

[Barry University](#)  
[Institutional Repository](#)

[Theses and Dissertations](#)

2018

Using Mindfulness Meditation Training to enhance Readiness to  
Return to Sport in Injured Athletes

Carlynn Marie Musser

*BARRY UNIVERSITY*

*COLLEGE OF NURSING AND HEALTH SCIENCES*

*Using Mindfulness Meditation Training to enhance Readiness to Return to Sport in Injured Athletes*

*BY*

*Carlynn Marie Musser*

A Thesis submitted to the

College of Nursing and Health Sciences

In partial fulfillment of the requirements for the Degree of Master of Science in

Movement Science & Human Performance

with a specialization, in

Sport, Exercise, and Performance Psychology

Miami Shores, Florida

2018

*BARRY UNIVERSITY*

*MIAMI SHORES, FLORIDA*

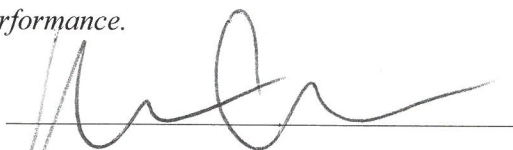
Date:

BARRY UNIVERSITY  
MIAMI SHORES, FLORIDA

To the Dean of the College of Nursing and Health Sciences:

*I am submitting herewith a thesis written by Carlynn Musser entitled "Using Mindfulness Meditation Training to enhance Readiness to Return to Sport in Injured Athletes." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science with a major in Movement Science and Human Performance.*

*Performance.*

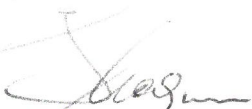


---

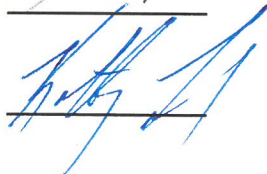
*Dr. Kimberly Cologgi, Thesis Committee Chair*

*We, members of the thesis committee,*

*have examined this thesis and recommend its acceptance:*



---



---

---



---

*Chair, Department of Sport and Exercise Sciences*

*Accepted:*



---

*Dean, College of Nursing and Health Sciences*

## ABSTRACT

The purpose of the following study was to assess the effectiveness of the Mindfulness Meditation Training for Sport (MMTS 2.0) intervention on the psychological readiness to return to sport following an athletic injury. This study was a case study, which only involved one participant. Psychological readiness to return to sport was measured using the Injury Psychological Readiness to Return to Sport scale (I-PRRS). The scale was administered prior to the intervention, mid intervention, and following the six week intervention. Following the six week intervention, a qualitative interview was conducted to gain insight on the experience, in which several themes emerged from the interview. The participants' psychological readiness to return to sport score increased from pre-intervention to post-intervention. Results from this particular study reveal that mindfulness meditation training for sport can assist in increasing psychological readiness to return to sport following injury. Finally, there were four themes that emerged from the qualitative interview including: *Learning, Identity, Present Moment, and Adapting*. This study helps to provide insight for coaches, athletes, and sport medicine teams to be aware of athletes' psychological readiness following injury. The overall findings from this study suggest that mindfulness meditation training may assist in increasing psychological readiness to return to sport following injury.

## ACKNOWLEDGEMENTS

I would like to give a huge and special thanks to my committee advisor, Dr. Cologgi. I cannot thank you enough for being so supportive of me since day one. You have a special gift with impacting students, and inspiring them to pursue their dreams. Thank you for the countless hours spent editing, making suggestions, and comments. I am forever grateful to have been able to learn from such a knowledgeable, dedicated, and motivated person and educator as yourself. Also, I would like to thank my committee members, Dr. Casani and Dr. Ludwig, for your time, dedication and commitment to this project. I know that you all have so many other things happening in your life outside of the classroom, so thank you all for deciding to be on my committee. I appreciate all of you individually, and as a whole for your time, patience, and impact.

From the moment I decided to commit to this, I have been so honored and blessed for the social support I have received from my family miles and miles away, friends, classmates, professors, and coworkers. No matter how intrinsically motivated you are, it is so easy to become burnout through this process, so thank you all for being a shoulder to lean on when I needed it. I am so lucky to have so many amazing people rooting for me in my life, and I hope you all know how much each and every one of you means to me. I cannot thank you all enough!

## TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION.....	8
<i>Statement of the Problem</i> .....	10
<i>Purpose of the Study</i> .....	11
<i>Assumptions</i> .....	11
<i>Limitations</i> .....	11
<i>Operational Definitions</i> .....	12
CHAPTER 2: LITERATURE REVIEW.....	13
<i>Section One:</i>	
<i>Mindfulness</i> .....	13
<i>Theories of Mindfulness</i> .....	13
<i>Mindfulness for Stress Reduction</i> .....	15
<i>Section Two:</i>	
<i>Stress and Injury</i> .....	20
<i>Stress, Injury, and Mindfulness Correlation</i> .....	24
<i>Section 3: Injury</i>	
<i>Injury</i> .....	26
CHAPTER 3: METHODS.....	27
<i>Participants</i> .....	27
<i>Measures</i> .....	27
<i>Interview Guide</i> .....	28
<i>Procedure</i> .....	30
<i>Mindfulness Meditation Training for Sport</i> .....	30
<i>Data Analysis</i> .....	31
CHAPTER 4: REFERENCES.....	33
CHAPTER 5: MANUSCRIPT.....	38

### *List of Tables*

**Table 1:** *Descriptive statistics pre-test, mid-test, and post-test of Injury Psychological Readiness to Return to Sport scale*

**Table 2.** *Themes, Sub-Themes, and Sample Quotes from the participant's experience following the MMTS 2.0 Intervention*

*List of Figures*

**Figure 1. Injury Psychological Readiness to Return to Sport**



## CHAPTER 1

### Introduction

Sport is an eminent social institution throughout the United States, in almost every society (Frey & Eitzen, 1991). Sport is a way in which athletes, as well as spectators come together to achieve a common goal, and feel unified as one. Sport merges together elements found in institutions, with an appeal that is debatably only mirrored by religion (Frey & Eitzen, 1991). It is a way in which individuals and spectators identify with and are tied to something greater than themselves. Sport is something that brings people together and holds a high importance in society.

Today, the participation rates in sports, as well as the attendance of spectators is continually on the rise. In 2005, there were over 484 million people in America, participating in athletics, as well as 277 million individuals who went to professional and college sporting events (Humphreys & Ruseski, 2009). Sport requires a level of primary or secondary participation, which makes it inimitable by other institutions (Frey & Eitzen, 1991). Sport participation has been increasing heavily, since the last collection of data in collegiate athletics in 1981. In the academic year of 2014-2015, it was reported that there were approximately 482,000 student-athletes on over 19,000 teams throughout the United States, as stated by the NCAA Sports Sponsorship and Participation Rates Report (National Collegiate Athletic Association, 2015).

While the growth and rise of athletic participation is occurring, it also continues to open the door for a rise in athletic injury as well. Each year in America, approximately 17 million athletes experience a sport-related injury (Ahern & Lohr, 1997). The amount of injury leaves room for further research as to whether or not injury may be able to be prevented by the use of psychological skills, or mental skills training. Williams and Andersen (1998) proposed the stress-

injury model, which suggests there are three antecedents which are predictors of injury in sport. The model proposes that these antecedents: history of stressors, inadequate coping resources, and personality, all increase the stress response, which in turn, greatly increases the risk of injury. The way in which an athlete cognitively appraises the stress response, can lead to physiological or attentional changes. The end result of the appraisal and physiological/attentional changes causes an athlete to be more susceptible to injury (Williams & Andersen, 1998).

The injury-stress relationship provides a deeper understanding of the psychological factors that are in alliance with injury risk. This correlation also suggests that when conducting such interventions pointed toward injury risk reduction, both physiological and psychological intervention routes can be taken to decrease stress responses that may potentially lead to injury (Williams & Andersen, 1998). For instance, a study with competitive soccer players (N=32) participated in a program based on relaxation and stress management techniques. After the seven-session program, the researchers found the treatment group only had a total of three injuries in a season. The control group, who did not participate in stress management and relaxation techniques, had a total of twenty-one injuries (Johnson, Ekengren, & Andersen, 2005). This study reinforces the notion as to how stress management interventions may help prevent injury.

Another study looking at the effects of stress on athletes, involved a shooting sport. The study involved 96 male elite shooters (John, Verma, & Khanna, 2011). The purpose of this study was to see if mindfulness meditation training could lower competitive stress. The study called for a total of 96 male elite shooters, with a mean age of 29.5 plus or minus 4.3 years and were examined in an experimental control group. This study also looked at the physiological response to stress, using a tracker on the HPA-Axis of the brain. The results of this study showed that

The results of the study showed that compared to the control group, the experimental group displayed a superior result of post-intervention using MMT ( $p < 0.001$ ), and in follow-up ( $p < 0.001$ ) in salivary cortisol and shooting performance (John et al., 2011). The findings for the control group showed a non-significant result ( $p < 0.05$ ), and did not have a reduction of pre competition stress like the experimental group did. The evidence displayed from this study, provides clarity as to how mindfulness, or MMT in this case can be a means for assisting athletes with reducing stress.

### **Statement of the Problem**

As there has been an increase in sport participation each year, this leaves room for more injuries to occur as a result. In the United States, there are approximately a total of seven million sport and recreation-related injuries that occur per year (Stanish, Ebel-Lam, Brewer, & Birchard, 2011). As the number of injured athletes will continue to increase as participation in sport increases, it is important to take into consideration all of these athletes are going to cope with their injury in different ways. There is statistical evidence as to how many athletic injuries there are, and what types of injuries there are, but there is limited research providing insight as to how athletes can cope with these injuries. The way that an athlete appraises a sport injury, can make a huge impact on their return to play.

There is no “one size fits all” approach for injury, or a time frame on an injured athlete’s psychological readiness to return to sport. While several studies support psychological skills training, or mindfulness meditation training used to cope with injury there is still a great lack of research supporting mindfulness for psychological readiness to return to sport (Ivarsson, Johnson, Andersen, Fallby, & Altemyr, 2015). Therefore, the purpose of this study is to show if a

mindfulness meditation intervention, can increase an injured athlete's psychological readiness to return to sport, over a 6 week timeframe.

### **Purpose of the study**

The purpose of this study is to see if the Mindfulness Meditation for Sport 2.0 approach can increase an athlete's psychological readiness to return to sport following an injury. This study will not only benefit coaches, but also sport psychology consultants, athletic trainers, and/or any other members involved of the sport rehabilitation team. Often times when athletes are injured, the physical aspect of returning to play is what stands out, but the psychological aspect of returning to play after suffering from an injury is often overlooked. An athlete may be prepared to return physically, but they may not be mentally stable and/or psychologically ready to return to play even if they are physically adequate to do so. The importance of increasing an athlete's readiness is simply so that they can return to play, while avoiding feelings of loneliness and isolation that come with being an injured athlete. The information learned from this study can provide insight for Sport Psychology Consultants and Athletic Trainers to be a voice when an athlete may not be psychologically ready to return, and such information can help these professionals help protect the athletes in the long run, in taking the proper time to prepare mentally and return in the right state of mind.

### **Assumptions**

It is assumed that all participants will respond truthfully to the self-reported measurements, adhere to the protocol recommendations of the mindfulness meditation training protocol (MMTS 2.0), and respond honestly during the semi-structured interviews.

### **Limitations**

A major limitation of this study is the bias of a self-report measure, as well as a lack of generalizability using a small sample size of participants.

### **Operational Definitions**

**Mindfulness:** Mindfulness is defined as “an open-hearted, moment-to-moment nonjudgmental awareness” (Kabat-Zinn, 2005, p. 24).

**Psychological Readiness:** The degree to which an injured athlete is fully confident to return to playing their sport following an injury (Glazer, 2009).

