

**Fear Avoidance and Readiness to Return to Sport after Injury
in Division I Collegiate Soccer Players**

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ABSTRACT

This study examined fear avoidance and psychological readiness to play, in Division I collegiate men and women soccer players at Virginia Tech, to uncover how injury affects mental readiness. Contributing factors that play a role in a successful and speedy rehabilitation process need to be identified to help student-athletes receive the tools that they need to return to their peak performance. Although there is a plethora of research both in the United States and internationally investigating fear avoidance and psychological readiness to return to sport, there is limited research studying both phenomena simultaneously in collegiate athletes. A total of 13 men and 24 women soccer players completed the Athlete Fear Avoidance Questionnaire (AFAQ) and the Injury Psychological Readiness to Return to Sport Scale (IPRRS). Results from the study indicated that there is a significant negative correlation between fear avoidance and readiness to play, that female soccer players scored significantly higher than the male soccer players on the AFAQ, that male soccer players scored significantly lower on the AFAQ than the female players for those players that had sustained an injury for greater than six weeks, and that those players that sustained injuries greater than six weeks scored significantly lower on the IPRRS, with male soccer players scoring significantly higher than female soccer players if injured less than six weeks. Therefore, sports medicine professionals involved in athletes' rehabilitation process should incorporate interventions to help diminish fear avoidance and increase psychological readiness to play, while also considering mental differences between male and female soccer players.

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INTRODUCTION

There is a saying that “athletes’ best ability is their availability.” This study explored the interaction between physical injury and mental state that impacts a student athlete’s availability to play.

During the last few years, college athletics has transformed into a transactional business by the advent of Name, Image, and Likeness (NIL) and revenue sharing (MacInnis, 2024). Student athletes can now readily move from team to team and earn money while competing. These changes in the college athletic landscape have only increased the emotional pressures on student athletes. At the same time due to the chaotic nature of sports, injuries continue to disrupt college athletes, and some injuries like concussion and anterior cruciate ligament (ACL) tears have significantly increased over time (Hootman et al., 2007). In addition, research indicates that mental health disorders negatively impact an injured athlete’s recovery process, including prolonging recovery times and decreasing likelihood of returning to sport (Rogers et al., 2023).

Two mental barriers potentially preventing injured college athletes from a successful rehabilitation process are fear avoidance and psychological readiness to play. Fear avoidance occurs when a person experiences pain and/or has an exaggerated perception of the pain, leading them to be scared of movement and avoid behaviors that they think will cause more pain or damage (Anaesthesia & Intensive Care Medicine, 2016.). The word kinesiphobia is also used to describe fear avoidance. Psychological readiness to play is the degree to which a person feels ready to compete again. A person who is psychologically ready to play is confident in their ability to compete and yearns to play again. A person who is not psychologically ready to play feels hesitant and unprepared to compete again.

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Two qualitative studies investigating psychological readiness to play involved interviews of student-athletes returning from ACL reconstruction (ACLR) surgery. Both studies found that the common theme in the participants' responses revolved around their confidence (Burland et al., 2018; Podlog et al., 2015). Specifically, a "hesitation and lack of confidence led to self-limiting tendencies" (Burland et al., 2018). These results indicate that the mind plays a crucial role in triggering people's abilities. That is why it is so important to study fear avoidance and psychological readiness so we can provide the support and resources that student-athletes need to return to their sport in an effective and an efficient manner after injury.

Purpose Statement

The purpose of this study is to measure fear avoidance and psychological readiness to return to sport after injury in Division I collegiate women and men soccer players at Virginia Tech. Injury in athletes causes physical pain and could possibly cause psychological pain as well. Psychological responses could affect athletes during their rehabilitation process and their ability to return to playing their sport. Thus, it is important to investigate how collegiate athletes are psychologically impacted by injury so their coaches and team health care providers (physicians, athletic trainers, dietitians, etc.) can provide them the support and resources they need to return to play at their peak performance.

LITERATURE REVIEW

Fear Avoidance in Ankle Injuries

Fear avoidance from injury occurs with all types of injuries including ankle injuries, both surgical and non-surgical. Fukano, Mineta, and Hirose conducted a study on collegiate football and lacrosse players (115 male athletes and 105 female athletes), measuring the relationship between fear of movement/reinjury in athletes with and without ankle instability by gender

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(Fukano et al., 2020). Participants completed the Identification of Functional Ankle Instability, Athlete Fear Avoidance Questionnaire (AFAQ), Tampa Scale for Kinesiophobia (TSK), and ankle joint laxity test. The researchers classified the participants into three groups: functional instability (FI), no functional instability (NFI), and a control based on their ankle sprain history and the identification of functional ankle instability. A two-way ANOVA was conducted, finding that the AFAQ scores were significantly higher in the NFI group compared to the FI group in both males and females ($P < 0.05$), indicating that there was a greater fear of movement/reinjury in individuals with ankle instability. The FI group also had significantly greater TSK scores than the NFI group (in both males and females), indicating participants with a history of ankle sprains who had functional ankle stability had a lower fear of movement/reinjury ($P < 0.05$). Notably, the results of fear of movement/reinjury in female athletes indicated a direct correlation with their ankle joint laxity ($P < 0.05$). Thus, functional and mechanical instability in female athletes may be related to their fear of movement/reinjury.

A cross-sectional study investigated fear avoidance in collegiate athletes who suffered from an ankle sprain (Houston et al., 2018). The participants were divided into three groups. There were 76 participants who sprained their ankle once, 44 participants with recurrent sprains, and 29 control participants who did not have a history of injury. All participants completed a self-reported injury history questionnaire and the Fear Avoidance Beliefs Questionnaire (FABQ). Significant group differences were discovered after the Mann-Whitney U tests were performed ($P < 0.05$), showing that athletes in the recurrent ankle sprain group reported higher levels of fear compared with the participants with a single sprain and the control group. In addition, participants with a single sprain had significantly elevated levels of fear compared to the control

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group ($P = 0.02$). This research indicates that athletes with an injury experience had increased fear avoidance, and the more often an athlete is injured, the greater their fear will be.

A comprehensive systematic review of 11 studies compared fear avoidance between individuals who have and have not experienced chronic ankle instability (Suttmilller & McCann, 2021). All 11 studies employed the TSK, FABQ, or AFAQ to evaluate participants in the chronic ankle instability group (CAI), ankle sprain copers group (COP), and the control group (CON) who did not suffer from ankle instability or pain. Data for each group from the studies was compared, finding that physically active individuals with CAI described having higher levels of injury-related fear compared to both the COP and CON groups. This study concluded that the FABQ and the TSK are helpful in identifying injury-related fears such as fear avoidance and in obtaining the necessary information to provide individuals with rehabilitation strategies to reduce and monitor fear.

Another study, also by Houston et al. examined the health effects of having chronic ankle instability. Twenty-five physically active participants with chronic ankle instability and 25 physically active participants who did not have a history of ankle sprains participated (Houston et al., 2014). All participants attended the laboratory for one testing session where they completed the Disablement in the Physically Active Scale (DPA), Foot and Ankle Ability Measure (FAAM), Tampa Scale of Kinesiophobia-11 (TSK-11), and Fear-Avoidance Beliefs Questionnaire (FABQ). After analyzing the results from the questionnaires, it was found that the participants with chronic ankle instability reported significantly higher fear avoidance on both the FABQ and TSK-11 ($P < 0.001$). Therefore, like the studies described above, an ankle injury is a strong predictor of fear avoidance.

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Fear Avoidance in Back Injuries

Back injuries are another common injury that can cause athletes to display an increased fear avoidance. Osuka et al. conducted a cross-sectional study, “Fear-Avoidance Beliefs Associated with Non-Specific Chronic Low Back Pain in College Athletes” examining 276 collegiate student athletes from Hokkaido University (Osuka et al., 2024). The participants were categorized into two groups: those who had non-specific chronic low back pain (NS-CLBP) and athletes without lower back pain (non-NS-CLBP). People with orthopedic spine disease or surgery were not included in this study. All participants completed the Fear-Avoidance Belief Questionnaire Physical Activity (FABQ-PA), Athlete Fear Avoidance Questionnaire (AFAQ), Tampa Scale for Kinesiophobia-11 (TSK-11), Pain Catastrophizing Scale (PCS), Roland-Morris Disability Questionnaire (RDQ), and Body Mass Index (BMI). Multivariate logistic regression analyses performed found that the FABQ-PA, TSK-11, RDQ, and BMI scores were significantly higher in the group with NS-CLBP ($P < 0.001$, $P = 0.034$, $P < 0.001$, and $P = 0.022$, respectively) than in the non-NS-CLBP group. The results suggest that college athletes with chronic low back pain tend to experience fear avoidance, and that their fear avoidance is greater than that of athletes who do not have pain.

