lot of confidence during the long layoff. And for a long time after I returned, I still held back. All I could think about was protecting my knee from another injury" (Podlog & Eklund, 2004).

The fear re-injury often yields feelings of anxiety, nervousness and depression (Podlog & Eklund, 2006). Hesitation in sport, holding back, giving less than maximal effort, being wary of injury-provoking situations, and strapping the previously injured body part when participating in sport, are common signs of athletes experiencing re-injury fears (Johnston & Carroll, 1998). Arden et al. (2012) suggested that gender, amount of time lapsed from time of injury to surgery, and the level of competition the athlete returned to were factors associated with the fear of re-injury after ACL reconstruction. For instance, past research suggests athletes who wait at least

three months to have surgery after an injury have an increased likelihood of fear of re-injury (Fithian, Paxton, Stone et al., 2005). This increased fear is due to the athlete attempting to use the injured knee, therefore encountering greater instability. As for gender differences, although there is a lack of psychological evidence, past research suggests that males often return to sport considerably earlier than females (Arden, Webster, Taylor, & Feller, 2011).

Several researchers have found similar findings in their studies concerning athletes who report feelings of kinesiophobia. Studies that have surveyed injured athletes suggest that those who exhibit lower levels of participation after surgery are actually more likely to experience concerns of re-injury (Tripp et al., 2007; Flanigan et al., 2013). A common measure used in these studies is the Tampa Scale for Kinesiophobia (TSK), which measures concerns associated with the fear of re-injury. Similarly, athletes who returned to their pre-injury level of activity reported lower fear of re-injury than athletes who did not return to their pre-injury activity level (Kvist et al., 2005; Arden et al., 2012).

Additionally, there are many ways in which an athlete can overcome their fears of re-injury. Podlog and Eklund (2006) found that social support from teammates, coaches, family and friends was beneficial to the athletes in overcoming kinesiophobia. Many researchers have suggested by many researchers that psychological interventions can also help (Flanigan et al., 2013; Bianco et al., 2013; Eldridge, 1983; Tripp et al., 2007; Lee et al., 2008). Some forms of psychological treatments that have been used with athletes include stress inoculation training, guided imagery, relaxation, goal setting, systematic desensitization, and biofeedback (Durso-Cupal, 1998).

A form of psychological intervention that has been effective in decreasing anxiety, tension, and pain, while encouraging healing is guided imagery (Green, 1993). Guided imagery is defined as cognitive intervention used to manage pain and ease anxiety levels by creating mental images through imagination (Mobily, Herr, & Kelley, 1993; McCaffrey & Beebe, 1989; Tusek, Church, & Fazio, 1997). This type of psychological intervention is not complicated to learn and does not require a great deal of training (Kwekkeboom, Harris-Moore, & Ward, 1998). A common guided imagery session consists of exercises such as relaxation, focusing on the debilitating situation, while implementing the proper situational treatment.

In fact, imagery has been found useful in assisting patients dealing with a wide variety of medical issues including burns (Patterson & Ptacek, 1997), cancer (Lioffi

& Hatira, 1999), fibromyalgia (Haanen et al.), headaches (Zittman, van Dyck, Spinhoven, Linssen, & Corrie, 1992), and other types of chronic pain and surgery (Lambert, 1996). Tusek, Church, and Fazio (1997) investigated the effects of guided imagery on preoperative patients undergoing elective colorectal surgery. One hundred and thirty participants were randomly assigned to either the group receiving guided imagery prior to surgery or the control group. Results indicated that patients who received guided imagery had lower levels of anxiety, both preoperative and postoperative. Results also indicated that patients who experienced guided imagery prior to surgery required 50% less narcotic medications than those in the control group.

Often, guided imagery is among the most commonly practiced psychological interventions used in the rehabilitation of sports injuries (Green, 1993). Hare, Evans, and Callow (2008) describe a case study where imagery was utilized. Their findings suggest that imagery was useful to the athlete throughout all phases of rehabilitation. Different types of imagery can be used depending on what the athlete's goals and expectations are. Cupal and Brewer (2001) conducted a study to explore the effects of guided imagery on patients who underwent ACL reconstruction surgery. Thirty participants were randomly assigned to one of three groups: the experimental group receiving ten sessions of guided imagery and relaxation; the placebo group receiving encouragement and attention; or the control group receiving no intervention. Results indicated that participants who received guided imagery had significantly greater knee strength and lower levels of kinesiophobia compared to the placebo and control group.