## CHAPTER 2

### Literature Review

#### **Mindfulness**

Throughout recent decades, the practice of mindfulness has become a topic of great interest (Shonin & Gordon, 2016). The term mindfulness is known as being aware of the present moment, and being nonjudgemental toward all of the thoughts in that present moment (Kabat-Zinn, 2003). Previous research has shown that mindfulness is linked to many benefits, such as reducing depression, anxiety, and stress (Kabat-Zinn, 2003). The roots of mindfulness have started in a clinical setting, and early forms of it were known as mindfulness-based stress reduction, or MBSR. Needless to say, while mindfulness is becoming much more of a well-known phenomenon, it is interesting to see how it was originally brought about, in hopes of becoming a model for other hospital and medical centers (Kabat-Zinn, 2003). Today, MBSR programs are being offered all around the world, from medical to school settings, it is being applied to all different types of fields, including sport and exercise psychology.

#### **Mindfulness Theories**

Mindfulness Based Stress Reduction (MBSR) was originally started up by Jon Kabat-Zinn, in 1979 at the Medical Center at the University of Massachusetts (Kabat-Zinn, 2003). Kabat-Zinn is the creator of the 8-week MBSR program, which was originally created from more of a clinical perspective. MBSR has been shown to decrease stress, anxiety, and depression, as well as increase positive characteristics such as optimism, self-compassion, and emotional intelligence (Kabat-Zinn, 2003). The aim of MBSR is to not only to bring about non-judgement

awareness about daily life, but also to bring awareness of the mind and body awareness to reduce the effects physiologically of stress, pain or illness (Kabat-Zinn, 2003).

Mindfulness-based cognitive therapy, or MBCT was based off of MBSR, but it was created specifically for depressive relapse. In other words, MBCT corresponds to MBSR since they both involve an 8-week intervention, but also includes research that has been validated on cognitive therapy (Teasdale, Segal, & Williams, 1995). These forms of mindfulness are seen more in the clinical setting verses for sport or performance.

Mindfulness-acceptance-based approaches are what have been shown to aid athletes in developing certain skills, including nonjudgement mindfulness awareness, mindful attention, and experiential acceptance to meet their goals (Moore, 2009). Another mindfulness approach that does not have a clinical focus but emphasizes skill building in healthy populations is the MAC (Mindfulness Acceptance Approach). The most widely accepted mindfulness-and acceptance-based approach that has been supported for performance enhancement is the Mindfulness-Acceptance-Commitment (MAC) approach. Since the creation of the MAC approach in 2001, there has been a growth in the amount of knowledge in regard to mindfulness- and acceptance-based interventions. The MAC approach was built off of the idea that there was not a lot of supporting evidence in regard to the application of working with athletes or individuals within sport psychology, on mindfulness meditation. The MAC became an alternative approach in trying to comprehend athletic performance when aiming to help athletes enhance their overall well-being as well as their performance (Gardner & Moore, 2004).

The MAC approach is the complete opposite of what is normally seen in sport psychology with Psychological Skills Training (PST). PST strives to assist in control of internal states, for optimal performance, whereas the goal of the MAC is to be nonjudgemental of

thoughts whether they are good or bad. Mindfulness is concerned with moment-to-moment awareness and acceptance of what one is feeling internally. The MAC approach also requires attentional focus on task-relevant external catalyst, as well as behavioral choices that support an athlete's venture for optimal performance (Moore, 2009). While psychological skills training in sport has looked more at control or reduction of internal processes such as cognitive and emotional activity during sport performance, mindfulness-based approaches differ from psychological skills training. These approaches take on more of "accept all things" approach and suggest letting the mind wander, and being nonjudgemental of all those thoughts (Sappington & Longshore, 2015). The difference between other psychological skills training and mindfulness-based approaches is simply that PST focuses on teaching strategies for reduction or control of what is happening internally to them. It is more of reducing or trying to block out that internal process, where mindfulness is more about accepting those internal thoughts (Moore, 2009).

### **Mindfulness for Stress Reduction**

Findings from certain studies such as, Moore (2009), provide insightful information that while psychological skills training approaches are helpful in modifying certain factors like arousal and anxiety that are related to athletic performance, there have still been no dramatic changes, in *actual* athletic performance that have transpired from psychological skills training (Moore, 2009). This supports the idea that while psychological skills training may have changed lives or enhanced athletic performance in terms of control and modification of certain variables, mindfulness may be the new "trying" phenomenon for actual enhancement of athletic performance. Conclusively, reduction or control of certain techniques may not be the most pertinent for achieving optimal performance. When athletes are trying to achieve this level of optimal performance, inevitable stressful and anxiety provoking circumstance are likely to arise



(Gooding & Gardner, 2009). Mindfulness-based interventions have been found to decrease stress symptoms (Baer, 2003) and increase recovery, which gives it the potential to be a preventative cause for burnout (Furrer, Moen, & Firing, 2015). Furrer and colleagues (2015) conducted a study to investigate if mindfulness training could assist junior elite athletes with stress reduction, performance enhancement, and burnout prevention. The participants, junior athletes in Norway, were asked to volunteer to take part in a 12-week mindfulness training intervention. The study included a total of twenty-nine junior athletes (n=29) from biathlon, cross-country skiing, and shooting. At the completion of the MTP program, six of the athletes, three females and three males, were randomly selected to voluntarily participate in a semi-structured interview to get a closer look at the effects from the MTP on performance (Furrer et al., 2015). The participants were invited to express their views both prior to and during the interview and probes and follow-up questions were used to deepen the responses. The results displayed that the mindfulness intervention had a positive impact on the junior elite athlete's awareness and recovery. Also, more importantly, it showed that there were reductions in athletes' perceived mind stress, which seemed to lead to lower perceived stress levels, less rumination, better sleep and impaired recovery (Furrer et al., 2015). This study went on to explain how mindfulness-meditation training program can be useful in lowering perceived mind stress, but how pertinent it is in knowing athletes' loads when it comes to the amount of training and intervention space that this may take up in their lives, and how important it is to help them find a balance so that they can use it as a skill to help them, not take up too much space and weaken them (Furrer et al., 2015). This study helps support evidence for the mindfulness and stress relationship, and how mindfulness- meditation training programs can be effective in reducing stress for athletes.

Another study examining stress, was conducted to see how stress affects athletes. In this case, the study looked at athletes in shooting sports, as shooting requires a high level of attentional focus, as well as an exceptional physical and psychological state (John, Verma, & Khanna, 2011.) The study aimed to see if mindfulness meditation training, or MMT, would lower levels of a certain physiological marker in the brain in relation to pre-competitive stress. Researchers used a valid physiological marker of HPA-axis response and looked to see if the MMT program played a role in reducing pre-competition stress, as well as looked at the effects it had on shooting performance (John et al., 2011). The study called for a total of 96 male elite shooters, with a mean age of 29.5 plus or minus 4.3 years and were examined in an experimental control group. There were two groups, with a split of 48 participants in each group. The study lasted for a total of five weeks, where four weeks were spent for the experiment, and one week was for follow-up procedures. Data was then recorded from pre, post, and follow up data of the phenotypic markers, specifically hypothalamic pituitary axis activity. Salivary cortisol, as well as shooting performance were then analyzed. Cortisol samples were taken from the participants, as cortisol is a hormonal response to acute stress (Salvador, Suay, Gonzalez-Bone, & Serrano, 2003).

The results of the study showed that compared to the control group, the experimental group displayed a superior result of post-intervention using MMT ( $p < 0.001$ ), and in follow-up ( $p < 0.001$ ) in salivary cortisol and shooting performance (John et al., 2011). The findings for the control group showed a non-significant result ( $p < 0.05$ ), and did not have a reduction of pre competition stress like the experimental group did. The evidence displayed from this study, provides clarity as to how mindfulness, or MMT in this case can be a means for assisting athletes with reducing stress. The physiological component of this study, which used markers on the

HPA axis in the brain, has shed insight as to what goes on physiologically in the body during pre-competitive stress. This unique type of research provides knowledge that can help athletes and coaches understand the benefits of stress reduction techniques for performance enhancement. In essence, this study helped to provide support as to how mindfulness can help reduce stress in sport and enhance performance; more specifically in this case performance (John et al., 2011). As research has supported that mindfulness has been used to reduce stress in sport, mindfulness could be used to reduce injury, as stress is one of the antecedents to injury (Williams & Andersen, 1998). Further examinations of how to use mindfulness in a different phase of injury, the recovery. Mindfulness has not yet been used during injury recovery, which leads to the purpose of this study.

### **PST used in Rehab**

Several researchers conducted a study with a total of 1283 athletes from the United States, United Kingdom, and Finland (Arvinen-Barrow, Clement, Hamson-Utley, Zakrajsek, Sae-Mi, Kamphoff, Martin, (2015). Specifically, college athletes from a total of five universities from the United States were selected, as well as collegiate, professional, and recreational club athletes were selected for this study. The main purpose of this study was to look at the different psychological, or mental skills that were used during the rehabilitation process for injury athletes.

The top three psychological skills reported that were used during rehabilitation included goal setting, positive self-talk/positive thoughts, and imagery (Arvinen-Barrow et al., 2015). Statistically, 71.6 percent of the injured athletes reported that the use of such psychological skills helped them to recover faster. The researchers had noted that while not a lot of participants received psychological skills training before, but they felt that it was useful in these

circumstances after being introduced to them (Arvinen-Barrow et al., 2015). Further research on mental skills for injured athletes may be beneficial for helping athletes recover mentally.

However, research on other mental skills such as mindfulness, which there is a lack there of between mindfulness and injury prevention, may be worth the time and effort to see if there is a link between the two.

Scherzer and colleagues (2001) conducted a correlational study, aiming to examine the relationship between self-reported use of psychological skills and rehabilitation adherence. The study involved fifty-four patients, 17 females, 37 men, who were undergoing rehabilitation after ACL reconstruction. The patients were recruited to participate by their orthopedic surgeon, and a research assistant explained the purpose and the procedures of the study to those who agreed prior to their surgery to participate. After the surgery, measures of adherence to rehabilitation were recorded at each scheduled physical therapy appointment. Attendance was also recorded, the Sport Injury Rehabilitation Adherence Scale was administered to the patients' physical therapist or athletic trainer, and the participants rated how much they adhered to their home exercises since their last physical therapy session (Scherzer et al., 2001). Approximately five weeks postsurgery, the participants were given the Sport Injury Survey, aiming to assess use of goal setting, imagery, and positive self-talk. During the remainder of rehabilitation, four adherence measures were recorded, attendance at rehabilitation sessions, practitioner ratings of patient adherence at rehabilitation sessions, patient self-reports of home cryotherapy completion. The results of this study revealed that goal setting was related to home exercise completion and practitioner adherence ratings, while positive self-talk was positively correlated with home exercise completion.

Means were calculated for the Sport Injury Rehabilitation Adherence Scale were calculated, as well as the items assessing adherence to home rehabilitation exercises and home cryotherapy across rehabilitation appointments. Psychological-skills and adherence variables were calculated by using descriptive statistics and intercorrelations. The scores on the goal-setting and imagery subscales of the abbreviated Sports Injury Survey were used in regression analyses in order to predict the four adherence indices (using scores obtained subsequent to administration of the abbreviated Sports Injury Survey).

The results of this study revealed that the regression equation of which predicted home exercise completion was statistically significant. Goal setting was a significant predictor of home exercise completion. The regression equation of which predicted The Sport Injury Rehabilitation Adherence Scale ratings was also statistically significant Goal setting was a significant predictor of Sport Injury Rehabilitation Adherence Scale ratings In the correlational analysis, a significant positive correlation was discovered between positive self-talk and completion of prescribed home exercises ( $r = .52, P < .05$ ) (Scherzer, 2001). This study helps to provide insight as to what psychological skills have been used in rehabilitation, as well as supports the notion that certain psychological skills may aid in better compliance to sport-injury rehabilitation protocol (Scherzer, et al., 2001).

## **Stress and Injury**

Recent research has shown that high levels of stress and stress responsivity can increase the likelihood in risk of injuries (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). Researchers argued that previous research on this topic looked at between-person relationships rather than within-person relationships. Thus, the purpose of this study was to look at within-

person changes in perceived stress symptoms over a one-month period of time could predict injury rates during the following three months (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). The participants for this study involved a total of 121 competitive soccer players from Sweden and the United States. More specifically the participants were 85 males (n=85), and 36 females (n=36). A prospective design was used, while looking at two time points throughout the study. The first time point looked at the beginning of the season, while the second one looked at one month into the season. During the first time point, the participants completed the Kessler Psychological Distress Scale (KPDS) in addition to a demographics form. During the second time point, the participants completed the Kessler Psychological Distress Scale a second time, and all acute injuries that took place over the three months were recorded. In order to find the answer to the proposed question involving within-person changes in stress potentially predicting risk of injury, the researchers used the Bayesian latent change scores model.

The results of this study displayed a credible positive effect of changes in stress symptoms on injury rates. This evidence stipulated that an increase in reported stress symptoms was in fact related to an increased risk for injury (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). These findings from this study place an emphasis on teaching stress management techniques to potentially aid in reducing the occurrence of injuries in sport.

While Williams and Anderson (1998) are famous for their Stress-Injury model, the following study critiqued the model and put it to the test. Researchers Noh, Morris, & Andersen, 2007, conducted an intervention that provides evidence and support for Williams and Andersen, 1998 Stress-Injury Relationship. The study included a total number of 45 female dancers from two dance institutes in Korea. Researchers contacted the directors of the ballet institutes via telephone and proposed the intervention to the dancers (Noh, Morris, & Andersen, 2007). An

original amount of 170 dancers volunteered and wished to participate in the study. This initial total amount signed an informed consent form and completed the ACSI-28, which was modified to relate to dance practice and performance, as well as an injury survey.

This intervention included three different conditions in which participants were assigned: Autogenic Training (AT), Broad-based coping skills and Control condition. The 30 participants with the lowest coping skills score were assigned to the AT group as well as the broad-based coping skills randomly. The low scoring participants from the other dance institute (n=15) were then assigned to the control condition.

Findings revealed several significant differences among the three conditions for the duration of injury, including an effect size,  $F(2/32) = 3.58, p < .05, \eta^2 = .19$ . Also, Tukey HSD post hoc tests suggested that the average duration of injuries was significantly shorter for the broad-based coping skills condition versus for the control condition. In order to investigate the magnitude of effects for differences between the three groups, univariate effect sizes (Cohen's  $d$ ) for the injury variables were also calculated.

Some key findings from this study were that that mental skills package (broad-based coping skills) was actually shown to be more effective than just the relaxation technique (AT) by itself. (2007). This study not only supports the Williams and Andersen model (1998), but it provides evidence as to how mental skills can enhance performance, and how teaching coping skills, which are based off of mental skills like imagery and self-talk can be beneficial for helping athletes cope in stressful situations that may arise (Noh, Morris, & Andersen, 2007).

Cognitive behavioral stress management (CBSM) has previously been found to decrease fatigue, depression, and cortisol levels among competitive athletes conducted by Perna, Antoni, Kumar, Cruess, & Schneiderman (1998). Another group of researchers conducted a randomized

controlled clinical trial, dealing with stress and injury with a purpose to expand on the previous study. Researchers Perna, Antoni, Baum, Gordon, & Schneiderman (2003) conducted a randomized controlled trial with rowers and tested the efficacy of the CBSM on intervention to reduce post-intervention period illness and injury. The degree to which mood and cortisol responses mediated intervention effects on injury and illness was also tested.

The study involved a total number of male (N=14) and female (N=20) varsity and junior varsity collegiate rowers at a major southern university, whom were invited to participate in a sport psychology study that was commenced during a high-volume preseason training cycle. At the completion of taking baseline measurements of the participants' medical history, stress, mood, cortisol, sleep, alcohol use, and exercise training, the participants were stratified by gender and competitive level, and then randomly assigned to a CBSM group or control group. Findings showed that the participants in the treatment group, CBSM experienced a decrease in the number of illness and injury days, compared to the control group. The treatment group also had half the number of health service visits in comparison to the control group. Preliminary analyses indicated that the number of office visits was highly correlated with injured and ill count over the entire study ( $r = .77, p < .01$ ), during the period from pre-intervention to immediate postintervention ( $r = .78, p < .01$ ), and during the period from immediate postintervention to season's ( $r = .75, p < .01$ ).

Specifically, approximately 49% ( $-.47 \times .43 / -.41$ ) other intervention effect on subsequent illness and injury was due to post-intervention negative affect. A similar path analysis indicated that the post-intervention cortisol accounted for approximately 16% of the CBSM intervention effect on days out, ( $p > .05$ ). Also, pre- to post-intervention cortisol change had a significant relationship with negative affect change over a similar time frame ( $r = .36, p <$



.05). The key findings of this study support the hypotheses made, in which athletes randomly assigned to the CBSM group had significant reductions in the number of illness and injury days and had half the number of visits to health services in contrast to the control group participants. Overall, the results from this study provide support how stress management interventions could potentially decrease injury and illness among athletes, and/or help in the injury recovery process (Perna et al., 2003).

### **Stress, injury, and mindfulness correlation**

While there has been more research, as well as interventions conducted on mindfulness, there has been limited research in regard to the actual experience that athletes have had prior to taking part in mindfulness meditation programs (Baltzell, Caraballo, Chipman, & Hayden, 2014). The following qualitative study not only gives insight to the experience of athletes with a MMTS program, but it also supports the limited amount of research for the connection between mindfulness meditation programs and injury.

The following qualitative study involved a total of 19 females, along with three participants who were coaches and staff on the National Collegiate Athletic Association (NCAA) Division I women's soccer in the Northeast region of the United States. The participants were required by their coach to attend twelve, sessions for thirty minutes, two times per week, over six weeks on mindfulness meditation training, specifically in sport. The participants were asked by the instructor of the MMTS to practice daily on their own time for five-ten minutes per practice session. The participants would receive a tape via email to listen to when they practiced on their own.

Overall, the goal for this intervention was to train these women and to improve their levels of mindfulness, to become nonjudgemental of their own thoughts and feelings, and to practice accepting these thoughts, feelings, and sensations (Baltzel et al., 2014). However, at the beginning of the program, these individuals struggled to see the significance of practicing meditation. The four main areas to the training included open awareness capacity, caring thoughts for self and teammates, concentration exercises, and practicing acceptance of negative mind states. Some of these involved performing concentration ladders or practicing on having warm feelings from their own self as well as their fellow teammates (Baltzel et al., 2014). At the completion of the program, seven participants out of the original 19 total players volunteered to be interviewed. The interviews were audiotaped and ranged from twenty minutes-one hour. Interview questions about their feelings at the beginning of the program, as well as the benefits and challenges were asked. Open ended questions were also asked about their likes and dislikes of the intervention, as well as the impact it had on them.

The major findings from this study showed that based off the interview questions, there were seven dimensions of themes that emerged from the MMTS program. The participants reported that they had an enhanced ability to accept and experience a different relationship with their emotions now, both on and off the field, then they had prior to this program. The overall conclusion of this study was that athletes had a greater focus on the field which led them to direct their attention more readily to the task in front of them, rather than focusing on mindless acts. (Baltzell et al., 2014). This study provides significance for the idea that mindfulness meditation training may be helpful for injury prevention as well as injury reduction not only for soccer players, but potentially for all athletes. With an increase in quantity of studies such as this one, it may help lead to more findings and bridge the gap between mindfulness and injury reduction.

A second study, particularly a quantitative study was conducted, specifically to see whether a mindfulness-based intervention could decrease the number of injuries in a group of soccer players. The data was gathered from a soccer team in Sweden, which involved a total number of 41 junior elite soccer players. There were a total of  $n=31$  male, and  $n=10$  female, which were between the ages of 16 and 19 (Ivarsson, Johnson, Andersen, Fallby, & Altemyr, 2015). This study was conducted by splitting up the players into two groups in which they were randomly assigned; either a treatment or attentional control group. The attentional group was provided with 7 sessions which were sport psychology related but focused the presentations specifically on soccer. The treatment group received a seven session program as well, but dealt with mindfulness, acceptance, and commitment.

Numerically, the results displayed that there were no major differences in injury rates recorded among the two groups,  $U(39) = 149.50$ ,  $z = -1.77$ ,  $p = 0.77$ . Aside from this finding, there was a medium effect size where there was approximately an 80% confidence interval for  $d$   $[-0.37, -0.74]$ . Some key findings from this study reported that about 67% of the athletes in the treatment group, who had received the mindfulness sessions, and all remained injury free. Of the control group, only 40% remained injury free and did not receive the mindfulness training (Ivarsson et al., 2015).

## **Injury**

In recent research, it has been suggested that during the sport injury rehabilitation process, it is pertinent that the sport rehabilitation professional(s) convey the psychological aspects of the injury. By conveying the mental part, it will make all the difference throughout the entire rehabilitation process for the injured athlete (Bennett, Czech, Harris, & Todd, 2016). The following will outline how Psychological Skills training has been used in athlete rehabilitation.

## CHAPTER 3

### METHODS

The purpose of this study is to explore injured athletes' readiness to return to sport before, during, and after adhering to a mindfulness intervention (Baltzell & Akhtar, 2014).

#### **Participants**

In order to participate in this study, participants must be between the ages of 18-25. Participants must be a NCAA Division I-III athlete, and must currently be an injured, living in South Florida. For the purpose of this study, a player will be defined as injured if he or she is unable to practice and play for at least six weeks. Both male and female athletes will be invited to participate, but participants must currently be active on a college team roster. Due to the nature of a case study, total number of participants will range from 5-10.

#### **Measures**

**Demographics.** Data will be collected on the participant's age, gender, athletic year, sport, injury type, previous history of injury, and the length of time they were out from sport previously during their injury.

#### **Injury-Psychological Readiness to Return to Sport Scale (I-PRRS) (Glazer, 2009).**

The I-PRRS is a six-item scale that measures psychological readiness of injured athletes to return to sport after being injured. The 100-point scale is the standard method for measuring efficacy beliefs about an athlete's readiness to return to play (Glazer, 2009). The scale ranges from 0 (little to no confidence) and 100 (utmost confidence). A score of 0 implied that the athlete had no confidence, a score of 50 implied moderate confidence, and a score of 100 implied utmost

confidence for that item. The scores from the six items are summed and then divided by ten scores from the six items.

The I-PRRS has received content validity after using the Delphi method with a panel of athletic trainers, who were considered to be the experts. The athletic trainers' took the I-PRRS, as well as their athletes. The scores from the athletic trainers' perspective on their athletes' psychological readiness to return to play were consistent with the athletes' scores, and how they perceived their psychological readiness to return to play. These consistent scores validated external validity of the scale (Glazer, 2009).

The I-PRRS will be administered prior to a mindfulness training intervention, during the middle of the mindfulness training intervention and preceding the mindfulness training intervention.

### **Interview Guide**

The following method was chosen to take a closer look at the experiences of the participants, while investing in their thoughts, feelings, and emotions in the process (Baltzell, Caraballo, Chipman, & Hayden, 2014). During the interview process, having a face to face interview with the researcher allows the interviewee to add as much information to the questions as they would like. If participants are unable to meet personally, then a phone interview will be conducted.

These semi-structured interviews allow the researcher to probe into the experiences of the participant, and gain insight more readily (Bennett, Czech, Harris, & Todd, 2016). Using interviews as a means of qualitative research gives participants the opportunity to get complete

answers, follow-up responses, a chance to clear up any misunderstandings and the participant will likely be more thorough with their answers (Baumgartner & Hensley, 2013).

In order to enhance the quality of the interviews, a pilot interview will be conducted with the participants to determine an appropriate opening question. This will also help to remove any biases from the entire process. An example of an opening question during the interview might be “What was your experience like using mindfulness meditation training?”

In the completion of the MMTS 2.0 program, the semi-structured interviews will take place at a convenient time and place for the participants. The length of the interviews will range from a minimum of twenty minutes to a maximum of sixty minutes. Researchers will then ask for permission from the participants to audio record the interview while in session. The researcher will also take hand written notes as well, to be able to transcribe the script verbatim. This will help keep record of each answer from each participant to get the best and accurate results to collect data.

The interview will start with several open-ended questions after the pilot interview, and continue on with general questions to evoke discussion. This will allow the participants to answer the questions openly and freely. Lastly, at the conclusion of the interviews, the participants will be given the opportunity to add anything else that they wish to share. Once the recordings are transcribed,

Each interview will acquire confidentiality, and once the recordings are transcribed, they will be destroyed and the handwritten notes will be shredded. Also, in order to improve trustworthiness, researchers will incorporate member checking. Member checking entails

sending data analysis to all participants so they can verify that the information is accurate (Turner & Coen, 2008).

## **Procedure**

An institutional review board for human subject application for approval will be submitted prior to recruitment and data collection. Participants for this study will be recruited via email to all head coaches. Participants who meet the foregoing criteria for this study, will be invited to participate. Once these participants have agreed to partake, participants will be asked to read and sign an informed consent form (Appendix A). The form will discuss and describe the study in its entirety, so participants have the opportunity to deny proceeding with this study if they wish to do so. The informed consent form will provide background information, general procedures, confidentiality, and potential risks and benefits. Participants for this study will be asked to participate in the MMTS 2.0 program, alongside their rehab, which will involve a thirty minute session twice a week, over the course of a total of six weeks.

The participants will first be asked to fill out a short questionnaire regarding demographics, and then will be asked to complete out a second questionnaire regarding their readiness to return to sport. This questionnaire will be administered by the researcher at three different times throughout the study: prior to the 2.0 program, halfway through the MMTS program, and after the completion of the mindfulness program. For the purpose of this study, a player will be defined as injured if he or she missed at least one practice or competition due to injury.

**Mindfulness Meditation Training for Sport (MMTS).** (Baltzell & Akhtar, 2014).

Following the MMTS protocol, sessions for the intervention can be an hour long, or two thirty-

minute sessions over the course of six weeks. The MMTS 2.0 intervention, involves a total of six modules, and twelve segments. For example, module 1, part A. Module 2, part B. These six modules include the following: (1a) Introduction to Mindfulness, (1b) Brief Introduction to Self-Compassion, (2a) Tolerating Sport Distress, (2b) Tolerating Sport Distress, (3a) Concentration, (3b) Coping with Distraction and Tolerating Sport Distress, (4a) Self-Compassion and Mindfulness for Difficult Moments, (4b) Self-Compassion and Mindfulness for self and others (5a) Self-Regulation-sport values to Help Performance, (5b) Self-Regulation-Body Awareness to Help Performance, (6a) Preparing to Adapt and Adjust in Performance, moment to moment with Open-Awareness, (6b) Accepting, Adapting, Adjusting-Including Novelty.

During each thirty-minute session, the first ten-minutes is instruction by the researcher, followed by ten-minutes of mindfulness practice, and ten-minutes of discussion. During the discussion piece, participants will be debriefed by the researcher.

### **Data Analysis**

In order to assess the psychological readiness of the participants, they will complete the I-PRRS prior to, during, and after the MMTS 2.0 intervention. A path analysis be used to record and compare the scores for each athlete during the three different time points. The hypothesis for this data will be that the participants' readiness to return score will increase during all three time points; before MMTS, during, and after MMTS program.

**Qualitative Data.** At the completion of the six week intervention, participants will be asked to complete a post-test interview on a series of qualitative open ended questions with the reasearcher. The questions will be based off of their thoughts and feelings on this intervention, such as “Do you think you will continue to practice daily mindfulness in the future? Do you feel



like you can control your nerves more now? Do you feel like you are more confident to return to sport following the MMTS program? The participants' answers will be recorded and coded. At the end, any common themes will be looked for and noted.

After the completion of the "exit interviews," the researchers will code each participant's response to the interviews. Coding each response will determine themes from the outcome of the interviews. The themes will be conducted based off of the responses from the participants. The researchers will look to see if there were similar responses from the participants, and their psychological readiness to return to sport. In order to improve trustworthiness, researchers will include member checking. The process of member checking will be to send out the data analysis to all of the participants, have them check it, and respond back to verify that all of the information is correct (Turner & Coen, 2008).

## CHAPTER IV

### REFERENCES

- Ahern, D., & Lohr, B. (1997). Psychosocial factors in sports injury rehabilitation. *Clinics In Sports Medicine, 16*(4), 755-768.
- Arvinen-Barrow, M., Clement, D., Utley, J., Zakrajsek, R., Lee, SM., Kamphoff, C., Lintunen, T., Hemmings, B., & Martin, S. (2015). Athletes' use of mental skills during sport injury rehabilitation. *Journal of sport rehabilitation, 24*(10).
- Baltzell, A., & Akhtar, V. L. (2014). Mindfulness meditation training for sport (MMTS) intervention: Impact of MMTS with division I female athletes. *Journal of Happiness & Well-being, 2*, 160-173.
- Baltzell, A., Caraballo, N., Chipman, K., & Hayden, L. (2014). A qualitative study for mindfulness meditation training for sport: division 1 female soccer players' experience. *Journal of Clinical Sport Psychology, 8*(3), 221.
- Baumgartner, T. A., & Hensley, L. D. (2013). *Conducting & reading research in kinesiology*. New York, NY: McGraw-Hill.
- Bennett, H. R., Czech, D., Harris, B., & Todd, S. (2016). Perceptions of Coping with an Injury in Sport at the NCAA Division I Level: Perceptual Continuity between Student-Athletes and their Athletic Trainers. *Clinical Kinesiology (Online Edition)*, 39-43.
- Brown, K.W. & Ryan, R.M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.

- D. A., Stanish, W., Ebel-Lam, A., Brewer, B. W., & Birchard, J. (2011). Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes with anterior cruciate ligament injuries at 1 year postsurgery. *Sport, Exercise, and Performance Psychology, 1*(S), 38–48. <https://doi.org/10.1037/2157-3905.1.S.38>
- Frey, J., & Eitzen, D. (1991). Sport and society. *Annual Review Of Sociology, 17*, 503-522.
- Furrer, P., & Moen, F., & Firing, K. (2015). How Mindfulness Training may mediate Stress, Performance and Burnout. *The Sport Journal*.
- Gardner, F. L., & Moore, Z. E. (2004). A mindfulness-acceptance-commitment-based approach to athletic performance enhancement: theoretical considerations. *Behavior Therapy 35*, 707-723.
- Glazer, D. D. (2009). Development and Preliminary Validation of the Injury-Psychological Readiness to Return to Sport (I-PRRS) Scale. *Journal of Athletic Training, 44*(2), 185-189.
- Holzel, B.K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S.M., Gard.T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging, 79*(1), 36-43.
- Humphreys, B. R., & Ruseski, J. E. (2009). Estimates of the Dimensions of the Sports Market in the US. *International Journal Of Sport Finance, 4*(2), 94-113.
- Ivarsson, A., Johnson, U., Anderson, M. B., Fallby, J., & Altemyr, M. (2015). It pays to pay attention: A mindfulness-based program for injury prevention with soccer players. *Journal of Applied Sport Psychology, 27*(3), 319-334.

- John, S., Verma, S. K., & Khanna, G. L. (2011). The effect of mindfulness meditation on HPA-Axis in pre-competition stress in sports performance of elite shooters. *National Journal of Integrated Research in Medicine*, 2(3), 15-21.
- Johnson, U., Ekengren, J., & Andersen, M. B. (2005). Injury Prevention in Sweden: Helping Soccer Players at Risk. *Journal Of Sport & Exercise Psychology*, 27(1), 32.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144-156.
- Kabat-Zinn. (2005). *Coming to our senses: Healing ourselves and the world through mindfulness*. New York, NY: Hyperion.
- Moore, Z. E. (2009). Theoretical and empirical developments of the mindfulness-acceptance-commitment (MAC) approach to performance enhancement. *Journal of Clinical Sports Psychology*, 4, 291-302.
- National Collegiate Athletic Association. *NCAA Sports Sponsorship and Participation Rates Report-1981-82 – 2014-2015*. . Indianapolis, IN: Irick, Erin, 2015.
- Noh, Y.E., Morris, T., & Andersen, M.B. (2007). Psychological intervention programs for reduction of injury in ballet dancers. *Research in Sports Medicine*, 15, 13–32.
- Perna, F.M., Antoni, M.H., Baum, A., Gordon, P., & Schneiderman, N. (2003). Cognitive behavioral stress management effects on injury and illness among competitive athletes: A randomized controlled trial. *Annals of Behavioral Medicine*, 25, 66–73

- Salvador, A., Suay, F., Gonzalez-Bone, E., & Serrano, M. (2003). Anticipatory cortisol, testosterone and psychological responses to judo competition in young men. *Psychoneuroendocrinology*, 28(3), 364-375.
- Scherzer, B. C., Brewer, W. B., Cornelius, E. A., Van Raalte, L. J., Petitpas, J. A., Sklar, H. J., Pohlman, H. M., Krushell, J. R., & Ditmar, D. T. (2001). Psychological Skills and Adherence to Rehabilitation after Reconstruction of the Anterior Cruciate Ligament. *Journal of Sport Rehabilitation*, 10(3), 165-172.
- Shonin, E., Van Gordon, W., & Griffiths, M. D. (2016). Ontological addiction: Classification, etiology, and treatment. *Mindfulness*, 7(10).
- Stanish, D. A., W., Ebel-Lam, A., Brewer, B. W., & Birchard, J. (2011). Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes with anterior cruciate ligament injuries at 1 year postsurgery. *Sport, Exercise, and Performance Psychology*, 1(S), 38–48.
- Teasdale, J. D., Segal, Z., & Williams, J. M. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy*, 33(1), 25-39.
- Turner, S., & Coen, S. E. (2008). Member checking in human geography: interpreting divergent understandings of performativity in a student space. *Area*, 40(2), 184-193.

Williams, J. M., & Andersen, M. B. (1998). Psychological antecedents of sport injury: Review and critique of the stress and injury model. *Journal of Applied Sport Psychology*, *10*, 5-25.

## **CHAPTER V**

### **MANUSCRIPT**

#### Introduction

Sport is an eminent social institution throughout the United States, in almost every society (Frey & Eitzen, 1991). Sport is a way in which athletes, as well as spectators come together to achieve a common goal, and feel unified as one. Sport merges together elements found in institutions, with an appeal that is debatably only mirrored by religion (Frey & Eitzen, 1991). It is a way in which individuals and spectators identify with and are tied to something greater than themselves. Sport is something that brings people together and holds a high importance in society.

Today, the participation rates in sports, as well as the attendance of spectators is continually on the rise. In 2005, there were over 484 million people in America, participating in athletics, as well as 277 million individuals who went to professional and college sporting events (Humphreys & Ruseski, 2009). Sport participation has been increasing heavily, since the last collection of data in collegiate athletics in 1981. In the academic year of 2014-2015, it was reported that there were approximately 482,000 student-athletes on over 19,000 teams throughout the United States, as stated by the NCAA Sports Sponsorship and Participation Rates Report (National Collegiate Athletic Association, 2015).

While the growth and rise of athletic participation is occurring, it also continues to open the door for a rise in athletic injury as well. Each year in America, approximately 17 million athletes experience a sport-related injury (Ahern & Lohr, 1997). The amount of injury leaves room for further research as to whether or not injury may be able to be prevented by the use of psychological skills, or mental skills training.

The injury-stress relationship by Williams and Andersen (1998) provides a deeper understanding of the psychological factors that are in alliance with injury risk (Williams & Andersen, 1998). This correlation also suggests that when conducting such interventions pointed toward injury risk reduction, both physiological and psychological intervention routes can be taken to decrease stress responses that may potentially lead to injury (Williams & Andersen, 1998). For instance, a study with competitive soccer players (N=32) participated in a program based on relaxation and stress management techniques. After the seven-session program, the researchers found the treatment group only had a total of three injuries in a season, while the control group, had a total of twenty-one injuries (Johnson, Ekengren, & Andersen, 2005). This study reinforces the notion as to how stress management interventions may help prevent injury.

Another study looking at the effects of stress on athletes, involved a shooting sport. The study involved 96 male elite shooters (John, Verma, & Khanna, 2011). The purpose of this study was to see if mindfulness meditation training could lower competitive stress. This study also looked at the physiological response to stress, using a tracker on the HPA-Axis of the brain.

The results of the study compared to the control group, the experimental group displayed a superior result of post-intervention using MMT ( $p < 0.001$ ), and in follow-up ( $p < 0.001$ ) in salivary cortisol and shooting performance (John et al., 2011). The evidence displayed from this study, provides clarity as to how mindfulness, or MMT in this case can be a means for assisting athletes with reducing stress.

## **Mindfulness**

Throughout recent decades, the practice of mindfulness has become a topic of great interest (Shonin & Gordon, 2016). The term mindfulness is known as being aware of the present



moment, and being nonjudgemental toward all of the thoughts in that present moment (Kabat-Zinn, 2003). Previous research has shown that mindfulness is linked to many benefits, such as reducing depression, anxiety, and stress (Kabat-Zinn, 2003). The roots of mindfulness have started in a clinical setting, and early forms of it were known as mindfulness-based stress reduction, or MBSR. While mindfulness is becoming much more of a well-known phenomenon, it is interesting to see how it was originally brought about, in hopes of becoming a model for other hospital and medical centers (Kabat-Zinn, 2003). Today, MBSR programs are being offered all around the world, from medical to school settings, it is being applied to all different types of fields, including sport and exercise psychology.

### **Mindfulness Theories**

Mindfulness Based Stress Reduction (MBSR) was originally started up from more of a clinical perspective by Jon Kabat-Zinn, in 1979 at the Medical Center at the University of Massachusetts (Kabat-Zinn, 2003). Kabat-Zinn is the creator of the 8-week MBSR program, and it has been shown to decrease stress, anxiety, and depression, as well as increase positive characteristics such as optimism, self-compassion, and emotional intelligence (Kabat-Zinn, 2003). The aim of MBSR is to not only to bring about non-judgement awareness about daily life, but also to bring awareness of the mind and body awareness to reduce the effects physiologically of stress, pain or illness (Kabat-Zinn, 2003).

Mindfulness-based cognitive therapy, or MBCT was based off of MBSR, but it was created specifically for depressive relapse rather than sport or performance (Teasdale, Segal, & Williams, 1995). Mindfulness-acceptance-based approaches are what have been shown to aid athletes in developing certain skills, including nonjudgement mindfulness awareness, mindful attention, and experiential acceptance to meet their goals (Moore, 2009). The most widely

accepted mindfulness-and acceptance-based approach that has been supported for performance enhancement is the Mindfulness-Acceptance-Commitment (MAC) approach. The MAC was created in 2001 regard to the application of working with athletes or individuals within sport psychology, on mindfulness meditation (Gardner & Moore, 2004).

### **Mindfulness for Stress Reduction**

Findings from certain studies such as, Moore (2009), provide insightful information that while psychological skills training approaches are helpful in modifying certain factors like arousal and anxiety that are related to athletic performance, there have still been no dramatic changes, in *actual* athletic performance that have transpired from psychological skills training (Moore, 2009). Furrer and colleagues (2015) conducted a study with twenty-nine junior athletes (n=29) in Norway whom were asked to take part in a 12-week mindfulness training intervention. Researchers investigated if mindfulness training could assist junior elite athletes with stress reduction, performance enhancement, and burnout prevention. The results displayed that the mindfulness intervention had a positive impact on the junior elite athlete's awareness and recovery. This study helps support evidence for mindfulness- meditation training programs being effective in lowering perceived stress and rumination, while improving sleep and recovery.

Another study examining stress, specifically looked at shooting sports and aimed to see if mindfulness meditation training, or MMT, would lower levels of a certain physiological marker in the brain in relation to pre-competitive stress. (John, Verma, & Khanna, 2011.) The study called for a total of 96 male elite shooters, with a mean age of 29.5 plus or minus 4.3 years and were examined in an experimental control group. The results of the study showed that the experimental group displayed a superior result of post-intervention using MMT ( $p < 0.001$ ), and in follow-up ( $p < 0.001$ ) in salivary cortisol and shooting performance compared to the control

group ( $p < 0.05$ ). Further examinations of how to use mindfulness in a different phase of injury, the recovery. Mindfulness has not yet been used during injury recovery, which leads to the purpose of this study.

### **PST used in Rehab**

Several researchers conducted a study with a total of 1283 athletes from the United States, United Kingdom, and Finland (Arvinen-Barrow, Clement, Hamson-Utley, Zakrajsek, Sae-Mi, Kamphoff, Martin, (2015). The main purpose of this study was to look at the different psychological, or mental skills that were used during the rehabilitation process for injury athletes.

The top three psychological skills reported that were used during rehabilitation included goal setting, positive self-talk/positive thoughts, and imagery (Arvinen-Barrow et al., 2015). Statistically, 71.6 percent of the injured athletes reported that the use of such psychological skills helped them to recover faster. The researchers had noted that while not a lot of participants received psychological skills training before, but they felt that it was useful in these circumstances after being introduced to them (Arvinen-Barrow et al., 2015). Further research on mental skills for injured athletes may be beneficial for helping athletes recover mentally.

Scherzer and colleagues (2001) conducted a correlational study, aiming to examine the relationship between self-reported use of psychological skills and rehabilitation adherence. The study involved fifty-four patients, 17 females, 37 men, who were undergoing rehabilitation after ACL reconstruction. After the surgery, attendance was recorded at physical therapy, and adherence to rehabilitation was measured by using the Sport Injury Adherence Scale (Scherzer et al., 2001). Approximately five weeks postsurgery, the participants were given the Sport Injury

Survey, aiming to assess use of goal setting, imagery, and positive self-talk. During the remainder of rehabilitation, four adherence measures were recorded, attendance at rehabilitation sessions, practitioner ratings of patient adherence at rehabilitation sessions, patient self-reports of home cryotherapy completion.

The results of this study revealed that goal setting was related to home exercise completion and practitioner adherence ratings, while positive self-talk was positively correlated with home exercise completion. This study helps to provide insight as to what psychological skills have been used in rehabilitation, as well as supports the notion that certain psychological skills may aid in better compliance to sport-injury rehabilitation protocol (Scherzer, et al., 2001).

### **Stress and Injury**

Recent research has shown that high levels of stress and stress responsivity can increase the likelihood in risk of injuries (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). The purpose of this study was to look at within-person changes in perceived stress symptoms over a one-month period of time could predict injury rates during the following three months (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). The participants for this study involved a total of 121 competitive soccer players from Sweden and the United States of which were 85 males (n=85), and 36 females (n=36). The results of this study displayed a credible positive effect of changes in stress symptoms on injury rates, and the evidence stipulated that an increase in reported stress symptoms was in fact related to an increased risk for injury (Clement, Ivarsson, Tranaeus, Johnson, & Stenling, 2017). These findings from this study place an emphasis on teaching stress management techniques to potentially aid in reducing the occurrence of injuries in sport.

Cognitive behavioral stress management (CBSM) has previously been found to decrease fatigue, depression, and cortisol levels among competitive athletes conducted by Perna, Antoni, Kumar, Cruess, & Schneiderman (1998). Researchers Perna, Antoni, Baum, Gordon, & Schneiderman (2003) conducted a study with a total number of male (N=14) and female (N=20) varsity and junior varsity collegiate rowers at a major southern university. The participants were stratified by gender and competitive level, and then randomly assigned to a CBSM group or control group after baseline measurements were taken.

Findings showed that the participants in the CBSM group had half the number of health service visits in comparison to the control group. Preliminary analyses indicated that the number of office visits was highly correlated with injured and ill count over the entire study ( $r = .77, p < .01$ ). Specifically, approximately 49% ( $-.47 \times .43 / -.41$ ) other intervention effect on subsequent illness and injury was due to post-intervention negative affect. Overall, the results from this study provide support how stress management interventions could potentially decrease injury and illness among athletes, and/or help in the injury recovery process (Perna et al., 2003).

### **Stress, injury, and mindfulness correlation**

While there has been more research, as well as interventions conducted on mindfulness, there has been limited research in regard to the actual experience that athletes have had prior to taking part in mindfulness meditation programs (Baltzell, Caraballo, Chipman, & Hayden, 2014). The following qualitative study not only gives insight to the experience of athletes with a MMTS program, but it also supports the limited amount of research for the connection between mindfulness meditation programs and injury (Baltzell, Caraballo, Chipman, & Hayden, 2014).

The following qualitative study involved a total of 19 females, along with three participants who were coaches and staff on the National Collegiate Athletic Association (NCAA)

Division I women's soccer in the Northeast region of the United States. The participants were required by their coach to take part in the MMTS program. The participants would receive a tape via email to listen to when they practiced on their own. Participants were then invited to volunteer to take part in a semi-structured interview following the program.

The major findings from this study showed that based off the interview questions, was that athletes had a greater focus on the field which led them to direct their attention more readily to the task in front of them, rather than focusing on mindless acts (Baltzell et al., 2014). This study provides significance for the idea that mindfulness meditation training and with an increase in quantity of studies such as this one, it may help lead to more findings and bridge the gap between mindfulness and injury.

## METHODS

The purpose of this study was to explore injured athletes' readiness to return to sport before, during, and after adhering to a mindfulness intervention (Baltzell & Akhtar, 2014).

### **Participants**

This study was a single-case study research design with one, NCAA Division II Varsity, white, college age, male athlete from the Southeast region of the United States. The participant was recruited via email, and met all of the criteria for this study: In order to participate in the study, the subject had to meet the following inclusion criteria: be a NCAA Division I-III athlete, must currently be injured (unable to practice and play for at least six weeks), must be at least 18 years of age, and must currently be active on a college team roster. The participant agreed to participate for the full six-week intervention.

## **Measures**

**Demographics.** Data was collected on the participant's age, gender, athletic year, sport, injury type, previous history of injury, and the length of time they were out from sport previously during their injury.

### **Injury-Psychological Readiness to Return to Sport Scale (I-PRRS) (Glazer, 2009).**

The I-PRRS is a six-item scale that measures psychological readiness of injured athletes to return to sport after being injured. The 100-point scale is the standard method for measuring efficacy beliefs about an athlete's readiness to return to play (Glazer, 2009). The scale ranges from 0 (little to no confidence) and 100 (utmost confidence). A score of 0 implied that the athlete had no confidence, a score of 50 implied moderate confidence, and a score of 100 implied utmost confidence for that item. The scores from the six items are summed and then divided by ten scores from the six items.

The I-PRRS received content validity after using the Delphi method with a panel of athletic trainers, who were considered to be the experts. The athletic trainers' took the I-PRRS, as well as their athletes. The scores from the athletic trainers' perspective on their athletes' psychological readiness to return to play were consistent with the athletes' scores, and how they perceived their psychological readiness to return to play. These consistent scores validated external validity of the scale (Glazer, 2009).

The I-PRRS was administered prior to a mindfulness training intervention, during the middle of the mindfulness training intervention and preceding the mindfulness training intervention.

## **Interview Guide**

The following method was chosen to take a closer look at the experiences of the participants, while investing in their thoughts, feelings, and emotions in the process (Baltzell, Caraballo, Chipman, & Hayden, 2014). During the interview process, having a face to face interview with the researcher allowed the interviewee to add as much information to the questions as they liked to.

- 1) The semi-structured interviews allowed the researcher to probe into the experiences of the participant, and gain insight more readily (Bennett, Czech, Harris, & Todd, 2016). Using interviews as a means of qualitative research gives participants the opportunity to get complete answers, follow-up responses, a chance to clear up any misunderstandings and the participant will likely be more thorough with their answers (Baumgartner & Hensley, 2013). In order to enhance the quality of the interviews, a pilot interview was conducted with the participant to determine an appropriate opening question. This also helped to remove any biases from the entire process. An example of an opening question during the interview was “What was your experience like using mindfulness meditation training?,” and “Do you think you will continue to practice daily mindfulness in the future?” An example of some of the sample questions that were asked throughout the interview were “Do you feel like you can control your nerves more now?” and “Do you feel like you are more confident to return to sport following the MMTS program?,” and “Has there been any time like during rehab or during running, or studying when you’ve like paid more attention to your breathing?”

The participants’ answers were recorded and coded. At the end, any common themes were looked for and noted.



In the completion of the MMTS 2.0 program, the semi-structured interview took place at the same time and location as the delivery of the protocol. The interview was carried out face to face for twenty-two minutes. The researcher asked permission from the participant to audio record the interview while in session. The interview obtained confidentiality, audio recorded, and then transcribed.

The interview began with several open-ended questions after the pilot interview (Appendix E), and continued on with several open-ended questions to evoke discussion. This allowed the participant to answer the questions openly and freely. Lastly, at the conclusion of the interviews, the participant was given the opportunity to add anything else that they wished to share. The researcher then transcribed the recordings.

The interview acquired confidentiality, and once the recording was transcribed, it was destroyed and the handwritten notes were shredded. Also, in order to improve trustworthiness, the researcher incorporated member checking. Member checking entails sending data analysis to the participant so they can verify that the information is accurate (Turner & Coen, 2008).

## **Procedure**

An institutional review board for human subject application for approval was submitted prior to recruitment and data collection. The participant of this study was recruited via email. The participant met the foregoing criteria for this study, and was invited to participate. Once the participant agreed to partake, the individual read and signed an informed consent form (Appendix A). The form discussed and described the study in its entirety, so the participant had the opportunity to deny proceeding with this study if they wished to do so. The informed consent provided background information, general procedures, confidentiality, and potential risks and

benefits. The participant for this study was asked to participate in the MMTS 2.0 program, alongside their rehab, which involved a thirty-minute session twice a week, over the course of a total of six weeks. The MMTS intervention was delivered weekly, in a library room at the university of the participant, which was chosen as a convenient place.

The participant was first asked to fill out a short questionnaire regarding demographics, and then was asked to complete a second questionnaire regarding their readiness to return to sport following their injury and rehabilitation. This questionnaire was administered by the researcher at three different times throughout the study: prior to the 2.0 program, halfway through the MMTS program, and after the completion of the mindfulness program. For the purpose of this study, a player was defined as injured because he was unable to practice and play for at least six weeks.

**Mindfulness Meditation Training for Sport (MMTS)** (Baltzell & Akhtar, 2014).

Following the MMTS protocol, sessions for the intervention can be an hour long, or two thirty-minute sessions over the course of six weeks. The MMTS 2.0 intervention, involves a total of six modules, and twelve segments. For example, module 1, part A. Module 2, part B. These six modules include the following: (1a) Introduction to Mindfulness, (1b) Brief Introduction to Self-Compassion, (2a) Tolerating Sport Distress, (2b) Tolerating Sport Distress, (3a) Concentration, (3b) Coping with Distraction and Tolerating Sport Distress, (4a) Self-Compassion and Mindfulness for Difficult Moments, (4b) Self-Compassion and Mindfulness for self and others (5a) Self-Regulation-sport values to Help Performance, (5b) Self-Regulation-Body Awareness to Help Performance, (6a) Preparing to Adapt and Adjust in Performance, moment to moment with Open-Awareness, (6b) Accepting, Adapting, Adjusting-Including Novelty.

During each thirty-minute session, the first ten-minutes is instruction by the researcher, followed by ten-minutes of mindfulness practice, and ten-minutes of discussion. During the discussion piece, participants will be debriefed by the researcher.

### **Data Analysis**

In order to assess the impact of the intervention, descriptive statistics were recorded for the pre, mid, and post (Weeks 1, 3, and 6) test results of the Injury Psychological Readiness to Return to Sport (I-PRRS). The sum scores were then compared to one another during the three different timepoints.

**Qualitative Data.** A qualitative content method was employed to analyze the data for recurrent themes. Thematic meaning units were identified in the analysis of the post-intervention interview. In order to ensure that the participant felt as if they provided accurate responses and trustworthiness, researchers included member checking. The process of member checking was to send out the data analysis to all of the participants, have them check it, and respond back to verify that all of the information is correct (Turner & Coen, 2008). The transcripts were then validated by the primary research and an experience researcher. After the completion of the “exit interview” the researcher coded the participant’s response to the interview. Coding each response allowed the researcher to determine themes from the outcome of the interviews. The themes were conducted based off of the responses from the participant. The researcher then looked to see if there were similar responses from the participants and their psychological readiness to return to sport.

### **Results**

The primary purpose of this study was to assess the efficacy of a mindfulness meditation intervention, specifically the Mindfulness Meditation for Sport 2.0 approach, on the experience of an injured athlete's psychological readiness to return to sport. To accomplish this objective, the results are divided into three sections. The first section discusses the results of the pre, mid, and post-test measurements of the Injury Psychological Readiness to Return to Sport (I-PRRS), indicators of confidence to return to sport after being injured. The second and final section discusses the thematic structure used to extract meaning from the post intervention semi-structured interview.

### **Descriptive Statistics**

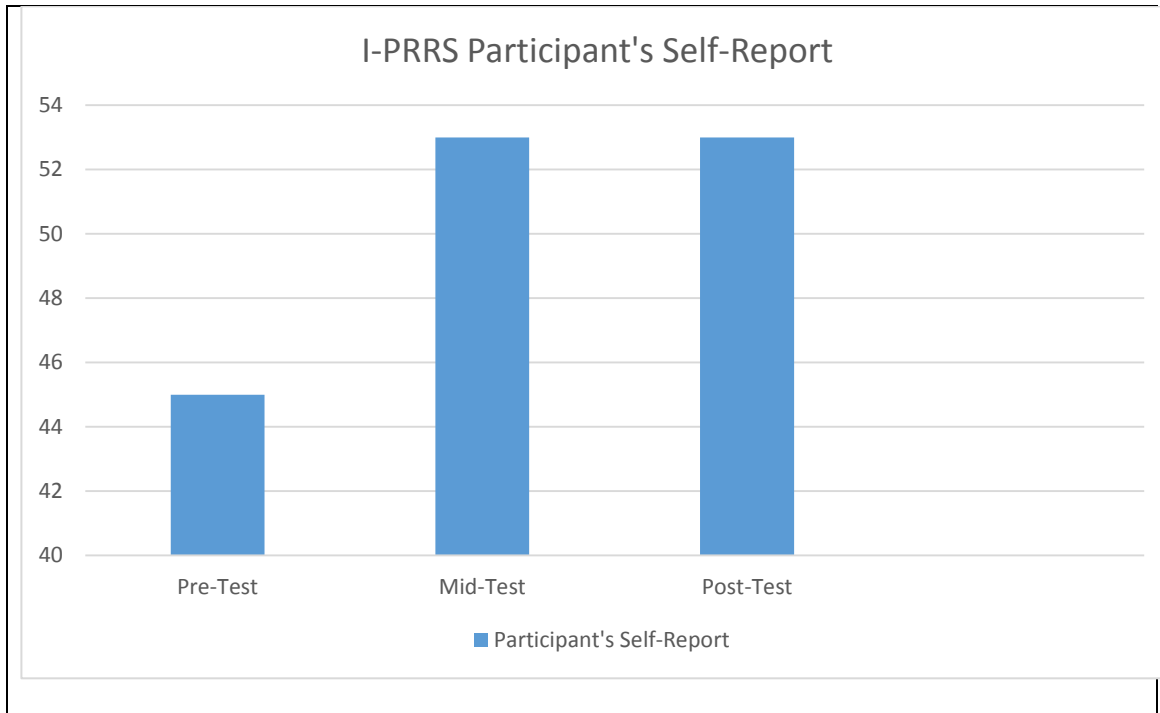
Table 1 and Figure 1 provide descriptive statistics of the results from the Injury Psychological Readiness to Return to Sport (I-PRRS) across three different time points. For the I-PRRS the pre-test score taken during the initial meeting, along with the demographic form, one-week prior to the intervention. Mid test results, were recorded at the end of the third week of the protocol. The post-test results were completed one-week after the intervention. As previously stated in the methods section, the I-PRRS is a scale that rates confidence to return to sport on a scale from 0 to 60. The six question items are summed and then the total is divided by 10. The highest score that can be achieved is 60, which means that an individual has the utmost confidence to return to sport at that time and is psychologically ready to return to sport. A score of 40 expressed that an athlete only has moderate confidence to return to sport, and a score of 20 indicates that an athlete has very low confidence to return to sport. It is important to note that if an athlete scores below 50, they are deemed as not psychologically ready to return to sport. (Glazer, 2009).

The individual’s psychological readiness to return to sport following their injury increased from pre to mid-test, and then stayed the same from mid to post-test. The participant rated one of the six questions differently from time point two and time point three. This is why there was not a change in score from time point two and time point three due to the participant rating one of the questions lower on the I-PRRS. For example, the participant ranked “My confidence to play without pain” a lower score at time point three than time point two, so therefore the total psychological readiness score did not go up. Lastly, is possible that this particular question was ranked lower due to being farther into the rehabilitation process and the participant has reported being more sore. While the score remained the same and did not increase from time point two to time point three, there was still an overall increase in psychological readiness from time point one to time point three. Lastly, since the participant had a total sum score of 53 for psychological readiness to return to sport following his injury, this score is above 50 which confirms that he is psychologically ready to return to sport. These results suggest the intervention increased the athlete’s psychological readiness to return to sport following an injury.

**Table 1.** *Descriptive statistics pre-test, mid-test, and post-test intervention*

Measures	Pre-Test	Mid	Post-Test
I-PRRS Overall Score	45	53	53

**Figure 1. Injury Psychological Readiness to Return to Sport**



**Post-Intervention Interview** In order to gain a deeper understanding of the participant's thoughts, emotions, and overall experience following the MMTS 2.0 Intervention, thematic analysis assisted in this process to analyze qualitative data. Thematic analysis involves analyzing the recording and transcription of the interview and looking for important connections, or terms that can emerged from the intervention (Schinke, JMcGannon, Battochio, & Wells, 2013). There were a total number of four themes and ten sub-themes that emerged from the semi-structured interview. Table 2 displays the thematic structure of the overall themes and sub-themes from the interview, but also allows room for the participant's actual voice via sample quotes.

**Table 2.** *Themes, Sub-Themes, and Sample Quotes from the participant's experience following the MMTS 2.0 Intervention*

<b>General Themes</b>	<b>Sub-Themes</b>	<b>Sample Quotes</b>
<b>Learning</b>	Self-Compassion	“Self-compassion) self-compassion I guess (and self-kindness) is the only thing I can possibly connect this to (that’s okay) and just like loving myself and doing it for me
	Breathing	“When I run, definitely. Ya know, in through the nose, out through the mouth.
	Self-Regulation	“Realizing when I’m kinda short of breath, maybe needing to tone it back a little bit”
<b>Identity</b>	Self-Awareness	I mean being more self-aware too was something that’s definitely grew since my injury. Just knowing what I have to do, when I have to do it.
	Self-Confidence	“That’s all kinda factored into gaining confidence and getting that head start because I’m like alright you can do this.”
<b>Present Moment</b>	Appreciation	“I get to be out of a cast for a few hours this week and it’s a huge highlight for me”
	Motivation	“Well I mean it’s because I’ve never been

---

this driven in my entire life to get back to somewhere that I mean I've never been this long without baseball in my entire life"

**Adapting**

Acceptance

"I mean getting hurt is probably the best thing that could've ever happened. Oh yeah I would argue that its more of one of the pivotal moments in my baseball career was getting hurt this year."

Mental Toughness

"I am doing everything, of this year off, I'm doing everything in my power that I can so that's something that has definitely like changed with me I guess it's just I've never wanted it more than I do now."



**Learning.** While this participant was someone who took a mindful approach before this intervention, learning seemed to be the biggest theme that emerged from the intervention, especially in regards to his breathing. The participant explained that even while he would be pitching, he still never tapped into his breathing like he did until learning some of the breathing exercises and scripts during the intervention. For example, he mentioned “Any of the breathing where I just like was sitting here and just taking deep breathes was the best part about it.” The second sub-theme that became evident was Self-Regulation. The participant described that he felt like he was able to control his breathing patterns more regularly when he needed to during rehabilitation or during running. Lastly, Self-Compassion was a major sub-theme that came about throughout the intervention. The participant explained that not only was one of the self-compassion scripts his favorite, but he felt like he became a lot more in tune with himself. This helps support the research question that mindfulness indeed does increase psychologically readiness to return to play.

**Identity.** This theme unfolded as the participant described throughout the six weeks of the intervention that he felt like he was slowly developing a new sense of self and identity throughout his injury recovery process. For example, he mentioned “Something that’s changed about me I guess, that I’m much more of a self, I’m more of a self-advocate for myself.” The one sub-theme Self-Awareness emerged as well as he explained that concepts like Self-Awareness throughout the intervention helped him to become more mindful. Self-Confidence was the last sub-theme that came about, as the individual described that he slowly started to gain “The thought of your ability back,” throughout the rehabilitation process and as he slowly started to recover. While self-awareness was a big and major topic discussed throughout the entirety of the mindfulness meditation training intervention, and the participant reported that self-awareness

was something in which he took away from this, it helps support the idea that mindfulness helped this participant to become more self-aware, as well as increase his psychological readiness to return to sport following injury.

**Present Moment.** This theme emerged as the participant began to describe how he was always able to be aware and live in the moment, but he has really learned to live day by day and have “appreciation” for the little highlights and progress that he makes each and every day. For example, the participant explained that he was not the type of person to take things for granted, but it was not until after he got hurt and throughout the recovery process where he became very appreciative for little things that he missed. For example, he explained that “I was just sitting on the bench like in my little sling thing, not being able to do anything and I was like I never thought I would miss running or I never thought I would miss being yelled at by coach.” Also, motivation was the last sub-theme that emerged. The individual explained as the intervention went on each week that he is more determined to get back to playing/ throwing a baseball than ever before, and is motivated to work hard to get back. Being in the present moment, living or moment to moment is heavily discussed throughout the mindfulness meditation intervention. This individual explained that taking on this outlook throughout his injury recovery has really allowed him to be more grateful and be much more accepting of things. This was discussed after his psychological readiness to return to sport score increased, which also evidence for the mindfulness meditation training assisting in increasing his psychological readiness.

**Adapting.** This is the last theme that emerged. Throughout the intervention “Adapting” was emphasized throughout the MMTS 2.0 protocol, and “Adapting” seemed to be a major theme that unfolded throughout the intervention. During the post-intervention interview, the participant kept using the word or phrase “New arm,” in regards to getting surgery and coming back from it as if he were learning to use his arm for the first time again. He has emphasized how he has had to adjust and change to being in a sling, and doing homework throughout this process. When we first met and started the intervention, he was in a sling, and then a hard cast, so it was interesting to see how he adapted to the different changes that took place. “Acceptance” was another sub-theme that came about following the intervention because he described in the interview that he has come to terms with his injury, and he even was accepting of how much pain he was going to be in during the recovery, which ended up not being as bad as he thought. Lastly, “Mental Toughness” was the last sub-theme that emerged. In the interview, the participant said that he felt like he never had to work this hard for anything in his life. Each week following the intervention, he explained that he was feeling stronger, and his outlook only got more and more positive as the weeks progressed.

## **Discussion**

The purpose of this study was to assess the efficacy of a mindfulness meditation training program for sport (MMTS 2.0) intervention on psychological readiness to return to sport with an injured athlete. This particular study helped to not only add to the previous literature on mindfulness meditation in sport, but to provide a closer and deeper look on an injured athlete’s experience, through a case study. The findings support the previous correlational studies on mindfulness and psychological readiness following an injury, as the participant’s psychological readiness increased from pre-test to post-test, and remained the same from mid-test to post-test.

For instance, as a previous study found with a mindfulness intervention, enhanced ability to accept and experience a different relationship with their emotions (Baltzell, Caraballo, Chipman, & Hayden, 2014) coincides with the current study findings.

By tracking the levels of readiness and recovery via the I-PRRS for athletes, the data reveals that a mindfulness meditation training program can help to increase psychological readiness to return to sport following an injury. This study helped to display an understanding of the experience of a mindfulness meditation program for an injured athlete. There were a total of four themes that emerged from the post-intervention interview: *Learning, Identity, Present Moment, and Adapting*. Furthermore, previous research emphasizes the difficulty injured athletes face with returning to sport, not just physically but psychologically. The tracking of the participant's psychological readiness via the I-PRRS corresponded with this intention by revealing an increase in the athlete's psychological readiness to return to sport, following the Mindfulness Meditation Training for Sport 2.0 intervention over the six-week intervention. It is possible that the participant's psychological readiness score remained the same or did not increase from mid-test to post-test due to greater intensity during rehabilitation. The reasoning behind this, is because the only question that decreased by rating from mid-test to post-test on the I-PRRS was "My confidence to play without pain."

Since this particular study was a case study, it allows to gain a deeper understanding as to how effective this mindfulness intervention was. First, it is important to note the demographics of this participant. This case study was done with a twenty year old male collegiate baseball player who is a transfer Junior. Also it is important to note that his injury type was a UCL injury to his left arm which happened on October 15<sup>th</sup>, 2018. He will return in a year, January 2020. At the start of this study, the participant explained that he has been playing baseball since he was

two years old, and it has been a big part of his life ever since he can remember. Finally, he filled out the Injury Psychological Readiness to Return to Sport (I-PRRS) scale for the first time. It is extremely important to note that his score at this time point, or time point one, he scored below a total score of 50, which deems an athlete is not psychologically ready to return to sport.

During the first intervention session, or module 1, the participant explained that the only type of meditation he has really done has been yoga, but that normally he is not focusing on his breathing. Since the start of the study, he explained that he was interested and excited to start this study, because the field of sport psychology really fascinates him. It was evident at the start of this intervention that the participant was going to have a positive outlook on his injury rehabilitation recovery process. For example, during the first intervention session, he explained that later that day would be the first time that he gets to be out of his cast for a few hours, and how it is a huge highlight for him.

Lastly, he explained that his perspective was slowly starting to shift. As we began to discuss and briefly started talking about self-compassion, he explained that “I’ve realized this is kind of my time to focus on me. Ever since I was 2 it’s always been about baseball.” This is the start of where the theme *identity* really started to be created. It was interesting to see that during our first initial meeting, he seemed quiet, reserved, and down. Even after the first module, his persona seemed to change and he was much more upbeat and open. A key point to note as well, was that the participant mentioned that he thought he was going to be miserable after surgery and throughout the recovery process but he has actually been better and not in as much pain as he thought he would be.

As his mood seemed to increase a little more each week, halfway through the intervention, it was evident that he was *adapting* more naturally to his injury, and his mental

toughness was increasing. This provides support for the theme of *adapting*, and the sub-theme of accepting his injury, and looking forward to getting stronger both physically and psychologically. A very important note to make is that at this point, this is when he reported that he is “The happiest he’s been in months, especially since surgery.” When the Injury Psychological Readiness to Return to Sport (I-PRRS) was administered at this halfway point, his psychological readiness to return to sport score had not only increased, but his total score was above 50, which is the score that deems an athlete is psychologically ready to return to sport.

During the last three weeks of the intervention, the participant seemed to remain positive, but the only thing that seemed to change was his energy level. He seemed to be a lot more exhausted, and he was not as fully engaged as the first half of the intervention. It is possible that due to the increase in rehabilitation days, may have played a role in this. During the last week of the mindfulness intervention, the individual reported that he felt like “Breathing and getting into his breathing has been easier and much more natural.”

After the intervention, and during the “exit interview” the individual highlighted that he has become much more self-aware, and it is something that has definitely grown since his injury. For example, he explained that “Being true to myself, working as hard as I think I should. Not just being eyewash, or I try to work hard in front of coach, or just try to but really just wanting to do it for me.” This is an example of how the *learning* theme and the sub-theme of self-compassion emerged. As a whole throughout the intervention, he explained that he was able to connect the mindfulness intervention and his injury to “Self-compassion (and self-kindness).” He emphasized that this was the biggest thing that he took away from the mindfulness intervention, and learning to “Love myself and doing it for me.” Also, breathing is something that I’ve definitely taken away from this. That was probably the most beneficial thing that I’ve gotten

from this cause then again I thought that I was an alright breather as it is but I definitely knew, that I know now that there's definitely other ya know peaks to reach with that whole thing." This is another example of how the sub-theme breathing emerged from the mindfulness intervention and from the "exit interview."

Lastly, one of the most important aspects that he took away was about being in the *present moment*, which was the last theme that emerged. He explained that "It's not a big picture kind of thing because you have to be super invested in what you are doing today. Like when I am out of this, I'm doing 2.5 hours of therapy, and I have to be invested in that, like I can't be thinking about how great I might be when I come back or how much its gonna hurt tomorrow."

While the participant's psychological readiness to return to sport score remained the same from time point two to time point three, having an increase in his psychological readiness score from before the intervention to after the intervention, still provides pertinent information and insight as to how important the psychological aspect in injury recovery is. While mindfulness interventions for injury recovery have not been used very often in previous research, this study helps to explain the importance of taking the time to focus on the present moment, and become aware of the present moment. Also, while certain interventions may be helpful to increase performance, or performance enhancement, psychological readiness and injury recovery are two very serious and important issues that are overlooked. For example, the participant from this study provides great insight on this issue, by explaining "For recovery, these first three months, imagery would mean nothing because I am nine months out, 'm even four months out from picking up a baseball so that would make zero sense to even focus on imagery because what would I imagine myself doing, like moving my arm like this, so mindfulness for sure but baseball wise imagery definitely."

This experience with this participant and the mindfulness meditation training intervention helps to link the connection between mindfulness and psychological readiness to return to sport. While the researcher was able to witness the participant's changes in mood, and the I-PRRS helped to provide evidence numerically, this can be very important insight for coaches, athletic trainers, athletes, and sport psychology consultants to try to use mindfulness in the future alongside the injury rehabilitation process. This study helps to teach the importance of how a participant's actual words, and including qualitative data helps depict the real-life experience and hardships that athletes face, like injury. Since the participant's psychological readiness to return to sport score increased from pre to post test, it provides support that mindfulness meditation has an impact on increasing psychological readiness to return to sport.

### **Limitations and Future Research**

While mindfulness has become much more well-known and widely used (Shonin & Gordon, 2016), there is still limited research on mindfulness in sport, especially mindfulness mediation for sport in injured athletes. While there have been other studies done in rehabilitation like goal setting, positive self-talk/positive thoughts, and imagery (Arvinen-Barrow et al., 2015), this case study helped to provide evidence as to how mindfulness can be beneficial for injured athletes, there are very few studies that look at mindfulness for psychological readiness and injury rehabilitation. For instance, imagery has been heavily used in injury rehabilitation (Arvinen-Barrow et al., 2015), but during the post-intervention in this study, the participant explained that imagery is beneficial for performance, but it would not have been beneficial for him throughout his recovery. Future research with mindfulness meditation training and injury rehabilitation and looking at psychological readiness to see if mindfulness is the best coping



mechanism for injured athletes. Lastly, more qualitative data should be conducted in order to gain insight on mindfulness meditation training used for injury rehabilitation and psychological readiness. While the Injury Psychological Readiness to Return to Sport (I-PRRS) scale was able to show the improvement in psychological readiness the participant made from before, during, and after the Mindfulness Meditation Training for Sport, the feedback and participant's words was important to understand the entire process. A major limitation for this study is that there was a lack of generalizability due to the study being a case study and there not being many participants. While the MMTS 2.0 intervention did show an increase in psychological readiness with a collegiate Division II, male baseball player, a larger sample size, multiple sports, competition levels, ages, and both genders should be included when replicating this study.

### **Applied Implications**

The following research study has several applied implications to the field of sport, exercise, and performance psychology. Psychological readiness to return to sport following an injury is not something that has been heavily studied, or sought after. This study helps to provide insight as to how a mindfulness meditation training intervention that coincides with injured athletes' rehabilitation routine may be beneficial. Also, measuring injured athletes' psychological readiness to return to sport following their injury and throughout their rehabilitation and recovery process is important. It is not only crucial for injured athletes to be aware of their psychological readiness, but it provides insight for coaches, AT's, and other sports medicine professionals. Injuries are not an easy thing for athletes to overcome and/or accept, but providing them with ways to cope psychologically may help them have an overall more positive experience. As a

whole, this study helps to stress the importance of psychologically readiness to return to sport, and can help shed light on this topic.

## References

- Ahern, D., & Lohr, B. (1997). Psychosocial factors in sports injury rehabilitation. *Clinics In Sports Medicine, 16*(4), 755-768.
- Arvinen-Barrow, M., Clement, D., Utley, J., Zakrajsek, R., Lee, SM., Kamphoff, C., Lintunen, T., Hemmings, B., & Martin, S. (2015). Athletes' use of mental skills during sport injury rehabilitation. *Journal of sport rehabilitation, 24*(10).
- Baltzell, A., & Akhtar, V. L. (2014). Mindfulness meditation training for sport (MMTS) intervention: Impact of MMTS with division I female athletes. *Journal of Happiness & Well-being, 2*, 160-173.
- Baltzell, A., Caraballo, N., Chipman, K., & Hayden, L. (2014). A qualitative study for mindfulness meditation training for sport: division 1 female soccer players' experience. *Journal of Clinical Sport Psychology, 8*(3), 221.
- Baumgartner, T. A., & Hensley, L. D. (2013). *Conducting & reading research in kinesiology*. New York, NY: McGraw-Hill.
- Bennett, H. R., Czech, D., Harris, B., & Todd, S. (2016). Perceptions of Coping with an Injury in Sport at the NCAA Division I Level: Perceptual Continuity between Student-Athletes and their Athletic Trainers. *Clinical Kinesiology (Online Edition), 39-43*.
- Brown, K.W. & Ryan, R.M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*, 822-848.
- D. A., Stanish, W., Ebel-Lam, A., Brewer, B. W., & Birchard, J. (2011). Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes with

- anterior cruciate ligament injuries at 1 year postsurgery. *Sport, Exercise, and Performance Psychology*, 1(S), 38–48. <https://doi.org/10.1037/2157-3905.1.S.38>
- Frey, J., & Eitzen, D. (1991). Sport and society. *Annual Review Of Sociology*, 17503-522.
- Furrer, P., & Moen, F., & Firing, K. (2015). How Mindfulness Training may mediate Stress, Performance and Burnout. *The Sport Journal*.
- Gardner, F. L., & Moore, Z. E. (2004). A mindfulness-acceptance-commitment-based approach to athletic performance enhancement: theoretical considerations. *Behavior Therapy* 35, 707-723.
- Glazer, D. D. (2009). Development and Preliminary Validation of the Injury-Psychological Readiness to Return to Sport (I-PRRS) Scale. *Journal of Athletic Training*, 44(2), 185-189.
- Holzel, B.K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S.M., Gard.T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging*, 79/(1), 36-43.
- Humphreys, B. R., & Ruseski, J. E. (2009). Estimates of the Dimensions of the Sports Market in the US. *International Journal Of Sport Finance*, 4(2), 94-113.
- Ivarsson, A., Johnson, U., Anderson, M. B., Fallby, J., & Altemyr, M. (2015). It pays to pay attention: A mindfulness-based program for injury prevention with soccer players. *Journal of Applied Sport Psychology*, 27(3), 319-334.

- John, S., Verma, S. K., & Khanna, G. L. (2011). The effect of mindfulness meditation on HPA-Axis in pre-competition stress in sports performance of elite shooters. *National Journal of Integrated Research in Medicine*, 2(3), 15-21.
- Johnson, U., Ekengren, J., & Andersen, M. B. (2005). Injury Prevention in Sweden: Helping Soccer Players at Risk. *Journal Of Sport & Exercise Psychology*, 27(1), 32.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144-156.
- Kabat-Zinn. (2005). *Coming to our senses: Healing ourselves and the world through mindfulness*. New York, NY: Hyperion.
- National Collegiate Athletic Association. *NCAA Sports Sponsorship and Participation Rates Report-1981-82 – 2014-2015*. . Indianapolis, IN: Irick, Erin, 2015.
- Noh, Y.E., Morris, T., & Andersen, M.B. (2007). Psychological intervention programs for reduction of injury in ballet dancers. *Research in Sports Medicine*, 15, 13–32.
- Perna, F.M., Antoni, M.H., Baum, A., Gordon, P., & Schneiderman, N. (2003). Cognitive behavioral stress management effects on injury and illness among competitive athletes: A randomized controlled trial. *Annals of Behavioral Medicine*, 25, 66–73
- Salvador, A., Suay, F., Gonzalez-Bone, E., & Serrano, M. (2003). Anticipatory cortisol, testosterone and psychological responses to judo competition in young men. *Psychoneuroendocrinology*, 28(3), 364-375.

- Scherzer, B. C., Brewer, W. B., Cornelius, E. A., Van Raalte, L. J., Petitpas, J. A., Sklar, H. J., Pohlman, H. M., Krushell, J. R., & Ditmar, D. T. (2001). Psychological Skills and Adherence to Rehabilitation after Reconstruction of the Anterior Cruciate Ligament. *Journal of Sport Rehabilitation*, 10(3), 165-172.
- Schinke, J. R., McGannon, R. K., Battochio, C. R., & Wells, D. G. (2013). Acculturation in elite sport: a thematic analysis of immigrant athletes and coaches, *Journal of Sports Sciences*, 31:15, 1676-1686.
- Shonin, E., Van Gordon, W., & Griffiths, M. D. (2016). Ontological addiction: Classification, etiology, and treatment. *Mindfulness*, 7(10).
- Stanish, D. A., W., Ebel-Lam, A., Brewer, B. W., & Birchard, J. (2011). Fear of reinjury, negative affect, and catastrophizing predicting return to sport in recreational athletes with anterior cruciate ligament injuries at 1 year postsurgery. *Sport, Exercise, and Performance Psychology*, 1(S), 38–48. <https://doi.org/10.1037/2157-3905.1.S.38>
- Teasdale, J. D., Segal, Z., & Williams, J. M. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy*, 33(1), 25-39.
- Turner, S., & Coen, S. E. (2008). Member checking in human geography: interpreting divergent understandings of performativity in a student space. *Area*, 40(2), 184-193.

Williams, J. M., & Andersen, M. B. (1998). Psychological antecedents of sport injury: Review and critique of the stress and injury model. *Journal of Applied Sport Psychology*, 10, 5-25.

## APPENDIX A

### Informed Consent

You are invited to partake in a research study examining psychological readiness of injured collegiate athletes. You were selected as a possible candidate, or participant for this study because you are a collegiate injured athlete who is currently injured, and active on a college team roster.

This form will discuss and describe the study in its entirety, so please make sure to read every part, and do not hesitate to ask questions regarding any confusions for this study.

This study is being conducted by Carlynn Musser, College of Nursing and Health Sciences, Department of Sport and Exercise Sciences.

#### **Background Information**

The purpose of this study is to better understand injured athletes' and their psychological readiness following an injury. This study will examine an athlete's psychological readiness to return to sport following an injury, by using self-report measures and answering a series of questions about their process. While injured athletes may be cleared to return to sport physically following an injury, they might not be ready psychologically, which is often overlooked.

#### **Procedures**

If you agree to take part in this study, you will be asked to do the following: (1) fill out a brief demographics form, (2) take part in a mindfulness meditation training for sport program, (3) fill out a series of questions regarding your readiness to return to sport following the program, and



(4) participate in a very brief and short interview, describing your experience through open-ended questions.

**Potential risks/benefits of this study:**

There are no risks for this study.

The benefits of this study will not only help the field of Sport Psychology, but it will attempt to help other injured athletes have the best experience they can both physically and psychologically.

**Confidentiality**

The findings for this study will be kept private and confidential on a computer in the Sport, Exercise, and Performance Psychology Lab. The office remains locked unless professors or the Graduate Assistant is in there.

**Voluntary Nature of the study**

Please understand that if at any point and time you wish to stop participating in this study, you have every right to do so. This study is voluntary, which means you are volunteering to take part

**Statement of Consent:**

I hereby authorize that I \_\_\_\_\_, have read and understand all that this study entails, and I wish to volunteer as a participant for this study. I agree to give my consent for this study by providing my signature below:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## APPENDIX B

### RECRUITMENT LETTER

#### ATTENTION ALL INJURED ATHLETES

Are you a collegiate athlete who is currently injured? My name is Carlynn Musser and I am a graduate student at Barry University in the Sport and Exercise Sciences department.

While the injury and rehabilitation process can be viewed as a negative topic to discuss in athletics, I am interested in assessing the efficacy of a mindfulness meditation intervention through the use of the Mindfulness Meditation for Sport 2.0 approach on psychological readiness to return to sport in injured collegiate athletes.

If you are an injured NCAA collegiate athlete who is interested about learning more about your injury process from not just the physicality of your injury, but from a psychological standpoint as well, please contact Carlynn Musser ([carlynn.musser@mymail.barry.edu](mailto:carlynn.musser@mymail.barry.edu)) about participating in this study!

In order to meet the requirements for this study, you **must** be:

- NCAA Division I-III athlete
- Must currently be injured (missed at least one practice or competition due to injury)
- Must be at least 18 years of age
- Must currently be active on a college team roster

Thank you so much for your time and consideration for this opportunity.

Best,

Carlynn Musser

APPENDIX C

**DEMOGRAPHICS FORM**

**Participant Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Gender:**     **M**     **F**                                   **Date of Injury:** \_\_\_\_\_

**Age:** \_\_\_\_\_ **Date of Expected Return:** \_\_\_\_\_

**Sport:** \_\_\_\_\_ **Type of Injury:** \_\_\_\_\_

**Athletic Year:** \_\_\_\_\_

**Previous Injury History:** \_\_\_\_\_

**How long were you out:** \_\_\_\_\_

## APPENDIX D

### **Injury Psychological Readiness to Return to Sport Scale (I-PRRS)(Glazer, 2009).**

The I-PRRS is a scale that is used to measure an athlete's psychological readiness to return to sport following an injury. The scale ranges from 0 (little to no confidence) to 100 (utmost confidence to return to sport). The scale asks athletes to rate six items based on their confidence level for that item. Once an athlete finishes rating the scale, the researcher adds up the total and then divides the sum by 10. Scores between 50 and 60 suggest that the athlete is psychologically ready to return to sport. If an athlete scores below, this indicates that an athlete is not psychologically ready to return to sport and needs more time to recover.

Please rate your confidence to return to your sport on a scale from 0 – 100.

0= no confidence at all

50= moderate confidence

100= complete confidence

1. **My overall confidence to play is:** \_\_\_\_\_
  
2. **My confidence to play without pain:** \_\_\_\_\_
  
3. **My confidence to give 100% effort is:** \_\_\_\_\_
  
4. **My confidence to not concentrate on the injury is:** \_\_\_\_\_
  
5. **My confidence in the injured body part to handle demands of the situation is:** \_\_\_\_\_
  
6. **My confidence in my skill level/ability is:** \_\_\_\_\_

## APPENDIX E

### Post Intervention Semi-Structured Interview

- 2) Do you think that after this intervention, you'll continue to practice daily mindfulness in the future, or use any of the concepts that we've talked about?
- 3) Has there been any time like during rehab or during running, uhm, or studying when you've like paid more attention to your breathing?
- 4) Do you feel like you can control your nerves more now or do you feel like there's been any difference?
- 5) From when we started so in January until now, do you feel like you are more confident when you will return or do you feel like more confident in your ability at all?
- 6) Do you feel like you've changed at all as a person, or as a player, or in any, like do you feel different at all? Does that make sense?
- 7) Do you think it's also something that you've had to work harder than you've ever had to (recovery)?
- 8) So do you feel like uhm some of the topics and different things that we talked about have helped you at all, like with your psychological readiness to return, like when you will return?
- 9) What were some things you didn't like? You can say as much or as little [uhm] as you want? Just about the whole thing or what could have been better, or what you think could have helped you more? Anything?
- 10) Did you feel like it was more beneficial [the imagery one?]

- 11) Did you feel like some of it was the scripts were like too long that you couldn't like pay attention?
- 12) Do you think that throughout your process and recovery, do you think that something else would have been more beneficial a different topic like imagery or something else would have been more beneficial:?
- 13) From a recovery standpoint or rehab standpoint do you think imagery would be more beneficial than mindfulness?
- 14) Is there anything else that you really liked or didn't like?
- 15) Do you think you like 1 on 1 better than in a group setting with three or four (other athletes)
- 16) Anything else you want to add?
- 17) Do you think that when you were feeling the physical sensation, do you think there would ever be a time during your rehab that it would do more harm than good?