A longitudinal study was conducted on 59 men and women athletes who experienced non-surgical injuries which included lower body, upper body, and back injuries. After sustaining an injury, the participants completed the AFAQ, TSK, pain catastrophizing (PCS), pain severity and interference, and depression questionnaires (Tito et al., 2023). The athletes repeated the same questionnaires once they returned to competition. Researchers used Pearson correlations and regression analysis to measure the relationships between function, psychological variables, pain, and return to competition time. The results showed that the AFAQ had the strongest

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correlation with return to competition time ($r=0.544$, $P < 0.001$), meaning that the more fear avoidance in an athlete, the longer their recovery time. For example, for every increase of 1 on the AFAQ, there was an increase in the athletes' return to play time by 0.85 of a day.

A randomized clinical trial investigated the effect of fear avoidance based physical therapy treatment for individuals experiencing acute low back pain for less than 8 weeks (George et al., 2003). The sixty-six participants were randomized to receive either fear avoidance-based physical therapy for 4 weeks or standard of care physical therapy for 4 weeks. Prior to the intervention, right after the intervention, and 6-months after the intervention, the participants completed the Oswestry Disability Questionnaire (ODQ), the FABQ, and they rated their pain intensity using a 0 to 10 scale. Both intervention groups experienced significant within group improvements for disability and pain intensity ($P < 0.05$). The fear-avoidance treatment group had significant improvements in their fear avoidance beliefs ($P < 0.05$) after treatment and their fear-avoidance beliefs were significantly lower compared to the standard care group ($P < 0.05$) at both the completion of the intervention and at 6 months after the intervention.

Fear Avoidance in Knee Pain

Knee injuries are quite common in athletes and due to the dependence on our knees in most sports, fear avoidance can be a barrier when returning to play. Research was conducted to understand how higher levels of fear avoidance in women with patellofemoral pain affects their lower body strength and squatting kinematics (Glaviano et al., 2019). There were 25 women in this study. Sixteen of them suffered from patellofemoral pain and the other 9 women were healthy (the control group). All the participants completed the Anterior Knee Pain Scale (AKPS), FABQ, and Visual Analog Scale (VAS). Then, they proceeded to perform the physical portion of the testing which included the strength of participants' knee extension, hip abduction, and hip

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external rotation, as well as trunk, hip, and knee kinematics were measured during a single leg squat. Based on the results of the FABQ, participants with patellofemoral pain were divided into two different groups: elevated fear avoidance belief and low fear avoidance belief. The results showed that participants in the elevated fear avoidance group were significantly weaker in knee extension and hip abduction, and performed the single leg squat with significantly greater ipsilateral trunk flexion compared to the healthy control group and the low fear avoidance group ($P < 0.05$). Also, participants in the low fear avoidance group performed their single leg squat with less knee abduction compared to the two other groups ($P = 0.001$). Therefore, the results indicate that participants with patellofemoral pain who have elevated levels of fear avoidance tend to exhibit lower extremity weakness as well as an increased frontal plane trunk motion when performing a single leg squat.

Anterior cruciate ligament reconstruction (ACLR) is a serious and unfortunately common injury in athletes. It takes about 9 to 12 months to rehab and the process is painful and tedious, highlighting the possibility of introducing fear avoidance as they re-enter their sport. Hoch et al. conducted a study investigating the fear-avoidance beliefs and health related quality of life (HRQL) in current Divisions I and III collegiate athletes who had a history of ACLR not participating in sport (ACLR-NPS), a history of ACLR participating in sport (ACLR-PS), and with no history of injury in sport (Control) (Hoch et al., 2020). There were 10 participants in each of the three groups. All participants completed the Physically Active Scale (mDPA) and Fear Avoidance Beliefs Questionnaire (FABQ). The mDPA was used to measure participants' HRQL and the FABQ was used to assess participants' fear avoidance beliefs. The results indicated that ACLR-NPS had significantly greater FABQ scores than the ACLR-PS and the control group, showing that athletes still in the rehabilitation process and not yet cleared for sport

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were more fearful of competing and reinjuring themselves ($P < 0.001$). In addition, the ACLR-NPS group had significantly greater scores on the mDPA compared to the ACLR-PS and the control group ($P < 0.001$), indicating that the ACLR-NPS group tended to have greater levels of functional impairment inhibiting their physical activity compared to the ACLR-PS group. The ACLR-PS group also had significantly higher scores on both the FABQ and mDPA compared to the control group ($P < 0.05$). Therefore, regardless of whether a person is participating in sport or not, those who had ACLR are more likely to experience fear avoidance and a poorer health-related quality of life.

Another study researched the longer-term effects of ACLR surgery. Ross investigated the relationship between functional levels and fear-avoidance beliefs in 48 participants (Ross, 2010). About 32 months after their surgery, the participants were given the Knee Outcome Survey (KOS), Activities of Daily Living Scale (ADLS), Sport Activity Scale (SAS), and Fear Avoidance Beliefs Questionnaire (FABQ) to complete in a single session. During this session, the participants also performed the isokinetic test of the quadriceps and single-leg hop testing. The regression model showed that having only one ACLR and having lower fear avoidance beliefs had significantly more daily living movement and participation in sports ($P < 0.001$). Therefore, for athletes to return to sport, it is important that they have zero or low fear avoidance beliefs.

A similar study examined injury-related fear and physical activity in people with a history of ACLR (Barchek et al., 2021). The 19 participants in this study completed the FABQ, and recorded their average step count per day and their average vertical axis counts per minute. There was a positive but non-statistically significant correlation between steps per day and FABQ scores ($P > 0.05$). People with more than 10,000 steps tended to have lower levels of fear

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avoidance. The study concluded that further research needs to be performed on the potential psychological variables that allow people who have had ACLR and have fear avoidance to be active.

Knee self-efficacy, fear avoidance beliefs, and kinesiophobia were studied in a systematic review that sought to understand the psychological impacts on people who suffered from ACL injuries (Bullock et al., 2022). This meta-analysis included seventy-three articles containing either the Tampa Scale of Kinesiophobia (TSK), Knee Self-Efficacy (KSES), or Fear Avoidance Beliefs Questionnaire (FABQ). It was discovered that there was significant improvement in kinesiophobia from pre-operative ACLR to 3 to 6 months after the surgery and from 3 to 6 months post operative to 7 to 12 months post operative ($P < 0.05$). The same improvement was also suggested to occur when analyzed via the FABQ; however, there are limited studies available on this topic. This meta-analysis suggests that with time, the fear of movement diminishes after ACLR and that more research needs to be conducted on the role of fear avoidance.

Fear Avoidance in Concussion Related Injuries

Compared to other injuries there is limited research on fear avoidance in athletes who suffered from sport-related concussions. However, Suzuki et al. performed an observational study on 48 male and female athletes who suffered a concussion playing their sport. All participants provided demographic information and completed the Athletic Fear Avoidance Questionnaire (AFAQ), Post Symptom Scale (PCSS), Profile Mood States (PMD), and Dizziness Handicap Inventory (DHI) (Suzuki et al., 2024). Twenty-eight of the 48 participants only completed the questionnaires once; the other participants completed the questionnaires on their initial visit, when they were discharged from rehabilitation, and 6 months after their discharge.

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There was no gender difference in the AFAQ scores. When the data of the 28 participants who completed the questionnaires multiple times was analyzed, it was discovered that their scores significantly improved ($P < 0.05$), indicating that with time and with an effective rehabilitation program, fear avoidance diminishes in athletes who have had a concussion.

Patlan et al. performed a similar study on 34 collegiate athletes who played various sports and sustained a concussion (Patlan et al., 2024). The purpose of the study was to identify whether there was a relationship between acute concussion symptoms and athlete fear avoidance, pain catastrophizing, depression, and anxiety. Within 48 hours of suffering from the concussion, the participants were assessed using the Sport Concussion Assessment Tool 5, AFAQ, Pain Catastrophizing Scale, and Hospitality Anxiety and Depression Scale. The researchers found that there was a significant relationship between the AFAQ and the number of symptoms that a participant experienced ($P = 0.003$) in addition to depression and anxiety ($P = 0.001$). Therefore, the athletes with more fear avoidance had more symptoms.

Fear Avoidance from a Variety of Injuries

Porter et al. measured fear avoidance and return to competition times in 35 collegiate student-athletes who suffered from an acute musculoskeletal injury (Porter, 2017). The participants played either football, rugby, soccer, basketball, or hockey. Within 24 hours of becoming injured, the participants completed the Athlete Numeric Pain Rating Scale (NRS), AFAQ, Pain Disability Index (PDI), Brief Pain Inventory (BPI), Pain Catastrophizing Scale (PCS), TSK, and FABQ. In addition, depending on the injury, the participant completed the Oswestry Low Back Pain Disability Questionnaire, the Lower Extremity Functional Scale, or the Disability of the Arm, Shoulder, and Hand questionnaire. All of these measures were taken from the participants every two weeks until they returned to competition. The primary investigator

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then calculated the number of days it took for the participants to rehab and return to play. The results revealed that there was significant improvement in both pain and function from injury at the return to competition time period ($P < 0.05$). Also, Pearson Correlations showed that there were significant relationships between the onset of injury athlete fear avoidance, change in function, pain disability, pain interference, and depression with return to play. This study concluded that there is a possibility that injury onset measures of pain and athlete fear avoidance could predict the duration of rehab and the amount of time it will take an athlete to return to competition.

O'Connor et al. investigated 73 injured Gaelic players at Dublin City University (O'Connor et al., 2021). All the participants were injured over the span of the same collegiate season. Immediately after an athlete was injured, they completed the Athlete Fear Avoidance Questionnaire (AFAQ) and once the athlete was cleared to return to competition, they completed the Injury-Psychological Readiness to Return to Sport (IPRRS) Scale. The average AFAQ score was 22.6 and the average I-PRRS score was 46.4. Scores on the AFAQ range from 10 to 50 and the higher scores indicate greater fear avoidance beliefs. Scores on the I-PRRS range from 0 to 100. Zero represents “no confidence” and 100 represents the “utmost/complete confidence.” The researchers found that 47.9% of players were considered psychologically unready to return to sport when they were cleared. The participants who suffered from severe injuries had significantly higher AFAQ scores than participants who suffered mild injuries ($P = 0.01$). Participants who suffered from severe injuries also had significantly lower I-PRRS scores than participants with mild and moderate injuries ($P < 0.0001$). A significant difference between gender scores was not observed. Therefore, the data indicates that collegiate athletes with injuries experience fear avoidance and lower confidence

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levels and that severity of injury helps dictate the extent of their fear avoidance and lack of confidence.

A different study was conducted on males from adolescent Irish Gaelic football clubs to examine their “fear avoidance post-injury, the effect of pain, time-loss, injury severity and previous injury on the extent of fear-avoidance, and the usefulness of a modified Athlete Fear Avoidance Questionnaire (mAFAQ) as a screening tool for predicting injury” (O’Keeffe et al., 2020). The 97 participants completed an injury history questionnaire which inquired about injuries that were suffered in the last 12 months. Participants also completed the mAFAQ to screen fear avoidance at the beginning of the season. If a participant was injured during the season, they immediately were given the AFAQ and were classified into the time-loss injuries group or the non-time-loss injuries group. The time-loss injuries group was not allowed to compete in Gaelic football due to injury. The non-time-loss injuries group could continue to compete with their injury. Participants who sustained a time-loss injury completed the AFAQ again right before their first time returning to competition. During the season, 22 of the participants suffered from time-loss injuries. Based on the two different AFAQs taken by the participants, the study found that fear avoidance post-injury significantly decreased before returning to competition ($P < 0.05$). Also, fear avoidance post injury was significantly higher in participants who experienced greater levels of pain ($P < 0.05$); however, time-loss, injury severity, and previous injury did not significantly affect participants’ fear avoidance levels ($P > 0.05$).

Another study conducted by O'Connor et al. enrolled 416 male athletes and 256 female athletes from 24 field-sport teams at one university in Ireland and followed them for a season (O’Connor et al., 2022). If an athlete during this time period had to sit out from their respective

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sport due to injury, he/she completed the AFAQ and Pain on the Visual Analogue Scale. Before the injured athlete returned to their sport, he/she completed the AFAQ and IPRRS. There was a total of 179 injuries during the course of the study. There was evidence of fear avoidance post-injury; the average score of the AFAQ was 21.8 and the average IPRRS score was 48.4. These numbers indicate that although the participants experienced fear avoidance, they had some confidence to return to their sport. In addition, the data indicated that the athletes who suffered from more severe injuries and higher pain levels presented significantly higher fear avoidance and lower confidence levels ($P < 0.0001$).

An additional study examined the kinesiophobia and fear avoidance behaviors in female college athletes during their menstrual cycle (Kizilay & Burkay, 2023). There were 50 female athletes in this study who were classified into 3 separate groups based on their pain levels during menstruation: Group 1 (with pain), Group 2 (no pain), and Group 3 (intermittent pain). Each group was given the TKS and FABQ to complete. The results showed that there were significant differences in the scores on the TKS and FABQ between the groups ($P < 0.05$). Group 1 had significantly higher scores than Group 2 on the TSK and Group 3 had significantly higher scores than Group 2 on the TSK ($P < 0.05$). Group 1 had significantly higher scores compared to both Group 2 and 3 on the FABQ ($P < 0.05$). Therefore, the female athletes who experience pain during menstruation tend to have kinesiophobia and fear avoidance behavior due to their pain.

Fear Avoidance in Non-Athletes

A study investigated fear avoidance beliefs in people who were receiving vocational rehabilitation services from the Return to Work Assist Program in Queensland, Australia (Watt et al., 2015). The 104 participants completed questionnaires including the FABQ and the Short

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Form-36 Health Survey, and answered questions about their return-to-work outcome. The results indicated that participants who returned to work had significantly lower fear avoidance beliefs than the participants who had not yet returned to work ($P < 0.05$). In addition, there was a significant correlation between fear avoidance beliefs and measures of physical and mental health ($P < 0.05$). For example, the participants who experienced more health-related struggles had higher levels of fear avoidance beliefs compared to participants who had fewer health-related difficulties.

There was a similar study conducted with the goal of understanding the effectiveness of a return to work intervention in participants who experienced low back pain and fear avoidance (Godges et al., 2008). All thirty-four participants were unable to attend work due to a work-related incident that caused low back pain. Participants completed the FABQ at their initial physical therapy evaluation. The participants who scored 50 or above, indicating that they had high fear avoidance beliefs, were divided into two intervention groups: the education group and the comparison group. Both groups performed conventional physical therapy. The education group also learned about and were given counseling on pain management tactics and the importance of physical activity and exercise. All participants received the physical therapy intervention 2 to 3 times a week for 45 to 60 minutes each session until they were able to return to work. The effectiveness of the interventions was calculated by the number of days between the date of their injury and the date when the participant returned to work and was able to perform the same duties as they were prior to their injury. It was found that all of the participants who received the education intervention returned to work within 45 days whereas only one third of the participants in the comparison group still had not yet returned to work within 45 days. There was a significant difference between the two intervention groups in the number of days it took

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the participants to return to work ($P < 0.05$). Thus, educating people with fear avoidance about pain management and physical movement can aid in the recovery process.

Another study looked at whether pain characteristics and fear avoidance beliefs predicted physical activity in older adults (Larsson et al., 2016). Adults 65 years and older who were registered residents of Sweden were randomly selected to participate. All participants were mailed a questionnaire which encompassed questions from the TSK-11, General Self-Efficacy Scale (GSE), Short Form Health Survey (SF-12), Multidimensional Pain Inventory, and demographic questions. The participants completed this same questionnaire again 12 months later. The responses and scores were analyzed, finding that participants with chronic pain had significantly lower activity levels compared to participants without chronic pain and this was significantly associated with kinesiophobia ($P < 0.001$). These results show the importance of managing fear avoidance beliefs so that adults can be more active and healthier as they continue to age.

Psychological Readiness to play in ACL Injuries

Psychological readiness to play is important to maximize full performance in one's sport. Kunnen et al. set out to uncover how athletes defined psychological readiness to play and how they knew they were ready to compete again after having ACL reconstruction (ACLR) surgery (Kunnen et al., 2020). Twenty-one soccer players who were back playing after having an ACLR surgery participated in an online survey that was open-ended. The goal was to gain insight on their experiences and emotions related to overcoming any psychological barriers to return to playing soccer again. There were two main themes that were discovered from the responses that predicted their psychological readiness to play: "Having Confidence" and the "Love of the Game."

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A qualitative study on athletes' recovery from ACLR surgery was performed to understand the perceptions and perspectives of the athletes about their decision to return to their sport (Burland et al., 2018). There were 12 participants including males and females. All participants were at least 1-year post-primary ACLR. Six of the participants had returned to competition, and the other six had not yet returned to their sport. The sports that all participants competed in required both cutting and jumping/landing. Participants completed a functional test battery to assess their strength, balance, power, and endurance and they reported outcome measures (internal knee documentation committee subjective knee form, Tegner Activity Scale, Marx Activity Scale, and Knee Injury and Osteoarthritis Outcome Score). Then, a certified athletic trainer not involved in the treatment and rehabilitation of the participants conducted semi structured interviews which lasted 25 to 50 minutes. The Colaizzi descriptive phenomenological method was used to analyze the data. There were six common themes found in the responses of the participants: “(1) hesitation and lack of confidence led to self-limiting tendencies, (2) heightened awareness after ACLR, (3) expectations and assumptions about the recovery process influenced the decision to return to sport after ACLR, (4) coming to terms with ACL injury led to a reprioritization, (5) athletic participation helped reinforce intrinsic personal characteristics, and (6) having a strong support system both in and out of rehabilitation was a key factor in building a patient's confidence.” These findings illustrate that psychological factors are a major component of the rehabilitation process, and therefore psychological readiness to play can discourage athletes from returning to their respective sport after injury.

Another qualitative study was conducted on seven participants who competed in soccer (Podlog et al., 2015). The mean age of the participants was 21.9 years old. The purpose of this study was to understand the experiences and psychological readiness to play in elite athletes after

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a serious injury. The participants had missed at least 2 months from their sport due to injury. The injuries included fractured metatarsal, ruptured posterior cruciate ligament, fractured ankle, bruised bone, Achilles tendon damage, and grade 2 hamstring tear. There were 2 stages in this study. In the first stage, the participants engaged in a focus group. This focus group lasted an hour and 45 minutes during which participants explored and shared their understandings and experiences about their injury, causing the participants to identify their commonalities. A researcher helped facilitate the conversation. The second stage was a one-on-one interview with a researcher. During this stage, the researcher asked each participant to elaborate on specific details they had shared in the focus group. The results showed that there are three characteristics that are needed for the participants to feel psychologically ready to return to competing: “(a) confidence in returning to sport, (b) realistic expectations of one’s sporting capabilities, and (c) motivation to regain previous performance standards.”

A quantitative study on psychological readiness to return to sport was conducted on 635 athletes (389 male and 246 female) who had ACLR and had been cleared to return to play (Webster et al., 2018). Participants completed the Anterior Cruciate Ligament-Return to Sport After Injury (ACL-RSI) scale at their 12-month postoperative review. Data including “demographics (age, sex), sporting outcomes (preinjury frequency), surgical timing (injury to surgery interval), clinical factors (laxity), functional measures (single-limb hop symmetry), and symptoms of pain and function (International Knee Documentation Committee subjective)” was collected at the postoperative review. Univariate analysis found that factors of being male, being younger, having a shorter interval between injury and surgery, having a higher frequency of preinjury sport participation, having a greater limb symmetry, and having higher subjective knee scores contributed to the participant being more psychologically ready to play. In the

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multivariate model, age and subjective knee scores “significantly accounted for 37% of the variance in psychological readiness” ($P < .0001$). Therefore, age and level of knee pain and function affected psychological readiness to play compared to other factors.

Another study was performed to evaluate whether knee function and psychological and demographic factors influenced participants’ ability to return to their sport or recreational activity after having ACLR (Ardern et al., 2014). Participants completed the Knee Self-Efficacy Scale (K-SES), ACL-RSI, TSK, Quality of Life, the ACL-Quality of Life scale, and questions regarding knee function and demographics. The participants took this questionnaire about 35 months after having their ACLR. The results showed that there was a significant difference in both psychological and appraisal of knee function factors between the participants who returned or who did not return to playing their sport or recreational activities ($P \leq 0.05$): the participants who returned to playing their sport or recreational activity reported higher knee self-efficacy and psychological readiness to return. These findings demonstrate that the mind can play a role in dictating the recovery process and an athlete’s ability to return to competition.

Webster and Feller sought to investigate psychological readiness to return to sport in adolescent athletes who had ACLR (Webster & Feller, 2022). Specifically, they were researching whether the psychological readiness scores at 6 months predicted whether the athlete returned to playing their sport at 12 months. The 115 participants in this study were all 17 years old or younger, had completed the Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) scale and stated their return to sport status both at their 6- and 12-month postoperative visits. The data analysis showed that ACL-RSI scores significantly increased from the time they took it at 6 months to the time they completed it at 12 months ($P < 0.001$). In addition, the results revealed that the ACL-RSI score at a participant’s 6-month appointment had

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“acceptable predictive ability for a return to play at 12 months” (area under the ROC curve = 0.7, $P = 0.03$). The factor of emotion was also found to be an acceptable predictive ability for return to play (area under the ROC curve = 0.73, $P = 0.009$). Thus, emotional response to the injury and surgery can be influential in the recovery process.

An additional study measured psychological readiness in elite rugby players who suffered from severe knee injuries (Robyn et al., 2022). Sixteen Union rugby players completed the ACL-RSI and International Knee Documentation committee (IKDC) questionnaires at two different points in time. The participants first answered the questionnaires when they returned to training and again completed it a second time when they returned to play. The results indicated that there was a significant positive difference between the scores taken when the athletes returned to training and when they returned to play, meaning that the athletes tended to be more psychologically ready when they returned to play ($P \leq 0.05$). The higher scores prior to return to play illustrate that athletes would need a longer recovery time and training for their sport to decrease fear of re-injury and to increase confidence in their knee function prior to competing again.

A longitudinal study was undertaken to investigate psychological readiness to play in student athletes who sustained a second ACL injury that required surgery (McPherson et al., 2019). In this study, 115 student athletes who were 20 years old or younger, who returned to sport after having ACLR, were followed for a minimum of two years. The participants completed a short version of the Anterior Cruciate Ligament Return to Sport After Injury (ACL-RSI) scale prior to their first ACL reconstruction surgery and again at their 12-month postoperative appointment. A higher score on this scale indicates greater psychological readiness to return to sport. Participants completed a follow-up survey 2-years after their initial surgery

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which included demographic questions and questions about their level of performance and injuries before and after the surgery. Twenty-one of the participants reported sustaining a second ACL tear and needing another surgery. The results showed that participants did not show improvements in the ACL-RSI score between preoperative and 12 months after surgery (58.5 vs 60.8 points, $P = 0.60$). The group that suffered a second ACL tear reported being significantly “more nervous about playing their sport, less confident in playing sport without concern for the knee, more frustrated with having to consider the knee with respect to sport, and more fearful of reinjuring the knee by playing sport” ($P \leq 0.05$) compared to participants who only suffered from one ACL tear.

A phenomenological approach was also used to gain a deeper understanding of psychological readiness to play in injured student athletes at a Canadian university in southern Ontario (Donald et al., 2024). In this study, participants who sustained an injury (fractures, sprained ankles, strains, and tears) that prevented them from being able to train for at least 8 days were interviewed twice. The first interview occurred before the athlete returned to competition and the second one occurred after the first competition after rehabbing from the injury. The interview questions were open ended. Prior to the first interview, demographic information was gathered from the participants. The responses were analyzed to discover the contributions to student athletes’ perceptions and experiences of psychological readiness to play. The results were centered around three themes: focus, confidence, and realistic expectations. Athletes stated that they were psychologically ready to compete when they could remain focused and not become distracted, the primary distraction being their injury status. Having confidence was central to athletes’ psychological readiness to play. The athletes’ expectations of their performance tended to increase when they had more confidence.

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Psychological Readiness to Play in Non- ACL injuries

Gomez-Espejo et al. conducted a case study on four elite soccer/futsal players (2 male and 2 female) who had an average age of 24.25 years old (Gomez-Espejo et al., 2022). The researchers investigated their psychological readiness to return to practice after suffering from moderate to severe injuries which sidelined them for at least 15 days. After the participants were medically discharged/cleared to play, they completed the Psychological Readiness of Injured Athlete to return to sport (PRIA) questionnaire and Profile of Mood States (POMS) questionnaire. Once a week after practices, participants continued to answer the POMS questionnaire as well as record the date and time of training. In addition, after each game, participants completed the POMS, the PRIA, and the Depression, Anxiety, and Stress Scale questionnaires. The study lasted for about 7 weeks. The results indicated that 3 out of the 4 participants were psychologically ready to resume competing because they had low anxiety, stress, and depression scores. Although more testing/data was needed for one of the participants because they only played in 3 matches, their mood profile did not change before the start of competition, showing that a healthy psychological state was maintained before and after competition and practice. This data also supports that the participants were psychologically ready to compete. The results of the PRIA for the fourth participant indicated that he was psychologically unable to return to playing and had an increase in anxiety and stress scores over the course of the evaluation. This study suggests that athletes' mental state is related to whether they feel psychologically ready to compete again.

Another study regarding psychological readiness to play in college athletes explored whether there is a significant difference in psychological readiness at the time of injury and at the time of medical clearance (Herring, 1997). Thirty NCAA Division I female student-athletes

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participated in the study. Participants were injured during the time frame of this study and were completely out for practice and/or competition for a minimum of one day. The Test of Injury Rehabilitation Effectiveness for Athletes (TIREA) was used to measure the athletes' psychological readiness. The participants completed the TIREA within 5 days of suffering from the injury and completed it a second time within 5 days of returning to practice/competition. A t-test showed that there was a significant increase in TIREA scores from injury until returning to play ($P < .05$), indicating that participants increased their psychological readiness at the time of return.

A different study about psychological readiness in college athletes returning to play, included the degree to which athletic trainers considered psychological readiness in the return to play decisions (Monahan, 2018). Thirty-four student-athletes who missed at least one practice or competition due to injury along with their respective athletic trainers participated in this research. One day before or on the day that student-athletes returned to their sport, the participants were given the IPRRS and the AFAQ to complete. The athletic trainers also answered a Likert scale question assessing the degree to which they considered psychological readiness for their specific athlete. Based on the student-athletes' responses to the IPRRS, they were placed in the "ready" or "not ready" group. The statistical analysis found that the "ready" group had significantly less fear avoidance compared to the "not ready" group ($P < 0.05$). The athletic trainers rated the participants the same regardless of the group classification of the participants, sending the athletes back to compete before the athletes felt ready. Thus, the results suggest that not all athletes are returning to competition when they are psychologically ready.

Lastly, a study investigated psychological readiness to return to play in 12 Canadian university student-athletes who were formerly concussed. Each participant was interviewed on

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two separate occasions (Lassman et al., 2022). The type of interviews conducted were called life-story interviews. The first interview was an average of 103 minutes long, focusing on the participants' experience with their sport-related concussion and return to play, comparing their concussion to other sport injuries that they suffered, discussing their perceptions of successful and unsuccessful return to play, and perceptions of factors that contributed to them feeling psychologically ready to play. The second interview occurred 1 to 2 weeks after the first interview and averaged 88 minutes long. After the interviews, the researchers took notes and the participants' responses were analyzed. There were six common themes of confidence, fear, identity, pressure, support, and individual perception of readiness found in the responses of the participants regardless of whether or not they felt psychologically ready to return to playing their sport after having a concussion. The results indicate that there is a need to better understand and more diligently assess the psychological aspects in the return to play process after suffering from a concussion.

Hypothesis and Specific Aims

Based on previous studies, it is predicted that the soccer players who are currently injured will have higher fear avoidance and will not be psychologically ready to play. Research points to a statistically significant relationship between injury and fear avoidance, and a reduced psychological readiness to return to sport, showing that regardless of the injury in both college athletes and the general population, those who experienced injury had higher fear avoidance and were psychologically not ready to play. With the changing climate in college athletics as well as the limited research on Division I collegiate soccer players, it is important to discover whether the results of this study confirm or contradict previous research so we know how to better support student-athletes in the changing athletic environment. Using the AFAQ and the IPRRS in

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collegiate Division 1 soccer players, correlations between injuries will be investigated, including whether there are differences between male and female players.

METHODS AND MATERIALS

Participants and Recruitment

Student-athletes on the men's and women's varsity soccer teams at Virginia Tech were recruited to participate in this study at an off-season weight training session. During the Spring 2025 semester, the researcher attended a weight training session for the men's and women's teams to administer a survey on fear avoidance after injury and readiness to play. If an athlete had never been injured or suffered from a serious injury that required surgery, then they were asked to imagine that they had experienced a serious injury. All participants completed the Fear Avoidance and Psychological Readiness Questionnaire only once. This study was approved by the Virginia Tech Institutional Review Board.

Survey Instruments

The participants were asked to fill out a hard copy of the Fear Avoidance and Psychological Readiness Questionnaire to measure their fear avoidance beliefs and psychological readiness to play. This questionnaire, as stated above, incorporated three different sections. The first section asked about demographics of the participants, including the age, race, gender, whether the athlete had been injured, and whether the athlete had needed surgery due to an injury. The second section in the survey was the Athlete Fear Avoidance Questionnaire (AFAQ), and the third section was the Injury-Psychological Readiness to Return to Sport Scale (IPRRS).

The AFAQ is a validated tool used to assess fear avoidance beliefs in athletes who suffered an injury while playing their sport (Dover & Amar, 2015). This is a 10-item questionnaire where participants rate on a scale of 1 to 5 the extent to which they agree with each statement. Responding with five means "completely agree" while responding with one means

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“not at all.” The values for each item are totaled, allowing for scores to range from 10 to 50. The higher the score, the more fear avoidance beliefs the participant has experienced.

The IPRRS is a tool used to gauge whether an athlete is psychologically ready to return to sport after suffering an athletic injury (Glazer, 2009). This is a 6-item questionnaire which focuses on the confidence levels of the athlete. Participants rate each item on a scale from 0 to 100. Zero means that the participant has no confidence at all, 50 means that the participant has moderate confidence, and 100 means that the participant has complete confidence. The total score is calculated by adding the scores for the 6-items and then dividing the sum by 10. Thus, the total possible scores range from 0 to 60. The higher the score, the more confident the participant.

Statistics

Analysis for a correlative relationship between the AFAQ and the IPRRS was statistically assessed using a linear regression. A One-way Anova was used for mean differences in race and time since last injury. An unpaired t-test was used to assess mean differences in gender, length of injury, needed surgery, and ACL injury. Data was analyzed using GraphPad Prism (GraphPad Software, San Diego, CA). The significance was set at ($P \leq 0.05$).

RESULTS

There were 24 female and 13 male soccer players who participated. The average age of the participants was 20 ± 1 years old, with 72.2% identifying as White, 13.9% as Black, 8.3% as Mixed, and 5.6% as Hispanic (see Table 1). Seven out of the 37 participants had not suffered an injury that caused them to miss practice or games. However, all of the participants had unfortunately suffered from an injury at some point in their life. The soccer players in this study suffered a variety of injuries (see Table 2).

Table 1. Participant demographic data.

Age	Gender	Race
	Female	Black
20	Male	Black
20	Male	Mixed
19	Female	White
19	Female	White
21	Male	White
20	Male	White
21	Male	White
20	Female	Hispanic
21	Female	White
22	Male	Black
18	Male	Hispanic
22	Female	White
	Female	Mixed
20	Female	White
21	Female	White
20	Female	White
21	Male	White
20	Female	White
21	Female	White
20	Female	White
19	Female	White
19	Female	White
21	Male	Black
20	Female	White

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20	Female	White
20	Male	Mixed
18	Female	White
18	Female	White
20	Female	White
21	Male	Black
21	Male	White
21	Male	Mixed
20	Female	White
19	Female	White
18	Female	White
19	Female	White

**As denoted in yellow, two participants did not respond with their age*

Table 2. Participants' injuries

Type of Injury
Knee Injuries: (14, 7 ACLs)
ACL, meniscus, stress fracture
ACL + Meniscus
ACL and Lateral Meniscus Tear (1st tear on right October 2023 and tear on left November 2024)
ACL reconstruction, lateral femoral condyle fracture, partial tears in MCL and lateral meniscus
ACL Surgery
Left ACL tear
Torn ACL and meniscus and pulled hamstring
Patella subluxation (recurring)
Torn meniscus
PCL Tear
Meniscus scope
Knee pain (meniscus, tendonitis)
Meniscus Strain
Plica removal and partial meniscus repair
Leg/Ankle/Feet Injuries: (11)
Strained Hamstring
Bad ankle sprain
Torn ligament ankle
Broken Pinky Toe

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Bone broke off in foot and had to get surgery; they thought it was just sprained at first
Stress Fractures on tibia and fibula
Sprained ankle & bone bruise
2 stress fractures in foot metatarsals
Ankle twist and swollen tissue
Sprained ankle
Torn hamstring, strained MCL
Back Injuries: (1)
Back injury that caused lots of nerve pain and numbness down my right leg.
Hip Injuries: (6)
Right hip labrum tear
Torn hip flexor, PRP
Groin Injury
Bursitis in left hip
Labrum Repair
Groin Pull
Head Injuries: (1)
Concussion
Miscellaneous Injuries: (3)
Injured but didn't have to miss anything. Played through it because it wasn't severe.
Aortic valve repair and garlic knot replacement
Partial tear in deltoid

**(n) = number of player injuries in each category*

There was a significant negative correlation between how the athletes answered the fear avoidance survey (AFAQ) and how they answered the readiness to play survey (IPRRS) ($R^2 = 0.129$, $P = 0.029$) (see Figure 1). Participants with higher AFAQ scores tended to have lower IPRRS scores and participants with lower AFAQ scores tended to have higher IPRRS scores, indicating that participants with higher fear avoidance also had lower confidence and are psychologically ready to return to playing soccer.

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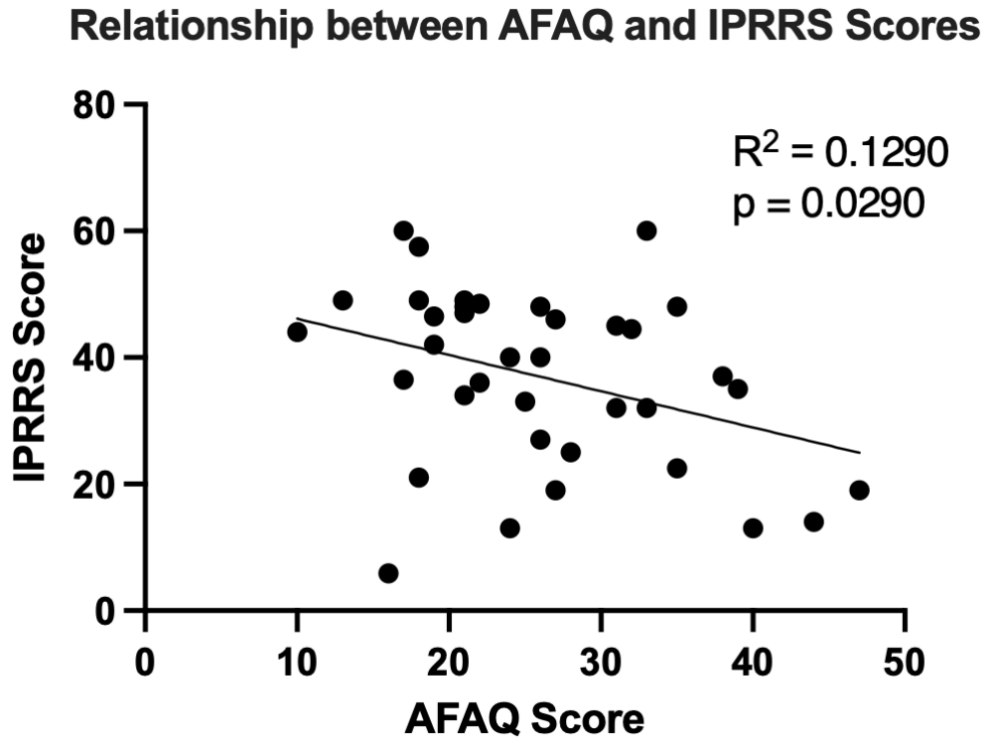


Figure 1. Correlation between the AFAQ and IPRRS score. Pearson's R correlation indicated a significant negative correlation between the soccer player's AFAQ and their IPRRS scores ($R^2 = 0.129$, $P = 0.029$).

There was a significant gender difference in how the participants scored on the AFAQ ($P \leq 0.01$). The male soccer players had significantly lower scores on the AFAQ compared to the female soccer players, meaning that the males tended to have lower fear avoidance (see Figure 2a). There was not a significant gender difference in the IPRRS scores (see Figure 2b). However, Figure 2b does indicate that the average IPRRS score for male players was slightly higher than the female players. This shows that the male players might be more psychologically ready to play.

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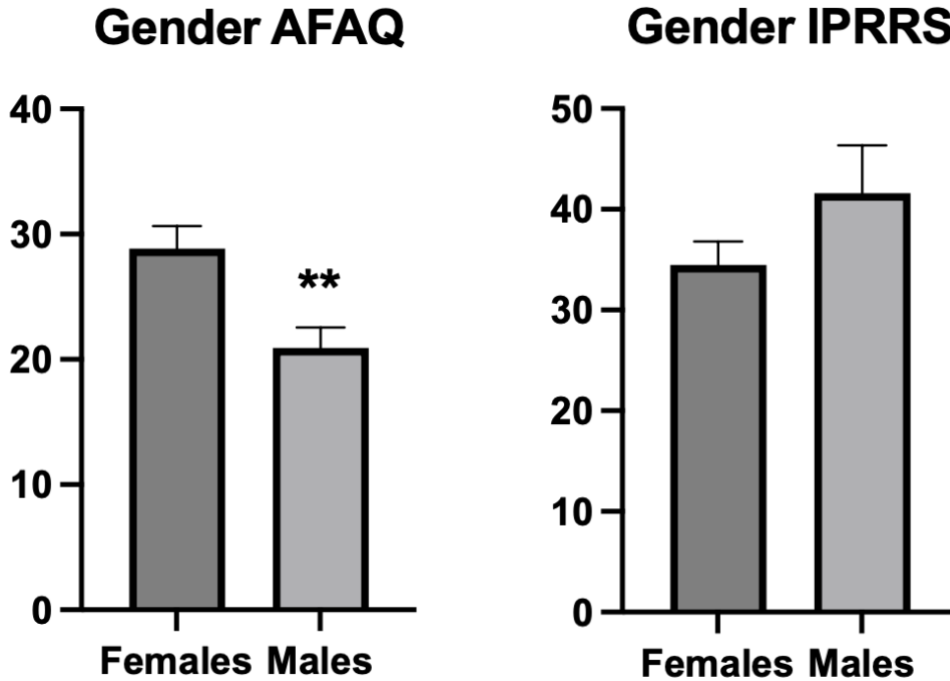


Figure 2a. and b. Gender differences on the AFAQ and IPRRS. a. Female soccer players scored significantly higher than the male soccer players on the AFAQ. b. There was no difference between how the players scored on the IPRRS. ** $P \leq 0.01$.

There was an insignificant relationship between the length of time that the participant was injured and their AFAQ scores. However, when looking at gender differences, the results showed that females had significantly higher AFAQ scores compared to males if they were injured for more than 6 weeks ($P < 0.05$) (see Figure 3). There was not a significant difference in gender for AFAQ scores when the participants were injured 6 weeks or less.

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AFAQ Scores for Participants Injured for 6+ Weeks

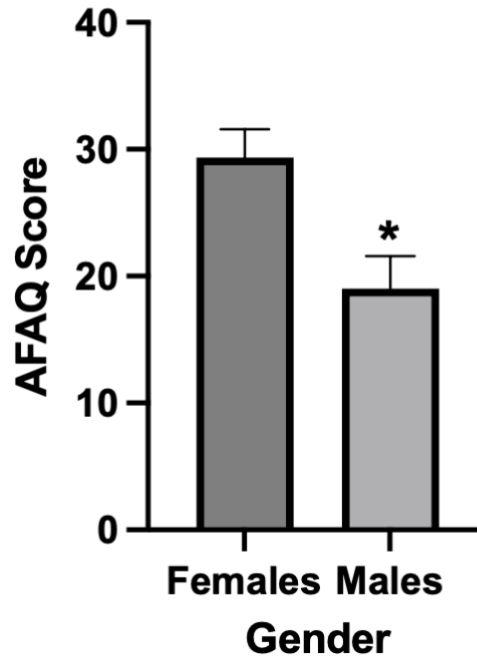


Figure 3. Gender Differences in Length of Injury. Male soccer players scored significantly lower on the AFAQ than the female players for those group of players that had sustained injured greater than 6 weeks. * $P < 0.05$.

For those participants who were injured for 0 to 6 weeks compared to those who were injured for more than 6 weeks, there was a significant difference in their IPRRS scores. The participants who were injured for a period of anywhere from 0 to 6 weeks had significantly higher IPRRS scores compared to participants who were injured for 6 weeks or more ($P \leq 0.01$) (see Figure 4a.). Males injured for 0 to 6 weeks also had significantly greater IPRRS scores compared to females ($P \leq 0.01$) (see Figure 4b). There was no difference between the male and female players if they had sustained injuries for greater than 6 weeks (data not shown).

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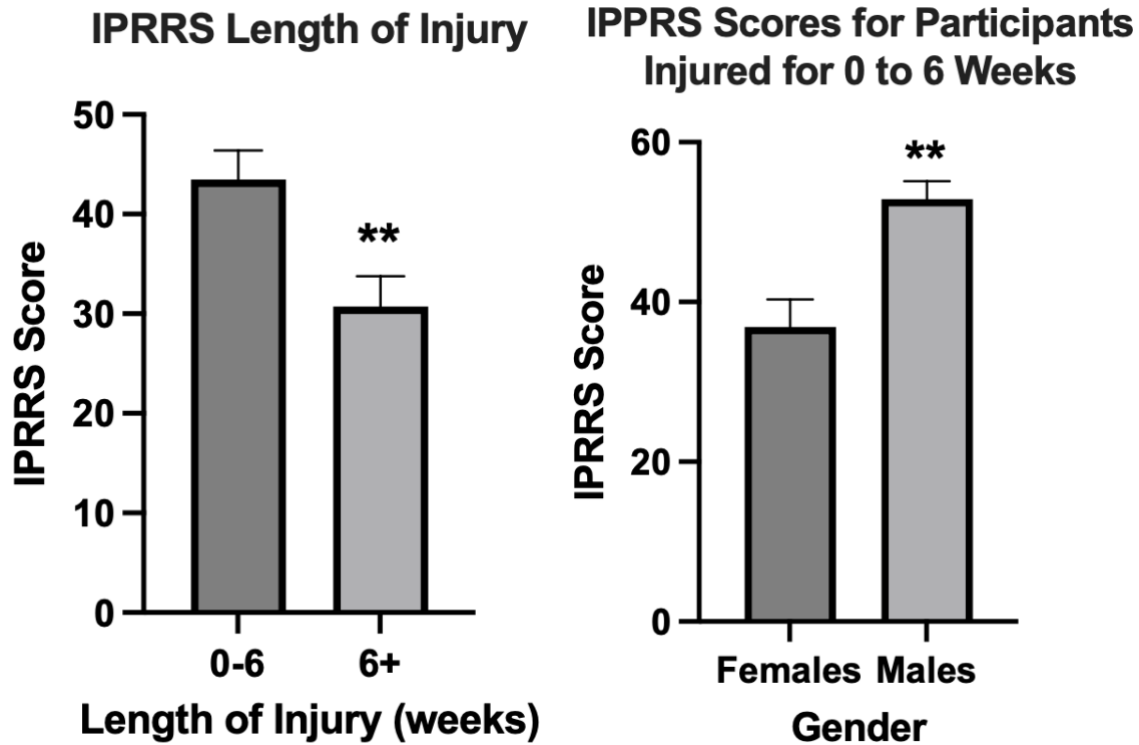


Figure 4a. and b. IPRRS Scores for the different lengths of injuries and gender differences seen within different lengths of injury. a. Those players that sustained injuries greater than 6 weeks scored significantly lower on the IPRRS. b. In players injured less than 6 weeks, male soccer players scored significantly higher than female soccer players on the IPRRS. ** $P \leq 0.01$.

There was a trend towards an increase in the athlete's IPRRS readiness to play score if the athlete was not injured, compared to being currently injured ($P = 0.058$, data not shown) and a trend towards an increase in their IPRRS readiness to play score in those who had never had an ACL injury compared to those who had ($P = .129$, data not shown). There were no significant relationships between the participants' scores on either the IPRRS or the AFAQ with race, time that had elapsed since their last injury, or whether or not the participants had had surgery.

DISCUSSION

The purpose of this study was to measure fear avoidance and psychological readiness to play in the Varsity women's and men's soccer programs at Virginia Tech to understand the relationship between physical injury and psychological state. It is important that this information be clarified to help best support the student-athletes so they can succeed in the classroom, on the field, and in life. Research shows that there is a positive correlation between the time it takes to "return to play," and an increase in fear avoidance beliefs (Tito et al., 2023). In addition, George et al. found that incorporating fear avoidance belief training significantly reduces an injured athlete's fear avoidance ($P < 0.05$) (George et al., 2003).

The significant negative correlation between the AFAQ and the IPRRS scores of the student athletes in this present study ($P < 0.05$), reveal that there is a relationship between fear avoidance and psychological readiness to play. These findings suggest that the participants with higher fear avoidance tend to have lower confidence and are less psychologically ready to return to playing soccer. This finding is consistent with research from O'Connor et al. who found that the Irish collegiate athletes who suffered from more severe injuries and experienced higher pain levels demonstrated significantly higher fear avoidance and lower confidence levels ($P < 0.0001$) (O'Connor et al., 2022). Another study also found a significant negative correlation between fear avoidance and self-efficacy, finding that participants with chronic back pain who had fear avoidance were less confident that they could accomplish a desired task or goal (de Moraes Vieira et al., 2014). In addition, a study measuring confidence and kinesiophobia in participants who had ACLR with and without knee osteoarthritis also supports our findings, as it discovered that in the participants with osteoarthritis, lower knee confidence was significantly associated with greater kinesiophobia ($P = 0.03$) (Hart et al., 2015). The relationship between fear

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avoidance and confidence levels may be connected because they are both negative emotions that interact with each other to cause an outcome and feeling. For example, fear avoidance could be due to the lack of confidence to commit a play of the field, and vice versa, the reason for not having confidence to make that play could be due to having fear avoidance.

Although a significant negative correlation was found between the AFAQ and the IPRRS scores, there was only a significant gender difference in how the participants scored on the AFAQ ($P \leq 0.01$), and not the IPRRS. Male participants had significantly lower fear avoidance compared to the female participants. However, the O'Connor research results found that there was not a gender difference on both the AFAQ and IPRRS scores (O'Connor et al., 2021). Another study investigating active participants with ACLR also found that there were no significant differences in gender when participants completed the IPRRS which was prior to their surgery (Dluzniewski et al., 2024). However, Fukano et al. made an interesting finding that, unlike in the male athletes, there was a direct correlation in fear of movement/reinjury and their ankle joint laxity in female athletes ($P < 0.05$) (Fukano et al., 2020). Females who had greater ankle instability, had more fear avoidance. This finding supports the concept that there may be a gender difference in fear avoidant beliefs. Also, Webster et al. found that being a male contributed to being more psychologically ready to play (Webster et al., 2018). Therefore, there is inconsistent research findings on gender difference in AFAQ and IPRRS scores. Based on the significant negative correlation between AFAQ and IPRRS scores and the significant gender difference in AFAQ scores, one would expect that the male participants would have a significantly higher IPRRS score compared to the female participants; however, this was not the case in this present study. One possible explanation of the malalignment of the data results is that

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there were few participants in this study. Further research is needed to investigate the gender differences in both AFAQ and IPRRS scores.

The results of the study revealed an insignificant relationship between the length of time that the participant was injured and the AFAQ scores. However, these results are inconsistent with much of the literature regarding this topic. For example, Tito et al. who found that the more fear avoidance an athlete had, the significantly longer their recovery time ($P < 0.001$) (Tito et al., 2023). A meta-analysis by Hsu et al. agrees with Tito et al., indicating that psychological response to a sports injury can negatively affect rehabilitation outcomes such as impacting return to play rates (Hsu et al., 2017). Chmielewski and George also found a significant correlation in participants with ACLR, between their TSK-11 scores one week after participants had surgery and their quadriceps symmetry index which was taken 12 weeks after surgery, indicating a better psychological response to injury was associated with greater improvement in knee symmetry rehabilitation (Chmielewski & George, 2019). The TSK-11 measures kinesiophobia. An explanation for the difference between the current study and Tito et al. is that the current study investigated athletes with both surgical and non-surgical injuries, while Tito et al. only investigated athletes with non-surgical injuries. Including the surgical injuries in the statistical analysis could have caused an insignificant relationship because medical professionals follow strict protocols and timelines for the recovery process of a surgical procedure; there are particular points in time in which patients are cleared to perform certain actions. For example, at the 3-month mark post ACL surgery, patients typically are allowed to start jogging. A reason why this research is different from the studies investigating surgical injuries is that those studies were longitudinal while this one is cross-sectional. In a longitudinal study, the researchers are able to

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track the participants' progress and emotions throughout a period of time, increasing the accuracy of the results. The present study was limited to the participants' reactions on one day.

Regarding the relationship between length of time that the participant was injured and IPRRS scores, there was a significant difference between participants who were injured for 0 to 6 weeks and more than 6 weeks. The participants who were injured for 0 to 6 weeks were significantly more confident/psychologically ready to return to playing soccer compared to the participants who were injured for more than 6 weeks ($P \leq 0.01$). The research that Robyn et al. conducted had similar findings; higher IPRRS scores prior to competing again showed that athletes need more time to recover and train for their sport (Robyn et al., 2022). In addition, a study conducted on athletes with ACLR found the same significant relationship between psychological readiness to return to sport and injury length ($P < 0.01$) (Ardern et al., 2013). The less psychologically ready to return to playing, the more months it will take an athlete to return to their sport. O'Connor et al. also supports these findings as they found a significant difference in injury severity and IPRRS scores in Irish athletes. The athletes with more severe injuries which required longer recovery time had significantly lower confidence scores on the IPRRS ($P < 0.001$) (O'Connor et al., 2021).

There are several explanations for these findings. The first one is that practice and consistent repetition of a skillset fuel athletes' confidence. Thus, when athletes lose more and more time to prepare for their sport, they lose confidence in their play. On top of that, more severe injuries require longer recovery times. When athletes have a severe injury, the pain can be tremendous and their ability to rely on that injured body part to move as it had prior to the injury is diminished, thus their confidence is low.

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One common severe injury suffered among athletes is an ACL tear. This present study suggests that there was a trend increase in the participants' IPRRS readiness to play score in those who had never had an ACL injury compared to those who had ($P = 0.129$). The research measuring psychological readiness in athletes who suffered an ACL injury once and twice similarly found that those who suffered a second ACL injury were significantly less psychologically ready to play ($P \leq 0.05$) (McPherson et al., 2019). Ezzat et al. recorded a similar finding in their research studying self-efficacy in female adolescent athletes with ACLR compared to a control group of uninjured participants who were the same age and played the same sports, discovering that the participants with ACLR had lower knee self-efficacy ($P < 0.001$) (Ezzat et al., 2022). In the findings, the more ACL injuries a person suffers from, the less psychologically ready to play and confident they will be. Research also found that the less impact that ACL surgery had on a person's physical function years after the injury/surgery, the more knee confidence they exhibited (Ageberg & Roos, 2016). These results reinforce the finding described above that the more severe the injury, the less psychologically ready the person is to return to sport.

Limitations

This study provided important insight on fear avoidance and psychological readiness to play in Division 1 soccer players; however, the results had some limitations. For example, there were only 36 participants, 12 of whom were males. This small sample size makes it challenging to investigate true gender differences as well as to apply the results to other Division 1 soccer teams. In addition, soccer players at Virginia Tech could very well answer differently than Division 1 soccer players throughout the country. Therefore, it is hard to generalize the results found in this study.

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Another drawback is that soccer players who were and were not currently injured participated. Thus, participants who were not currently injured had to answer based on their memory. It is difficult to remember the exact state of mind and physical pain one was in when injured. In addition, the brain can play tricks, resulting in recall bias. Therefore, trusting participants' answers based on memory may not be reliable. In addition, data was not collected on when the injury occurred so was no way of knowing how much participants had to rely on their short- and long-term memory. Lastly, although the questions in the questionnaire were validated, it is a self-reported measurement, allowing for participants to have different interpretations of the questions and possibly varying definitions of terms like confidence and fear. More research is needed to address these limitations and more deeply understand how college athletes in general are psychologically affected by their injuries.

Future Directions

To address the limitations and find more reliable and valid results regarding fear avoidance and psychological readiness, a larger scale study needs to be conducted on currently injured college athletes who play a variety of sports. Gaining more information about the relationship between fear avoidance and psychological readiness to play will allow sports medicine professionals to develop a comprehensive rehabilitation plan that collegiate medical staffs can employ to help diminish the fear avoidance and increase confidence in their injured athletes.

One example of a fear avoidance intervention is being implemented by Dr. Gary Bennett, a sports psychologist currently at Virginia Tech. Dr. Bennett, conducts individual sessions with student athletes who exhibit fear avoidance. Dr. Bennett states that fear is a natural response for our bodies when facing a threat so it is okay to have some fear. He explains to the athletes that

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fear is actually a way to protect people from harm. Therefore, instead of trying to eliminate the fear, Dr. Bennett works with the athletes to accept that having fear is part of the rehabilitation process while simultaneously building their confidence. On some occasions, Dr. Bennett tells the student athletes that he can teach them a way to guarantee the cessation of their fear. By doing this, it captures their attention. He then shares that the method is, to quit playing the sport. However, since athletes want to continue to play, Dr. Bennet challenges them to participate despite having some fear. In all of Dr. Bennett's sessions, he appeals to the student athlete's values as it pertains to their sport.

In addition to a larger scale study, a longitudinal study also needs to be performed to examine the changes over time in the mental states of students who were previously sidelined from their sport due to injury. Understanding these changes can help uncover the best methods to support the student athletes so they can succeed in their sport, in the classroom, and in life.

Conclusion

The results of this study support the concept that there is a relationship between injury, fear avoidance, and psychological readiness to play. Gender differences and length of injury time also contributed to differences seen in mental readiness. The mind is powerful when it comes to recovery. Therefore, sports medicine professionals involved in athletes' rehabilitation process should incorporate interventions to help diminish fear avoidance and increase psychological readiness to play through integrating mental training during the rehabilitation process.

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