Furthermore, past research has failed to investigate the effects of guided imagery on intercollegiate athletes alone. Many studies also failed to use a baseline score to compare the progress of an athlete's psychological state, and a large sample size was not used. Our study intends to explore the effects of guided imagery on the fear of re-injury in intercollegiate athletes who underwent ACL reconstruction surgery. We hypothesize that athletes who receive this psychological intervention will present lower scores on the TSK scale compared to athletes not receiving the intervention.

PROPOSED METHOD

Participants

One thousand intercollegiate athletes with first time ACL injuries, post-surgery, from hospitals in the New York City area will be asked to participate in this study via convenience sampling. Informed consent will be given prior to participation. Demographic variables of age, class year, biological sex, and injury information will be collected.

Procedure

The estimated length of time for this experiment is six months. Once consent is received, participants will participate in a one-way between subjects experimental design. Participants will then be randomly assigned to one of the two conditions: physical therapy or physical therapy plus 15 additional minutes of guided imagery with a sports psychologist. Once assigned to his or her condition, participants will be given the TSK scale as a baseline measure in order to evaluate their initial fear of re-injury (see Appendi). The TSK is a likert scale, a higher score, indicates a greater fear of re-injury (Vlaeyen et al., 1995). After collecting baseline data, participants will begin their rehabilitation protocol ordered by their orthopedic surgeon. Participants in the "physical therapy condition" will conduct their rehab at an assigned physical therapy facility. Participants in the "physical therapy with additional 15 minutes of guided imagery condition" will conduct their rehab at a separate facility. Themes that will be touched upon during guided imagery sessions include establishing goals, breath-assisted relaxation, acceptance and improvement of limited mobility, and reestablishing confidence levels in athletic performance.

At two, four, and six months post-surgery, participants will be re-administered the TSK scale to evaluate their progress in terms of kinesiophobia. After six months of rehab in their assigned condition and collection of the final TSK scale measure, participants will receive a debriefing form. Upon completion of this study, data will be analyzed using a mixed model ANOVA, which is used to test for differences between two or more independent groups that are participating in a repeated measure. The test will compare TSK scores of the between-subjects variable, which is the therapeutic condition and the within-subjects variable, which is the time since injury.

CONCLUDING REMARKS

Limitations

In this experiment, one possible limitation is the lack of attendance at physical therapy sessions. Although it is protocol to attend a certain amount of physical therapy sessions per week, patients will often miss appointments for various reasons. If patients miss a significant amount of appointments, it may alter the findings of the study. Furthermore, due to the self-report nature of the experiment, patients could potentially report false or socially desirable answers on the TSK scale. Future studies would need to implement a way to measure kinesiophobia without having to use self-report in order to receive more accurate data.

Significance

The results of this study will contribute to the field of psychology and sports medicine. Past research lacks data on how guided imagery can help in the rehabilitation process of athletes. Specifically, there has not been adequate research conducted on guided imagery and its effects on the fear of re-injury in intercollegiate athletes. The goal of our study is to determine what kind of effect guided imagery has on the fear of re-injury in intercollegiate athletes. An experimental design is an effective method that will allow us to examine how kinesiophobia levels are different among athletes who receive guided imagery during rehabilitation compared to athletes who do not receive guided imagery. If it is determined that guided imagery decreases the fear of re-injury in athletes, medical teams can incorporate this psychological intervention into future physical rehabilitation programs of all injuries.

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APPENDIX

Tampa Scale for Kinesiophobia

Circle the choice that defines you best.

1. I'm afraid that I might injure myself if I exercise
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
2. If I were to try to overcome it, my pain would increase
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
3. My body is telling me I have something dangerously wrong
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
4. My pain would probably be relieved if I were to exercise
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
5. People aren't taking my medical condition seriously enough
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
6. My accident has put my body at risk for the rest of my life
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
7. Pain always means I have injured my body
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
8. Just because something aggravates my pain does not mean it is dangerous
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
9. I am afraid that I might injure myself accidentally
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
10. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
11. I wouldn't have this much pain if there weren't something potentially dangerous going on in my body.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
12. Although my condition is painful, I would be better off I were physically active.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
13. Pain lets me know when to stop exercising so that I don't injure myself.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
14. It's really not safe for a person with a condition like mine to be physically active.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
15. I can't do all the things normal people do because it's too easy for me to get injured.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
16. Even though something is causing me a lot of pain, I don't think it's actually dangerous.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
17. No one should have exercise when he/she is in pain.
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree