

REINTEGRATION EXPERIENCES OF COLLEGIATE ATHLETES
AFTER SUSTAINING A SPORT-RELATED CONCUSSION

by

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LIST OF ABBREVIATIONS

Abbreviation	Description
BESS	Balance Error Scoring System
CISG	Concussion in Sport Group
CDC	Center for Disease Control and Prevention
D1	NCAA Division I
D2	NCAA Division II
D3	NCAA Division III
ICCCS	5 th International Consensus Conference on Concussion in Sport (ICCCS) in Berlin
mTBI	Mild Traumatic Brain Injury
NATA	National Athletic Trainers' Association
NCAA	National Collegiate Athletics Association
PCSS	Post-Concussion Symptom Scale
RTL	Return-to-Learn
RTP	Return-to-Play
SCAT5	Sport Concussion Assessment Tool (5 th Edition)
SRC	Sport-Related Concussion
TBI	Traumatic Brain Injury
VOMS	Vestibular Ocular Motor Screening

1. INTRODUCTION

1.1. mTBI vs SRC

Over the last several decades, sport-related concussions (SRC) have been an emerging topic in literature surrounding mild traumatic brain injuries (mTBI). While there are some similarities between these two topics, it is important to establish the differences between them. The first primary difference is related to mechanism of injury. While mTBI are mainly caused by vehicular accidents, assaults, and falls¹, SRC occur during sport-related activities. Most mTBI literature addresses post-concussion syndrome, whereas SRC literature rarely, if ever, discusses prolonged symptoms. mTBI is defined as trauma sustained to the head with the following criteria: (1) amnesia of less than 1 hour following the trauma; (2) a Glasgow Coma Scale score between 13-15; (3) loss of consciousness for less than 15 minutes; and (4) no structural abnormalities seen on imaging¹. At the 2016 5th International Consensus Conference on Concussion in Sport (ICCCS) in Berlin, the expert panel revisited and modified the definition of SRC. This modified definition states that SRC is a mTBI that has been induced by biomechanical forces². Additionally, there are some common features that can be utilized clinically to aid in diagnosing SRC. These features are: (1) SRC may be caused by a direct blow anywhere on the body that has force transmitted to the head; (2) rapid onset of impaired neurological function; (4) a wide range of clinical signs and symptoms that does not have to include a loss of consciousness; and (5) clinical signs and symptoms cannot be explained by medication, alcohol, or drug use.² This study will be focusing solely on SRC, specifically the reintegration experiences of National Collegiate Athletic Association (NCAA) student-athletes back into school and sport after sustaining a SRC.

1.2. Signs and Symptoms

Because the clinical presentation is mostly subjective, the symptoms an athlete experiences after impact are paramount in the diagnosis of SRC. A diagnosis of SRC should be suspected if any of the following domains are impacted: (1) symptoms (somatic, cognitive, or emotional); (2) physical signs, such as amnesia, neurological deficits, or loss of consciousness; (3) impairments in balance; (4) changes in behavior; (5) impairments in cognitive functioning; (6) disturbances in sleep.² While these signs and symptoms are helpful in the diagnosis of SRC, it is also important to understand that these symptoms are comprehensive to many injuries, meaning SRC should remain a differential diagnosis until further testing can be conducted.²

1.3. Recovery Process

While the research is lacking regarding general guidelines to follow during the recovery process, the 2016 ICCCS Berlin Conference set forth some recommendations regarding rest, rehabilitation, and recovery.² Previous research suggests that athletes should rest physically and cognitively until their symptoms are resolved; however, recent research suggests that 24-48 hours after injury, athletes can begin increasing activity levels, while remaining below their symptom-exacerbation threshold.² It has been recommended that the recovery process should be a collaborative approach focusing on treatment, controlling cognitive stress, pharmacological intervention, and school accommodations. Due to the individualized nature of concussion presentation, generalized recovery guidelines have not yet been established; although, components aiding in recovery efforts such as, Return-to-Learn (RTL) and Return-to-Play (RTP) have been well-defined.²

1.4. Return-to-Learn

Return-to-Learn (RTL) is defined as the process of gradually reintroducing a student-athlete back into the classroom after sustaining a sport-related concussion.³ In this study, RTL is defined as the process someone goes through as they are returning to the classroom after a concussion. This process can last a few days or several months. Due to the high academic demand expected of a collegiate student-athlete, they are at a higher risk to exhibit academic difficulties when returning to the classroom post-SRC, when compared to other academic levels.⁴ Returning to the classroom too quickly post-SRC can have detrimental effects on the student-athlete's grades, and ultimately affect the eligibility status of the athlete.³ Providing the student-athlete with a gradual return to cognitive stressors can be accomplished by giving the student-athlete academic accommodations.³ Oftentimes, campuses will give resources such as removal or decreased class time, extended test time, quiet exam spaces, and notetakers to aid student-athletes while they navigate the RTL process. While RTL policies provide student-athletes with a process to gradually return to the classroom, there has not been much consensus among researchers on a specific set of guidelines for clinicians to follow.⁴ Currently, there is a lack of research looking at how the impact of SRC affects academic performance.³

1.4.1. Return-to-Learn Protocols

To date, there seems to be no consistent processes for RTL in the collegiate setting like there is for RTP.³ The intended purpose of a RTL protocol is to establish a set of guidelines that a student-athlete can follow, as well as provide them with resources that may be necessary for reintegrating into the classroom post-SRC.³ Hall et al. proposed a potential RTL progression for collegiate student-athletes that is similar to RTP protocols.⁵ The graded RTL progression includes: (1) no activity, (2) a gradual reintroduction of cognitive activity, (3) implementing

homework before schoolwork, (4) returning to class, (5) graduation reintegration into academics, and (6) full return to normal cognitive loads.⁵

1.5. Return-to-Play

According to McKeithan et al., return-to-play (RTP) is defined as the continuation of athletic participation after the student-athlete has returned to their neurological baseline after sustaining a SRC.⁶ In this study, the RTP process involved the experiences student-athletes had from the time of their concussion until full-sport participation. This includes the time they were asked to rest or reduce their physical or mental activities, any training or rehab they may have done prior to starting their RTP protocol, as well as their RTP activities. The graded approach to RTP is based on the Concussion in Sport Group (CISG)'s 11 R's of SRC management. These R's include: (1) Recognize, (2) Remove, (3) Reevaluate, (4) Rest, (5) Rehabilitation, (6) Refer (7) Recover, (8) Return to sport, (9) Reconsider, (10) Residual effects and sequelae, and (11) Risk reduction.²

1.5.1. Return-to-Play Protocols

Before a student-athlete can return to their sport after sustaining a SRC, they must complete a graded RTP protocol. According to the National Athletic Trainers Association (NATA)'s Position Statement on Management of Sport Concussion, current RTP guidelines state that RTP protocols should not begin until the athlete is no longer experiencing concussion symptoms, has a normal clinical examination, and returns to baseline levels on all objective concussion assessments.⁷ The experts at the 2016 ICCCS Berlin Conference determined that after a short rest period during the acute injury phase, student-athletes can begin to gradually incorporate physical and cognitive activity, as long as they stay below their cognitive- and

symptom-exacerbation thresholds.² Sub-symptom threshold exercise may also be beneficial in decreasing the likelihood of developing post-concussion syndrome.⁸

Once concussion symptoms have resolved and the student-athlete has returned to their cognitive baseline, they can begin their RTP protocol. There is typically a 6-step graded RTP progression healthcare professionals utilize when assisting athletes in RTP. These steps are: (1) symptom-limited activity; (2) low-intensity light aerobic exercise; (3) sport-specific exercise; (4) non-contact training or practice; (5) contact training or practice; (6) full RTP.^{2,6,7} The 2016 ICCCS Berlin Conference also stated that there should be at least 24 hours between each step in the RTP protocol, which makes the RTP protocol at least a week in duration.² If the student-athlete begins to experience concussion symptoms at any point throughout the RTP protocol, they must immediately stop activity and return to the last, subsequent step after being asymptomatic for 24 hours or longer.²

1.6. Qualitative vs Quantitative Methodology

When deciding which methodology (quantitative or qualitative) would be most appropriate for a research study, researchers must reflect on the types of research questions they are wanting to ask. Quantitative research utilizes a controlled and rigorous study design to examine a certain phenomenon through numerical data to provide a definitive answer to a specific research question.⁹ Quantitative methodologies are developed based on a hypothesis and gives the researcher the ability to control the variables, the environment, and the research questions of a study.⁹ Conversely, qualitative research looks at a phenomenon using a more holistic approach to produce a narrative about that phenomenon.⁹ Qualitative research is flexible and adapts to new information as the study progresses.⁹ Qualitative research is utilized when the researcher has a desire to explore a topic that is not well understood and wishes to explore the

topic more thoroughly.⁹ Qualitative research can also be used when researchers want participants to reflect on a particular experience.¹⁰ This is accomplished through asking open-ended questions in an interview format.⁹ This study utilizes a qualitative methodology to investigate the perceptions and experiences of student-athletes as they reintegrate into school and sport after sustaining a SRC. By obtaining the information directly from the student-athletes, we will be able to determine things that went well, areas for improvement, barriers they encountered, and if their athlete identity was challenged during their SRC recovery.

1.7. Statement of the Problem

While there has been previous research to explore specific processes for a student-athlete's recovery after sustaining a SRC¹⁻⁸, there has been very little research investigating the experience of student-athletes as they reintegrate into school and sport after SRC, specifically collegiate student-athletes. While most research involving RTL and RTP protocols has focused on establishing a set of guidelines for clinicians to follow, there has not been much attention given to determining if those guidelines truly benefit the student-athlete. The purpose of this qualitative research study is to investigate the experiences of NCAA student-athletes as they reintegrate into school and sport after SRC. The results of this study could significantly impact patient care and patient outcomes following SRC and promote future research to establish updated protocols that are focused more on the well-being of the student-athlete, instead of focusing on the processes used to return them to school and sport.

1.8. Specific Aim

To qualitatively examine the experiences of National Collegiate Athletic Association (NCAA) student-athletes as they reintegrate into school and sport after sustaining a sport-related concussion.

1.9. Operational Definitions

Mild Traumatic Brain Injury (mTBI): Trauma to the head that is mainly caused by vehicular accidents, falls, assaults, domestic accidents, and industrial accidents. The clinical presentation of an mTBI is as follows: (1) post-traumatic amnesia for less than 1 hour; (2) initially, a Glasgow Coma Scale score of 13-15; (3), loss of consciousness for no more than 15 minutes; and (4) no intracranial abnormality found on a CT scan or from other neurological testing.¹

Sport-Related Concussion (SRC): A form of traumatic brain injury that represents the transient and immediate symptoms of TBI and is induced by biomechanical forces. The key features that are utilized in clinically defining SRC are: (1) direct blow to the body with impulsive forces transmitted to the head; (2) rapid onset of neurological function impairment; (3) clinical signs and symptoms that reflect a functional injury, rather than a structural injury; (4) may or may not involve loss of consciousness; and (6) clinical presentation cannot be explained by medication use, alcohol, drugs, or any other comorbidities.²

Recovery Process: The process student-athletes experience while recovering from a sport-related concussion. This process fully encompasses rest, rehabilitation, return-to-learn, and return-to-play.

Return-to-Learn: The process of gradually reintroducing a student-athlete back into the classroom after sustaining a sport-related concussion.³ In this study, RTL is defined as the process someone goes through as they are returning to the classroom after a concussion. This process can last a few days or several months and may include but isn't limited to, removal or decreased class time, assignment and exam extensions, note takers, counseling, and medications.

Return-to-Learn Protocol: A set of guidelines that a student-athlete can follow, as well as provide them with resources that may be necessary for reintegrating into the classroom post-SRC.³

Return-to-Play: The continuation of athletic participation after the student-athlete has return to their neurological baseline after sustaining a SRC.⁶ In this study, RTP involved the experiences student-athletes had from the time of their concussion until full-sport participation. This includes the time they were asked to rest or reduce their physical or mental activities, any training or rehab they may have done prior to starting their RTP protocol, as well as their RTP activities.

Return-to-Play Protocol: A 6-step graded RTP progression healthcare professionals utilize when assisting student-athletes in RTP.^{2,7}

Athlete Identity: The degree to which a student-athlete identifies themselves with their associated sport.¹¹ Student-athletes who experience impaired athlete identity may experience issues in the school, social, and emotional aspects of their lives.¹²

Quantitative Research: A controlled and rigorous research design utilizing precise measurements (numerical data) to examine a particular phenomenon.⁹

Qualitative Research: Addresses the social aspect of research by utilizing open-ended questions and interviews. This type of research is employed when there is a desire to explore a topic that is not well understood, or the researcher wants participants to reflect on particular experience.^{9,10}

Descriptive Phenomenological Approach: This approach allows for researchers to explore a phenomena by directly interacting with the participant to learn more about the lived experiences of the participant.¹³

Criterion-Based Sampling: In qualitative research, criterion-based sampling is used when participants meet specific criteria or show knowledge of a phenomenon due to their experiences.¹⁴

Trustworthiness: the degree to which qualitative research can be proved to be valid and reliable. Research studies accomplish trustworthiness through the following criteria: 1) credibility, 2) dependability, 3) confirmability, 4) transferability, and 5) authenticity.¹⁵⁻¹⁷

1.10. Assumptions

1. The interview questions that are asked as a part of this study are valid methods of data collection and are all asked to learn more about the experiences of the participants.
2. The participants in this study accurately describe their experiences during their SRC recovery process.
3. All responses to the questions we ask in the interview are accurate and truthful regarding the participants' SRC experiences.

1.11. Delimitations

1. This current study is restricted to athletes who experienced a sport-related concussion while at a NCAA institution.
2. This current study is restricted to those who experienced a sport-related concussion on or after February 1, 2021.
3. This study only denotes the experiences of NCAA collegiate athletes.

1.12. Limitations

2. This study was only conducted with NCAA student-athletes.
3. This study was only conducted with participants who had an SRC diagnosed while at a NCAA institution.

4. This current study is restricted to those who volunteered to participate throughout the entire duration of the interview process.
5. This study only includes male NCAA student-athletes.
6. The majority of the participants are Division I student-athletes (5/6).
7. The majority of the participants are football players (5/6).

1.13. Significance of the Study

Concussions are a public health concern that can affect many aspects of an individual's life from a physical, mental, and social health perspective. Additionally, student-athletes are often at a greater risk of sustaining a concussion than their fellow non-athlete classmates. Due to their roles as both a student and an athlete, concussed student-athletes often must successfully return to the classroom and to their sport. Thus, they must return to a level of high functioning cognitively, socially, and physically. While the research supports recommendations for the reintegration into school and sport following a concussion, there is little research that investigates the experiences of student-athletes as they navigate these processes.

2. LITERATURE REVIEW

2.1. Introduction

Over the last several years, sport-related concussions (SRC) have become a major public health concern in the United States, with Ianof et. al. labeling it as a “silent epidemic.”⁸ While there are many similarities that can be observed in regard to SRC and mild traumatic brain injury (mTBI), there are some key differences that should be noted. While mTBI and SRC are both sustained due to blows to the head or body, the clinical presentation can differ slightly. The environment in which mTBI and SRC occur differs, as well. mTBI is sustained most often in vehicular accidents, whereas SRC occur in activity-related and athletic environments.^{1,8} Recovery from SRC typically includes return-to-learn (RTL) and return-to play (RTP) protocols, which must be completed correctly and, in their entirety, to reduce the likelihood of the student-athlete suffering any long-lasting, detrimental effects after sustaining an SRC. There are many psychological, neurocognitive, and vestibulo-ocular aspects of concussion recovery that must be focused on, as well. One of the most important components of these protocols is that the RTL protocol should be completed in its entirety before the RTP protocol can be successfully completed.² There has been significant research surrounding recommendations for RTL and RTP protocols, however, there has not been much research conducted on the student-athlete’s perception of those processes.

2.2. Sport-Related Concussion

While there has been a significant increase in research surrounding the identification and management strategies of SRC, SRC still remains one of the most complex injuries that sports medicine professionals treat.⁷ Currently, there has not been much research conducted to determine the relationships between SRC, long-term neurocognitive dysfunction, and

neuropathological conditions. Because of this, it is imperative for healthcare providers to have a foundational basis of understanding diagnosis and management of SRC.⁶ The current definition of SRC, according to the 2016 5th International Consensus Conference on Concussion in Sport (ICCCS) in Berlin, involves four criteria: (1) trauma, direct or indirect, located anywhere on the body that has force transmitted to the head; (2) rapid or delayed symptom presentation; (3) negative imaging on a CT or MRI, reflecting a functional injury rather than a structural injury; and (4) loss of consciousness or no loss of consciousness.² While a concussion is considered a form of mTBI, the main difference is that a concussion is no longer considered a concussion if the individual has positive imaging on a CT or an MRI.⁶ The initial diagnosis of SRC is largely dependent upon clinical signs and symptoms. There are several tests that can be utilized to diagnosis SRC. Some of these tests include the Sports Concussion Assessment Tool 5 (SCAT5), the modified Balance Error Scoring System (BESS), the Post-Concussion Symptom Scale (PCSS), and the Vestibular/Ocular Motor Screening (VOMS).⁶ Obtaining baseline measurements of the previously mentioned evaluation tools is imperative to ensuring proper diagnosis and can assist healthcare professionals in postinjury management.⁷ Because of the complex and individualized nature of SRC, each athlete must be evaluated and treated using an individualized approach.

2.3 Symptoms

Due to the subjective nature of concussions, diagnosis can be very difficult. Each concussion comes with its own set of unique characteristics. Healthcare professionals are faced with the challenging responsibility to recognize and evaluate SRC in their student-athletes. To do this, the healthcare professional often will have to rapidly assess the athlete in the middle of the competition, requiring a brief sideline evaluation. It is recommended that the sideline evaluation

consist of many different segments: recognition of injury, symptom assessment, cognitive function, cranial nerve function, vision, coordination, and balance.² These aspects of a concussion evaluation aid the healthcare professional in the diagnosis of concussion. The healthcare professional should suspect a sport-related concussion if the athlete meets any of the following clinical presentation criteria: (1) somatic, cognitive, or emotional symptoms; (2) physical signs – loss of consciousness, neurological deficits, amnesia, etc.; (3) impairment in balance – disturbances in gait pattern; (4) changes in behavior – irritability; (5) disturbances in sleep pattern – drowsiness, insomnia, etc.; and/or (6) visual disturbances.² It is important to note that the clinical presentation of concussions can mimic other conditions; therefore, if an athlete presents with these symptoms, a concussion should be included as a differential diagnosis, but not as a definitive diagnosis until further testing can be completed.²

2.4. Neurocognition

Being endorsed by the CISG as the “cornerstone” of concussion management, the addition of neurocognitive testing into the diagnosis and management of SRC has given healthcare professionals a more objective way to measure and detect cognitive performance changes, acutely and chronically, following a SRC.¹⁸ These testing batteries have also given healthcare professionals the ability to identify and track factors that may influence cognitive outcomes in student-athletes. While these testing batteries can be utilized acutely, they are most commonly used for obtaining baseline measures, as well as in the decision-making process of returning an athlete to sport participation after a SRC.¹⁸ The neurocognitive domains that can be most commonly affected by SRC include: (1) concentration and attention (2) cognitive processing, (3) speed/efficiency, and (4) learning and memory.¹⁸ There is a lack of research

surrounding how neurocognitive deficits can impact student-athletes as they reintegrate into the classroom and athletics post-concussion.

2.5. Vestibulo-ocular

There are many symptoms that an individual may experience after sustaining an SRC. These include a variety of physical, cognitive, affective, and sleep-related symptoms or impairments. Of these symptoms, the least understood and potentially the most important of these impairments or symptoms are the oculomotor and vestibular disturbances that can be experienced after sustaining an SRC.¹⁹ Kontos et. al. reported that approximately 60% of student-athletes, who have sustained a SRC, will experience some degree of vestibulo-ocular impairment.¹⁹ While oculomotor symptoms can include blurred vision, difficulty reading, convergence insufficiency, and diplopia, some of the vestibular disturbances that can occur are dizziness, nausea, and discomfort in busy environments.¹⁹ Studies have assessed the effectiveness of vestibulo-ocular rehabilitation post-concussion; however, the evidence supporting rehabilitation strategies for vestibular and oculomotor disturbances is lacking.¹⁹ It is also important to note that there is a lack of research surrounding how much vestibulo-ocular issues truly affect student-athletes.

2.6. Recovery Process

According to the 2016 ICCCS Berlin Conference, clinical recovery after SRC is functionally defined as the time when the athlete returns to normal activities such as sport, school, or work.² Operationally, recovery encompasses the athlete returning to preinjury balance and cognitive functioning, as well as symptom resolution. Because of the individualized nature of SRC, this process can look different among athletes.² There has been an evolving narrative surrounding concussion recovery in the last 15 years. While previous research suggests that most

student-athletes will fully recover from SRC within a 7–10-day period, a study by McAllister et al. revealed that it is more realistic for student-athletes to fully recover at a much slower pace (24-74 days).²⁰ Due to the complex and individualistic nature of SRC, while there are guidelines to assist with the recovery process, it is important for clinicians and student-athletes to understand that the recovery process will differ from person to person.

2.7. Return-to-Learn

Return-to-Learn (RTL) is defined as the process of gradually reintroducing a student-athlete back into the classroom after sustaining a sport-related concussion.³ Having a student-athlete return to the classroom prior to the resolution of their concussion symptoms can have adverse effects on their overall recovery, grades, learning, and potentially the livelihood of the athlete. To date, there seems to be no consistent processes for RTL reported in the literature.³ McAvoy et al. noticed the lack of research regarding RTL protocols and set out to establish a set of guidelines or consensus of what themes should be focused on during RTL.²¹ The main themes that McAvoy et al. focused on were monitoring progress, returning the student-athlete to school, determining who should make up the concussion-management team, and neuropsychological testing of the student-athlete.²¹ Lyons et al. also reported domains that were unmet in regard to RTL protocols. Some of these topics were barriers to providing accommodations or receiving them, a general lack of RTL policies, and wide variability in patterns of communication.²² There is also a lack of literature looking at how academic performance is truly affected by SRC.³

2.7.1. Current RTL Recommendations

While there are many recommendations regarding RTP, the literature is lacking regarding RTL recommendations. Due to cognitive exertion, many healthcare professionals have prevented student-athletes from returning to the classroom for days, weeks, months, or even until they are

symptom free.²¹ One of the main problems that schools face when working to return a student to the classroom is finding the happy medium between ensuring the student gets enough rest and reintroducing activity slow enough to not overburden an athlete's presenting symptomology.²¹ In an effort to push for generalized recommendations regarding the RTL process for student-athletes, McAvoy et. al. surveyed 16 national organizations to determine where the disconnect lied with these policies.²¹ From the survey responses, 13 RTL consensus statements were established focusing on cognitive rest, developing a concussion management team, progress monitoring, ascending levels of academic support, neuropsychological testing, and RTL legislation.²¹

2.8. Return-to-Play

McKeithan et. al. defines RTP as the continuation of athletic participation after the student-athlete has returned to their neurological baseline after sustaining a SRC.⁶ This process begins immediately and encompasses all experiences student-athletes had from the time of their concussion until full-sport participation. This includes the time they were asked to rest or reduce their physical or mental activities, any training or rehab they may have done prior to starting their RTP protocol, as well as their RTP activities. After the student-athlete is back to their neurological baseline and they have been asymptomatic for at least 24 hours, they can begin the RTP protocol, which is a 6-step graded RTP progression healthcare professionals utilize when assisting student-athletes in RTP.^{2,7} The approach most clinicians take to establish RTP protocols is based on the Concussion in Sport Group (CISG)'s 11 R's of SRC management.² These R's include: (1) Recognize, (2) Remove, (3) Reevaluate, (4) Rest, (5) Rehabilitation, (6) Refer (7) Recover, (8) Return to sport, (9) Reconsider, (10) Residual effects and sequelae, and (11) Risk reduction.²

2.8.1. Current RTP Recommendations

According to the NATA, current RTP recommendations state that protocol should not begin until the athlete is no longer experiencing concussion symptoms, has a normal clinical examination, and returns to baseline levels on all objective concussion assessments.⁷ Student-athletes should not fully return to their sport until they have fully reintegrated into the classroom.² Exercising at sub-symptom threshold levels may be beneficial in decreasing the likelihood of developing post-concussion syndrome.⁸ Once concussion symptoms have fully resolved, the student athlete may begin their RTP protocol. There is typically a 6-step graded RTP progression healthcare professionals utilize when assisting athletes in RTP. These steps are: (1) symptom-limited activity; (2) low-intensity light aerobic exercise; (3) sport-specific exercise; (4) non-contact training or practice; (5) contact training or practice; (6) full RTP.^{2,6,7} The recommendations state that there needs to be at least 24 hours in between each progression through the protocol. If the student-athlete begins to experience symptoms during one of the protocol steps, the activity must immediately cease, the athlete must be asymptomatic for 24 hours, then can resume the protocol at the previous step.²

2.9. Athlete Identity

When a student-athlete suffers an SRC, their identity as an athlete may be affected due to them not being able to practice or compete. Athletic identity is defined as the degree to which an athlete identifies themselves with their associated sport.¹¹ Athletes who have their athletic identity impaired may experience issues in the school, social, and emotional aspects of their lives.¹² Athletes who are categorized as having a high athletic identity are at a greater risk for having difficulty adjusting to any changes after sustaining an injury. Previous research described that athletes experience an increase in emotional issues post-SRC which significantly impacted

their social identity roles.¹² Some student-athletes have described their rehabilitation experiences post-SRC as an “emotional rollercoaster.”¹² While research supports how an adolescent student-athlete’s identity is affected after having an SRC, little research has been done to look at how the identity of collegiate student-athletes is affected by SRC.

2.10. Psychosocial

There are many psychosocial factors that are associated with concussions that may complicate the recovery process.²³ Over the last several years, there has been an increased emphasis placed on how mental health can be altered having sustaining an SRC.²⁴ While there have been many recommendations related to mental health in position and consensus statements from the NCAA and the National Athletic Trainers Association, the literature is lacking regarding how healthcare professionals should monitor and assess mental health in student-athletes post-concussion.²⁴ Because of the invisible and subjective nature of concussions, many athletes may become vulnerable to an increase of fear.²³ Some of the fears athletes may include fear of re-injury, fear of isolation, fear of losing financial stability (scholarship or income), and fear of losing team affiliation.²³ There is also a mentality in athletics for athletes to “play through the pain.” If athletes have this mentality, they may be more inclined to prematurely return to full participation.²³ An athlete’s teammates, coaching staff, and support staff also play a role in the psychosocial recovery of the athlete. These individuals may place additional pressures and stressors on the athlete that may be detrimental to the recovery of the athlete post-concussion.²³ Because of this, it is imperative for healthcare providers to have full control over the athlete’s recovery process post-concussion.²³ It also may be necessary to provide the athlete with psychological and social buffers during the concussion recovery process.²³ Having these buffers can provide support for the challenging aspects of concussion recovery to help facilitate and

accelerate the RTP and RTL processes.²³ Research suggests that psychosocial factors are a predictor for reinjury in orthopedic injuries; however, there has not been much guidance on the impact of psychosocial factors on RTP and RTL processes.²⁵

2.11. Quality of Life

While most individuals fully recover from a concussion within a month after injury, some individuals experience symptoms that persist well beyond that mark.²⁶ Persistent concussion symptoms can potentially lead to a disruption in the individual's social, academic, physical, and emotional functioning.²⁶ These disruptions can potentially lead to a reduction in the quality of life for the individual.²⁶ By utilizing patient-reported quality of life measurements, clinicians can gain a deeper understanding for how the individual's life is affected by their concussion. More specifically, quality of life measurements tell clinicians how an individual perceives their mental well-being, physical well-being, and social-well-being after sustaining a concussion.²⁶ Several studies have investigated the quality of life of children and adolescents post-concussion²⁶; however, there is a lack of research discussing how the lives of collegiate athletes are affected post-concussion.

2.12. Support Systems

Multiple studies have shown that social support is helpful in orthopedic injuries,²⁷ but there is a lack of literature regarding support systems for student-athletes during their recovery from a SRC. An athlete's teammates, coaching staff, parents, roommates, medical staff, and athletic support staff may play an important role in being a support system throughout the athlete's recovery process. Academic staff, teachers, and students can also be a positive source of social support for student-athletes as they navigate the recovery process. A study by Covassin et

al. revealed that having a stronger support system can decrease state anxiety throughout the SRC recovery process and returning to sport.²⁷

2.13. Conclusion

There has been extensive research about SRC and what should be done regarding the recovery process; however, there is a lack of research regarding student-athletes experiences while reintegrating into school and sport following a concussion. This information can help researchers and clinicians determine if the current recommendations benefit the student-athletes. Utilizing a qualitative approach would allow student-athletes to verbalize their recovery experiences and allow the researchers to determine any potential missing links that may be associated with the reintegration processes. Future research should be conducted to establish updated protocols that are focused more on the well-being of the student-athlete, instead of the processes used to return them to school and sport.

3. METHODS

3.1. Research Design

Due to the lack of research surrounding the reintegration experiences of NCAA Division I – III student-athletes into school and sport after sustaining an SRC, this study used a qualitative methodology to gain a better understanding of these processes. Specifically, a descriptive phenomenological approach was used to allow participants to share their experiences using their direct words, alleviating any potential bias from the research team.¹³ Furthermore, this study allowed the student-athletes to share their experiences about their own reintegration, including resources, personnel, and any unexpected challenges they may have faced. The participants spoke with the research team in a one-on-one, semi-structured interview via Zoom, where they answered open-ended questions that were related to their experiences during their recovery process. This study was approved by the institutional review board prior to subject recruitment.

3.2 Participants

Student-athletes (male and female) who were current members of a D1, D2, or D3 NCAA Institution were recruited to participate in this study. Criterion-based sampling¹⁴ was utilized to determine participants eligible for this study. The predetermined criteria for participation were (1) must be 18 years of age or older, (2) must be fluent in English, (3) must be a current varsity-sport student-athlete at a Division 1, Division 2, or Division 3 National Collegiate Athletic Association Institution, (4) must have sustained a sport-related concussion on or after February 1, 2021, and (5) must have fully returned to academics and athletics prior to enrolling in the study. All participants gave informed consent via Qualtrics, as well as oral consent to have the interview recorded via Zoom prior to the start of the interview.

3.3. Instrumentation

3.3.1. Survey

A demographic questionnaire (Appendix 1) was delivered via Qualtrics prior to scheduling an interview. This questionnaire was conducted to share the study information, verify eligibility, to collect demographic data, to provide the research team with contextual information regarding concussion history, and to receive informed consent to participate in a video-recorded Zoom interview. The Qualtrics questionnaire consisted of five sections: (1) Introduction and Consent, (2) Inclusion Criteria, (3) General Questions, (4) Concussion Information, and (5) Personal Information. The Introduction and Consent section gave the potential participant information regarding the study, as well as two questions to allow the potential participant to give informed consent to participate in the study and to participate in a video-recorded interview. The Inclusion Criteria section consisted of six questions to determine if potential participants met the inclusion criteria for the study. In order to be considered for the study, the participant must be (1) fluent in English, (2) 18 years of age or older, (3) a current, varsity-sport student-athlete at a Division I, II, or III National Collegiate Athletic Association Institution, (4) must have sustained a concussion on or after February 1, 2021, and (5) must have fully returned to both school and sport. The General Questions section collected participant's demographic information including, assigned sex at birth, age, athletic eligibility status, primary sport, and the NCAA Division of their collegiate team. If the participant selected that they were a Division I student-athlete, they were directed to a question to select which athletic conference they participated in. The Concussion Information section consisted of six questions concerning their concussion history including but not limited to, their total number of diagnosed concussions, the mechanism of injury for the most recent concussion, how many undiagnosed concussions the participant has

had, if the participant missed any practice or playing time as a result of their concussion, academic accommodations received, and days missed from sport and academics. The Personal Information section was used to collect the participant's name and contact information. This information was used to schedule their interview and to email the interview transcription to the participant for approval. To protect anonymity of the participant, all transcripts were coded using a pseudonym, which can be found in Table 1.

3.3.2 Interview Script

Participants participated in one-on-one, 20–30-minute Zoom interview that utilized a semi-structured interview protocol (Appendix B) consisting of 14 open-ended questions that were separated into 3 sets of questions: (1) General Concussion Experiences, (2) Return-to-Sport Experiences, and (3) Return-to-Learn Experiences. The open-ended, semi-structured nature of the questions asked in the interview protocol allowed for the participants to share their experiences while reintegrating into school and sport after their sport-related concussion, while also allowing for the flexibility to ask for elaboration, if it was necessary. This also allowed for the potential of topics and themes to emerge that were not previously thought of or mentioned. The General Concussion Experiences set highlighted the overall concussion injury experience, as well as how explored how relationships with teammates, coaches, athletic trainers, athletic staff, students, teachers, and academic staff were affected by the participant's concussion. The Return-to-Sport Experiences set allowed for the participant to talk specifically about their experiences while returning to their respective sport. These questions allowed the participants to share how their return-to-sport process went, what they expected their return-to-sport process to look like, who, if anybody, helped them throughout their return-to-sport process, and what recommendations they would give to better aid student-athletes while reintegrating into sport

after a sport-related concussion. The Return-to-Learn Experiences set allowed for the participant to expand on what the term return-to-learn means to them, how their return-to-learn process went, who supported them through the return-to-learn process, what, if any, academic accommodations they may have received, and if those accommodations helped the participant while recovering, and what recommendations they would give to better aid student-athletes while reintegrating into the classroom after a concussion. After those questions were answered, the interviewer then gave the participant a chance to share anything else with the research team that may not have been previously mentioned in the interview. Before data collection began, the interview protocol was pilot tested with a former Division I collegiate football player who had sustained a SRC. The purpose of the pilot study was to train the interviewer and ensure that the interview questions answered the research questions set by the research team.

3.4. Data Collection

We utilized social media, word of mouth, and email to recruit eligible participants for this study. The initial data for this study was collected through an online survey (Qualtrics.com) that contained study information, participant consent, and demographic information. Consented participants who completed the survey, including their contact information were contacted by the research team to set up their 20–30-minute, one-on-one, semi-structured interview via Zoom. Consent to participate in the interview, as well as to be recorded during the interview was obtained via Qualtrics prior to scheduling the interview. The research team verbally confirmed the participants' consent to be recorded prior to starting the Zoom interview. During the 1-on-1 interview, the researcher followed the interview protocol (Appendix B) using the semi-structured script (Appendix B). In order to protect the privacy of the participants throughout the interview and transcription process, all participants were given a pseudonym to ensure their anonymity.

Following each interview, all interviews were transcribed verbatim and emailed to the participant for approval. This was done to ensure that everything the participant stated in the interview was an accurate representation of their experiences and that they were accurately represented in the study. The participants were allowed to add any additional, clarifying information they needed to; however, they were not allowed to remove any information from the transcript.

3.5. Data Analysis

All data collected during the interview process were analyzed using thematic analysis techniques inclusive of data reduction, pattern identification, and triangulation in order to develop themes and subthemes that were reflective of the study findings. This was accomplished using a descriptive, phenomenological approach.¹³ Utilizing this approach allowed for participants to describe the relationships between all variables and the participants using their exact words and without assuming any additional meaning. After all interviews were conducted, three members of the research team met to determine and agree upon the initial theme domains and subthemes. Additional subthemes were placed in each domain as the research team saw necessary. The research team continued to meet regarding how themes were coded until a consensus was met about the placement of the themes. At that time, pattern identification was conducted to determine similarities and differences that were found from the individual interviews. Triangulation occurred throughout the data analysis process by meeting multiple times to ensure that all parties of the research team agreed on the emerging themes and subthemes, as well as protect against researcher bias.

3.6. Trustworthiness

Ensuring trustworthiness is essential in qualitative research to ensure that the readers can be confident in the results set forth by research studies. Establishing trustworthiness is done

through the following five criteria: 1) credibility, 2) dependability, 3) confirmability, 4) transferability, and 5) authenticity.¹⁵⁻¹⁷ The questions utilized throughout the interview script were formatted in an open and expansive manner to limit the participants from feeling lead toward a certain response to the interview questions. Follow-up questions were asked if the interviewer felt like the participant did not answer the question to the fullest extent. Through a process called “member checks”, the participants were also asked to approve their interview transcripts to ensure that what they mentioned in the interview was reflective of their experiences.¹⁵⁻¹⁷ The participants were given clear and strict instructions that they could add clarifying information as necessary, but they could not remove any information in the transcript. As mentioned above, a multi-perspective approach was utilized for data analysis. Because the research team had three members participate in data analysis, the impact of assumptions or limitations was alleviated. The potential for any researcher bias was also alleviated by having three members participate in data analysis. Any discrepancies that were found among the data analysis team were discussed until an agreement was reached of each overarching theme and subtheme.

3.7. Triangulation

Triangulation is a strategy utilized in qualitative research to test the validity of the study through the merging of information from a variety of sources.²⁸ This can be done by using multiple methods or sources of data to establish a thorough understanding of a certain phenomenon.²⁸ Triangulation used to prevent the establishment of researcher bias. There are four types of triangulation that can be found in qualitative research. These include: (1) method triangulation, (2) theory triangulation, (3) investigator triangulation, and (4) data source triangulation.²⁸ Method triangulation is utilized several methods of data collection surrounding

the same phenomenon. This is commonly seen through conducting interviews.²⁸ Theory triangulation utilizes theories to interpret or analyze data. Researchers typically use this type of triangulation to use the theories to support their research findings. Investigator triangulation utilizes two or more researchers to provide their observations of the study. Investigator triangulation can be beneficial to qualitative researchers because it brings different perspectives on the data, which can lead to an expansion of ideas surrounding the phenomenon.²⁸ Finally, data source triangulation consists of collecting data from different types of individuals. This type of triangulation is utilized to ensure that the research team is gaining multiple perspectives surrounding the phenomenon, as well as, increasing overall validity.²⁸ All four types of triangulation were utilized in this study. Method triangulation was used by collecting demographic surveys, as well as, conducting Zoom interviews. Theory triangulation was used by using a descriptive phenomenological approach to reflect the study findings. Investigator triangulation was used by having the three members of the research team participate in data analysis. Finally, data source triangulation was used by collecting data from student-athletes who participate in different sports, as well as different NCAA divisions and schools.

4. MANUSCRIPT

4.1 Abstract

Background: Return-to-Learn (RTL) and Return-to-Play (RTP) protocols have been established to guide the reintegration into school and sport after sustaining a sport-related concussion (SRC). To our knowledge, there has not been any research investigating the experiences of collegiate student-athletes as they navigate these processes.

Methods: We collected demographic surveys and conducted 6 semi-structured interviews with male, NCAA student-athletes who had sustained a sport-related concussion on or after February 1, 2021, while attending a Division I, II, or III NCAA institution. After data saturation and member checks, the data were analyzed using a descriptive, phenomenological approach.

Results: We discovered five themes. Participants described their physical and cognitive impacts affected their recovery by talking about the symptoms that they experienced. Regarding psychosocial impacts, participants mentioned the emotional impact and the role social support played in their recovery. Academic experiences were described by the participants' perception of RTL and the role academic accommodations played in their recovery. Athletic experiences were described by having a false reality of RTP and overall perception of RTP. Finally, recommendations were given to aid student-athletes as they reintegrate into school and sport post-SRC.

Conclusion: Participants denoted their personal concussion recovery experiences as they reintegrated into school and sport post-SRC. The results showed the importance for clinicians to utilize an individualized and collaborative approach when reintegrating a student-athlete into school and sport post-SRC.

Key Words: return-to-learn, return-to-play, social support, athlete identity, academic accommodations, recommendations

4.2 Introduction

Concussions are a public health concern that can affect many aspects of an individual's life from a physical, mental, and social health perspective. Additionally, student-athletes are often at a greater risk of sustaining a concussion than their fellow non-athlete classmates.²⁹ Due to their roles as both a student and an athlete, concussed student-athletes must successfully return to the classroom prior to returning to their sport. Thus, they must return to a level of high functioning cognitively, socially, and physically throughout this process.

Return-to-Learn (RTL) and Return-to-Play (RTP) Protocols have been established to aid student-athletes, clinicians, and educators through the reintegration process back into school and sport after sustaining a sport-related concussion. While there is research to support recommendations for the reintegration into school and sport following a concussion,^{2,7} to our knowledge, there has not been research conducted to investigate the experiences of collegiate student-athletes as they reintegrate into school and sport after a sport-related concussion. Most research involving RTL and RTP protocols has focused on establishing a set of guidelines for clinicians to follow; researchers have not given much attention to determining if those guidelines truly benefit the well-being of the student-athlete.

The purpose of this qualitative research study is to investigate the reintegration experiences of National Collegiate Athletic Association (NCAA) student-athletes into school and sport after sustaining a sport-related concussion.

4.3 Methods

4.3.1 Research Design

In order to better understand the reintegration experiences of collegiate student-athletes into school and sport after sustaining a sport-related concussion, we used a descriptive, phenomenological, qualitative approach.¹³ This study allowed the student-athletes to share their perspectives about their own reintegration experiences back into school and sport. The participants in this study completed an online screening survey and participated in a one-on-one, semi-structured interview via Zoom with a member of the research team to answer open-ended questions that were related to their experiences during their recovery process. Institutional board approval was granted prior to participant recruitment.

4.3.2 Participants

Student-athletes (male and female) who were current members of a Division I (D1), Division II (D2), or Division III (D3) National Collegiate Athletic Association (NCAA) Institution were recruited to participate in this study. Criterion-based sampling¹⁴ was utilized to determine participants eligible for this study. The predetermined criteria for participation were (1) must be 18 years of age or older, (2) must be fluent in English, (3) must be a current varsity-sport student-athlete at a D1, D2, or D3 National Collegiate Athletic Association Institution, (4) must have sustained a SRC on or after February 1, 2021, and (5) must have fully returned to academics and athletics prior to enrolling in the study.

4.3.3 Instrumentation

Prior to data collection, a pilot study (1 practice interview and 1 practice transcription) was conducted as part of the interviewer's training and reviewed by senior members of the research team experienced in qualitative research methods. The participant utilized for this

practice interview was a former D1 football player who had sustained a SRC while participating in a practice. This pilot study was also used to ensure that the interview questions answer the research question set by the research team. After the practice interview, three members of the research team met to modify the interview questions to ensure the questions were clear and easily understandable.

Two separate instruments were administered as part of this study. A screening and demographics questionnaire (Appendix A) that was delivered via Qualtrics.com prior to scheduling an interview. This questionnaire was conducted to share the study information, verify eligibility, to collect demographic data, to provide the research team with contextual information regarding concussion history, and to receive informed consent to participate in a video-recorded Zoom interview. The Qualtrics questionnaire consisted of five sections: 1) Introduction and Consent, 2) Inclusion Criteria, 3) General Questions, 4) Concussion Information, and 5) Personal Information. The Introduction and Consent section gave the potential participant information regarding the study, as well as two questions to allow the potential participant to give informed consent to participate in the study and to participate in a video-recorded interview. The Inclusion Criteria section consisted of six questions to determine if potential participants met the inclusion criteria for the study. The General Questions section collected participant's demographic information including, assigned sex at birth, age, athletic eligibility status, primary sport, and the NCAA Division of their collegiate team. If the participant selected that they were a D1 student-athlete, they were directed to a question to select which athletic conference they participated in. The Concussion Information section consisted of six questions concerning their concussion history including but not limited to, their total number of diagnosed concussions, the mechanism of injury for the most recent concussion, how many undiagnosed concussions the participant has

had, if the participant missed any practice or playing time as a result of their concussion, academic accommodations received, and days missed from sport and academics. The Personal Information section was used to collect the participant's name and contact information. This information was used to schedule their interview and to email the interview transcription to the participant for approval.

The second study instrument was a one-on-one, 20–30-minute Zoom interview protocol that utilized a semi-structured interview format (Appendix B) consisting of 14 open-ended questions that were separated into 3 sets of questions: 1) General Concussion Experiences, 2) Return-to-Sport Experiences, and (3) Return-to-Learn Experiences. The open-ended, semi-structured nature of the questions asked in the interview protocol allowed for the participants to share their experiences while reintegrating into school and sport after their sport-related concussion, while also allowing for the flexibility to ask for elaboration, if it was necessary. This also allowed for the potential of topics and themes to emerge that were not previously thought of or mentioned. The General Concussion Experiences set highlighted the overall concussion injury experience, as well as explored how relationships with teammates, coaches, athletic trainers, athletic staff, students, teachers, and academic staff were affected by the participant's concussion. The Return-to Sport Experiences set allowed for the participant to talk specifically about their experiences while returning to their respective sport. These questions allowed the participants to share how their RTP process went, what they expected their RTP process to look like, who helped them throughout their RTP process, and what recommendations they would give to better aid student-athletes while reintegrating into sport after a sport-related concussion. The RTL Experiences set allowed for the participant to expand on what the term RTL means to them, how their RTL process went, who supported them through the process, what academic

accommodations they may have received, if those accommodations helped the participant while recovering, and what recommendations they would give to better aid student-athletes while reintegrating into the classroom after a concussion. After those questions were answered, the interviewer then gave the participant a chance to share anything else with the research team that they felt was important to the study that may not have been previously mentioned in the interview.

4.3.4 Procedures

To recruit and identify eligible participants, the research team disseminated a flyer via social media and email that contained general information about the study, as well as the link to the online questionnaire. Word of mouth was also utilized as a recruitment tool. After a participant completed the online consent, screening, and demographic questionnaire, the primary investigator contacted the participant via the email or phone number they provided. Zoom interviews began approximately a week after the participants accessed the survey and continued until data saturation was achieved, which is when the participants were no longer sharing new information with the study team. Participants were interviewed until the research team kept hearing the same patterns repeated throughout the interviews and thought that saturation was reached. At that time, no further participants were recruited. All participants gave informed consent via Qualtrics, as well as oral consent to have the interview recorded via Zoom prior to the start of the interview.

All interviews were recorded via Zoom. At the conclusion of each interview, the primary investigator transcribed the interview verbatim. The transcription was then emailed to the participant in an effort to enhance trustworthiness.^{16,17} This was done to ensure that everything the participant stated in the interview was an accurate presentation of their experiences and that

they were correctly represented in the study. Through a process called “member checks,” the participants were allowed to add clarifying information;¹⁵⁻¹⁷ however, they were provided with clear instructions that they were not allowed to remove information from the transcript.

4.3.5 Data Analysis

Once the transcripts were approved, the primary investigator analyzed the data using thematic analysis techniques inclusive of data reduction, pattern identification, trustworthiness, and triangulation in order to develop themes and subthemes that were reflective of the study findings. Data analysis was conducted using a descriptive phenomenological approach.¹³ This approach allowed for the participants to describe the relationships between all of the variables and the participants by using their exact words, which alleviates any assumptions made by the research team.

After all interviews had been conducted and the transcripts were approved, the research team met to agree on the themes and subthemes that emerged from data analysis. After all themes and subthemes were agreed upon by the research team, pattern identification was conducted to determine similarities and differences that were found throughout the individual interviews. Triangulation occurred throughout the data analysis by the research team meeting multiple times to discuss any discrepancies found in the themes and to ensure that all members agreed on the emerging themes and subthemes, as well as to protect against research bias.

4.4 Results

Seven male participants completed the Qualtrics survey. All seven participants were invited to participate in a one-on-one Zoom video interview with a member of the research team. Six participants (86%) completed the one-on-one Zoom video interview and were included in

our data analysis. The demographics of the participants in this study, as well as the lengths of their RTL and RTP protocols are listed in Table 1 and Table 2.

Table 1: Demographic Information

<u>Pseudonym</u>	<u>Sex</u>	<u>Age</u>	<u>Athletic Eligibility</u>	<u>Sport</u>	<u>NCAA Division</u>	<u>Diagnosed Concussions</u>	<u>Undiagnosed Concussions</u>
John	M	21	Redshirt Sophomore	Football	D1	1	1
David	M	23	Redshirt Senior	Football	D1	1	0
Andrew	M	20	Redshirt Junior	Football	D1	2	1
Charlie	M	22	Redshirt Senior	Football	D1	1	0
Liam	M	21	Redshirt Sophomore	Football	D1	1	0
Michael	M	24	Graduate Student	Baseball	D3	3	0

Table 2: Length of RTL and RTP Protocols

<u>Pseudonym</u>	<u># of Days of Missed Class</u>	<u># of Days of Receiving Academic Accommodations</u>	<u># of Days out of Athletic Participation</u>
John	2	2	7
David	5	5	5
Andrew	14	14	14
Charlie	1	4	6
Liam	14	14	12
Michael	5	5	5

The data analysis revealed five themes related to student-athlete experiences while reintegrating into school and sport after sustaining a sport-related concussion: 1) physical and cognitive impact of sport-related concussions; 2) psychosocial impact of sport-related concussions; 3) academic experiences, 4) athletic experiences, and 5) recommendations. When exploring the physical and cognitive impact of sport-related concussions, data analysis of the interview transcripts revealed two sub-themes: 1) symptoms; and 2) the heat/the sun. An analysis of the psychosocial impact of sport-related concussions revealed four sub-themes: 1) overall recovery; 2) emotion; 3) general social support; 4) relationships (athletic trainer, coach, teammates, academics, and external). The analysis of academic experiences revealed four sub-themes: 1) overall experience with RTL; 2) athlete perception of RTL; 3) academic accommodations; 4) and communication. The analysis of athletic experiences revealed two sub-themes: 1) false sense of RTP; and 2) athlete perception of RTP. When analyzing recommendations given by the participants, two sub-themes emerged: 1) athletic recommendations; and 2) academic recommendations. Figure 1 shows the framework of the themes that emerged.

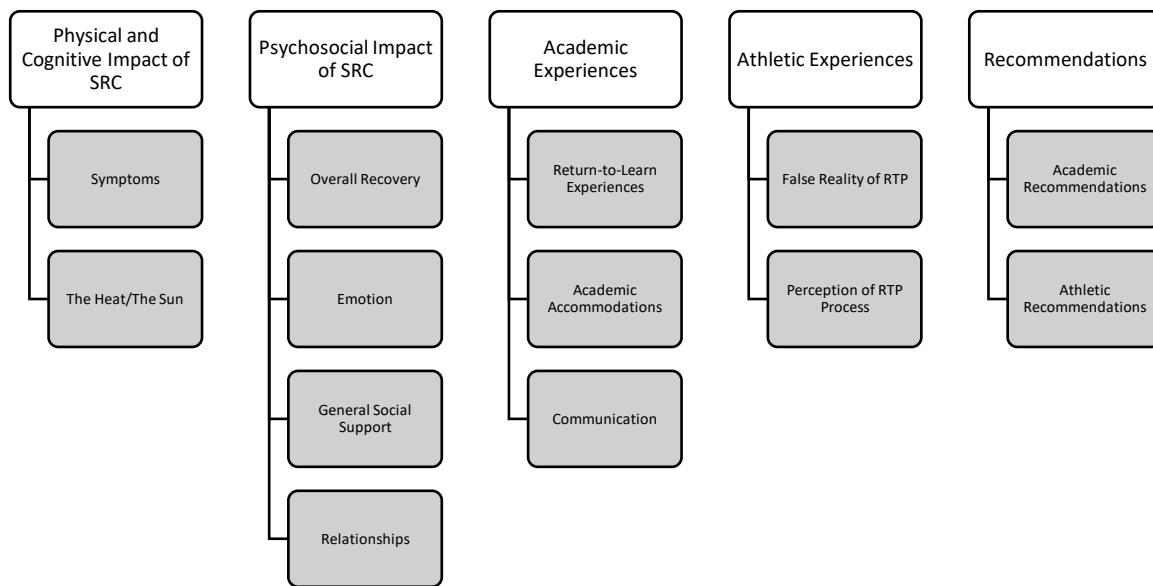


Figure 1: Framework of Themes

4.4.1 Physical and Cognitive Impact of Sport-Related Concussions

The physical and cognitive impact of sport-related concussions theme included all information from participants pertaining to physical (i.e., balance, pain, etc.) or cognitive (i.e., confusion, concentration, etc.) concussion-related effects they experienced. All participants (n=6) described some level of physical or cognitive impact following their concussion, with vestibulo-ocular disturbances (n=4) and the impact of head and the sun (n=2) being most common.

Symptoms

Many of the symptoms the participants' experienced were related to vestibulo-ocular impairments. David stated,

"...as soon as it happened, my vision, I remember it was like – the best way I could describe it was like tinted brown. Like everything I looked at around me was like brown. It wasn't necessarily blurry..."

David also mentioned,

“...I remember my ears were ringing and I was kind of like I had a lot of head space like I was like instantly confused as to what was going on around me”.

Michael reported,

“...even though my body felt fine, like I could tell that my head wasn't in the right spot because I was mishearing words. The lights instantly started bothering me, and then due to the like the lights being so bright is what ended up making me feel sick.”

The Heat/The Sun

For two of the participants, the heat and the sunlight played a role in symptom exacerbation. Charlie reported,

“Dealing with the light sensitivity was the main thing that I had to get over. Not too much of like the lights in the building, but the sun itself was the main factor contributing to my disorientation and stuff.”

Andrew also stated,

“...you really don't want to be there [class] because your head is hurting or like just walking to class, your head is just pounding from the heat.”

4.4.2 Psychosocial Impact of Sport-Related Concussions

The psychosocial impact of sport-related concussions theme included all information from participants pertaining to the psychological and social effects they experienced. All participants (n=6) described some extent of overall recovery experiences. All participants (n=6) described an emotional component to their psychosocial impact of sport-related concussion. Finally, all participants (n=6) described multiple ways social support affected their recovery experiences, mostly positive, but some negative.

Overall Recovery

For the most part, participants had a somewhat easy time throughout their overall recovery experience. Liam stated,

“...one of the more manageable parts was also being away from the game for a while and focusing on my health.”

Andrew said,

...the easiest thing was getting back to like the, uh, steps to getting back on the field, the training was easy.”

There were a few instances where participants mentioned difficult parts of overall recovery. Charlie stated,

“[the most difficult part] Um, trying to stay patient. Trying not to be hardheaded and returning too early, just taking the process as a whole, and just really seeing how important it is to get the required rest...”

Emotion

The emotional aspect of the psychosocial impact was related to frustration and worry about not being able to participate in their sport. David, said

“I missed that game that week and I was worried about missing the next one, ..., but at the same time, I didn’t want to, um, create any like worsening issues with my concussion, so really it was just it was kind of stressful.”

David also mentioned,

“Whenever I was doing the questionnaires, I was really wanting to be accurate because I didn’t want any long-term effects, but at the same time, I wanted to get back, so I would say it was stressful overall.”

Andrew stated,

“...kind of rough...once you take a break for that long, you start to lose everything you already worked towards, so you have to rebuild everything right back.”

General Social Support

For the most part, all participants reported positive social support throughout their recovery. Charlie stated,

“...it kind of showed me how much the staff really cared. There’s a lot of help from the training staff, coaching staff, and my teammates. It was pretty much just to make sure I was okay. Nobody was trying to rush anything, and the main priority was my health and how I felt about returning personally. So, kind of just showed and proved how much the training staff is there to help every athlete in times of need.”

Relationships

All participants mentioned having positive experiences with the athletic training staff throughout their recovery experiences. David mentioned,

“The athletic training staff helped me throughout the process just in different ways...there’s not a whole lot you can do for a concussion, besides just getting rest, but I think just dealing with the athletic training staff and the way they treated me and the way they made me feel throughout the return process was good.”

Andrew reported,

“The athletic trainers just helped me rest and not do no physical activities or mental activities like for about probably three or four days.”

Most participants had positive support from their coach, while one had a negative experience. Andrew stated,

“Uh, well, with coaches, you know they always think you fake it. So, when they think you’re faking it, they start not talking to you and shutting you out.”

While Liam reported a more positive experience concerning his coaches,

“Also, my football coaches helped me too, just getting back into my academics, like pushing me and making me get on top of my work, and you know, not letting me forget any missed work I had not done yet.”

There were very mixed responses in terms of teammate relationships. While the relationships with teammates had a positive impact on most participants, Andrew had a negative experience stating,

“Teammates, they think you’re doing the same thing [faking it], because they hear coaches saying it all the time, so that’s usually what happens.”

Whereas, David said,

“The only way they were affected was by the time off that I had.”

The support from academic relationships mainly came from academic advisors. Liam said,

“The academic advisor helped me a lot. They just helped me organize all my assignments and other things I had to work on and that I had missed and needed to work on, and yeah.”

Relationships outside of athletics or academics were very helpful throughout the recovery process for some participants. Liam stated,

“...the training staff helped me a lot, and then, you know, my support system, my mom, my dad, my sister...”

John also stated,

“My girlfriend helped a lot because she was there with me. She was able to drive me around, just kind of communicate, especially writing emails from my teachers and all types of stuff...anything I needed, she was there to help.”

4.4.3 Academic Experiences

The academic experiences theme included all information from participants pertaining to their experiences while returning to academics. Most participants (n=4) described their overall experience with RTL. All participants (n=6) shared their perception of what RTL means. All participants (n=6) described academic accommodations and how those accommodations helped their recovery. Most participants (n=4) specifically mentioned communication with professors being helpful throughout their academic recovery.

Overall Experience with RTL

There were mixed experiences with RTL primarily related to the differences between online classes vs. in-person classes. David, who is only in online classes said,

“Um, pretty easy, just because I’m in online classes.”

Charlie, who only had a few online classes, said,

“...being on the computer wasn’t too much of an issue, it was more of how long I had to lock in and focus my eyes on examining the information. That’s what started to bother me, just kind of constantly looking left and right and just processing information.”

Andrew, who is not in online classes, said,

“Um, going back to the classroom it was, uh, it was hard because you missed stuff that you should have been there to learn during the time that you have your concussion, and so you got to catch up.”

Athlete Perception of RTL

Overall, all participants had a fairly good grasp on the concept of returning to learn.

When asked what the term RTL meant to them, Charlie said,

“I feel like return to learn is the ability to sit in the classroom for full sessions without any like aggravation or having your attention span lost just due to being cloudy or just unfocused and just ultimately having and being at full health in order to learn at full capacity.”

Liam also stated,

“...just getting back to your daily schedule, your daily school schedule, getting back to your education, and you know, your daily learning routine being able to go back to class and opening your books and paying attention and just being in that environment that learning environment.”

Academic Accommodations

Academic accommodations were crucial in the academic recovery of all participants in this study. John reported,

“...I basically got extra time on stuff, and I think all of my classes got date extensions...without getting a date extension, I wouldn't have gotten a chance to even attempt those assignments.”

Charlie mentioned,

“I feel like [the accommodations] helped a lot. Honestly, the stress of the whole situation...honestly, if the accommodations were not made, it definitely would have made my life a lot harder and possibly even slowed down the process of me returning to play.”

Communication

Communication was important for all participants when returning to academics. John said,

“Communication is probably the biggest thing...make sure you either communicate, or you have someone to communicate to your professors or whoever you need that deals with your academics.”

Liam mentioned,

“I would say talk to your teachers a lot. Definitely keep them in the loop, because, you know the more they know, the more they’ll be able to help you.”

4.4.4 Athletic Experiences

The athletic experiences theme included all information from participants pertaining to their experiences while returning to athletics. Most participants (n=5) reported having a false reality of RTP; however, all participants (n=6) reported having a positive RTP process.

False Reality of RTP

The participants in this study had a false sense of what RTP entailed. While some participants did not realize there was a protocol, others thought that the protocol would be an extremely long process. John stated,

“...I really thought that I’d be out a couple of days and then I would be right back playing...I didn’t know that there was a whole protocol”

Charlie mentioned,

“I honestly had no idea, but I knew there was going to be a brief period where I was going to have to sit out and just kind of get mental reps and just be out of the way.”

David mentioned,

“...I thought, I would be out, you know, at least a few weeks...”

Athlete Perception of RTP

While the participants did not have a good sense of what RTP was, they all had a positive perception of their RTP process. John stated,

“I feel like the whole protocol is put there so you can let you know your mind and really concussion heal.”

One participant stated that the process was slower than they were anticipating. Charlie stated,

“The return to sport process, it was kind of a slow one, mainly due to the fact that I thought I was fine altogether...pretty much just trusting the process and the instructions of the trainers and just believing that [the RTP protocol] was going to get me back to where I used to be.”

David’s take on the RTP process was different because he had never been through the process before. He said,

“It was kind of hard because that was my first diagnosed concussion and I’ve never – I don’t really know you know, what’s like, what’s too soon?”

4.4.5 Recommendations

The recommendations theme included all information from participants pertaining to recommendations they have for aiding student-athletes in reintegrating into school and sport post-concussion. All participants (n=6) gave academic and athletic recommendations.

Academic Recommendations

When the participants were asked regarding academic recommendations, the participants really focused on the importance of limiting stress. David said,

“...just take your time, and, uh, take it one day at a time and make sure that you’re not forcing it...if you feel like any stress on your brain while you’re trying to return to learn, I would say it’s not time to come back yet. Give it another day, maybe try to read something, and if your head hurts or you feel foggy still, I’d say it’s still not time. Let’s say just listen to your body really.”

The feeling of needing support was also discussed. Charlie said,

“...just support the athlete...in this situation, in particular, I feel that there needs to be an emphasis on how important it is to actually rest your brain after a concussion, because even though you may feel fine, you are like altered slightly...I would just say don’t try to rush anything and just stay the course and be patient.”

Athletic Recommendations

Athletically, the recommendations given by the participants were centered around taking it easy (n=5) and being honest about concussion symptoms (n=1). Liam said,

“...take it slow and not to rush...at the end of the day, you know, you have a long life ahead of you, and rushing back may make you prolong your time away from the game...the easier you take it you’ll be back 100% faster.”

David stated,

“...be honest about how you feel and take your time and just be as transparent as you can possible be...”

4.5 Discussion

The findings of this study reveal an in-depth analysis of the experiences of six, NCAA student-athletes as they reintegrated into school and sport after sustaining a sport-related concussion. While there were similarities in experiences, there were also individualized differences found in the data. This shows the importance of clinicians utilizing an individualistic approach to concussion recovery, as well as the importance of a collaborative approach to RTL and RTP. The discussion of the findings from this study are broken down by five themes: physical and cognitive impact of sport-related concussions, psychosocial impact of sport-related concussions, athletic experiences, academic experiences, and recommendations.

4.5.1 Physical and Cognitive Impact of Sport-Related Concussions

There are many symptoms and impairments (cognitive and vestibulo-ocular) that a student-athlete can experience when they sustain a SRC.^{2,7,30,31} Over the last several years, there has been an increase in research focusing on the vestibulo-ocular impairments associated with SRC.^{19,31,32} The main symptoms that the participants in this study reported were related to vestibulo-ocular impairments (i.e., vision disturbances, ringing in the ears, mishearing words). This is a significant finding because research supports that vestibulo-ocular impairment can lead to a decrease in academic capability and prolong the return to play process.^{32,33} When returning to academics, one participant, who was in all online classes, was unable to look at a computer screen due to light sensitivity, so they were not able to do any schoolwork until their symptoms

were resolved. Current research supports collegiate student-athletes having an increased sensitivity to light due to the increased exposure to computer use in college.³⁴ The findings from this study are in line with current research surrounding computer use and symptom exacerbation.

A finding in this study that the research team was not anticipating was the impact that the heat and the sun played on the exacerbation of concussion symptoms in the participants. While the impact of temperature has been well-documented in the healing of moderate and severe TBIs, the impact of temperature on mTBIs has not been well documented.³⁵ There has been emerging research to support the benefits of hypothermic therapy to shorten SRC recovery times.³⁵⁻³⁷ The participants did not mention anything they did to remedy the symptom exacerbation caused by the heat. Based on these findings, there is a need to continue investigating the impact of the heat and the sun of post-SRC symptom exacerbation.

4.5.2 Psychosocial Impact of Sport-Related Concussions

There are many psychosocial implications that come from sustaining a sport-related concussion, which can make the recovery process more difficult than other injuries.³¹ Because a SRC is “invisible” in nature, concussed student-athletes oftentimes appear normal to teammates, coaches, and professors, due to the student-athlete not having physical signs of injury (i.e., crutches, stitches, swelling, etc.).³¹ While most orthopedic injuries have a distinct method to treatment, the subjective and individualistic nature of SRC does not allow for that, which can lead to an increase in psychological distress in student-athletes.³¹ The analysis of interview transcripts revealed four sub-themes related to the psychosocial impact of sport-related concussions: 1) overall recovery, 2) emotion, 3) general social support, and 4) relationships (athletic trainer, coach, teammates, academics, and external).

In terms of overall recovery, the participants in this study did not have much difficulty throughout the process. The manageable parts of recovery were resting and focusing on their recovery, while the more difficult part of recovery was trying not to rush the process and return to quickly. Emotion was found to be a meaningful component of the psychosocial impact for the participants. The emotions commonly reported by the participants were frustration, stress, and worry. The main source of these emotions stemmed from being away from the participants' respective sport. Research supports that concussed student-athletes report feeling isolated from their teammates and their sport.³¹ Research also shows that student-athletes may feel an increased pressure from themselves, teammates, coaches, and other external sources to return to their sport.^{31,38,39} A finding of this study was the idea of not wanting to create more issues related to the concussion, but still wanting to rush through the process to get back to their sport as soon as possible. Research shows that student-athletes are likely to downplay their concussion symptoms in an effort to return-to-play faster. This is commonly due to fear of losing playing time, standing on the depth chart, or interpersonal pressures.⁴⁰ The findings of this study are in line with current research surrounding the emotional aspect of SRC recovery.

Support systems play an important role in overall recovery from injury.^{31,41-43} In collegiate athletics, there are many different entities that interact with a student-athlete on a daily basis. The athletic training staff, coaches, teammates, academic staff, teachers, and students are all potential sources of support for student-athletes when they sustain a SRC.^{12,24,25,27,43-45} The data in this study revealed positive and negative findings regarding experiences surrounding social support throughout recovery. All participants in this study mentioned having positive experiences and support from the athletic training staff during their recovery. Previous research supports that most student-athletes seek support from athletic trainers.^{27,45} Because athletic

trainers play such a vital role in concussion management,⁷ it is important that student-athletes recovering from a SRC feel positively supported by their athletic training staff. As some collegiate institutions have greater access to athletic trainers than others, future research should be conducted to investigate any discrepancies that exist for athletic training support across collegiate athletics.

In this study, there were mixed experiences with receiving support from coaches, some experiences being positive and some experiences being negative. As mentioned above, student-athletes may feel an increased pressure from their coaches to return to their sport.^{31,38,46} The participant who mentioned a negative coaching experience stated that the coach felt like the student-athlete was faking their concussion. Research shows that coaches who have negative beliefs toward concussions are more likely to not encourage concussion safety.³⁸ This implies that student-athletes with negative support from their coaches may be more inclined to not report their concussion symptoms at all, or to falsify their concussion symptoms to return to their sport faster.^{44,47,48} On the contrary, most participants mentioned that their coaches were very supportive throughout their recovery process. Coaches most often serve as a source of emotional support for student-athletes as they recover from injuries.⁴⁹ Research also supports that student-athletes who have a secure relationship with their coach are at a higher likelihood to report concussion symptoms.⁴⁸ Having positive support from coaches allows for an athlete to be less worried about negative outcomes from prolonged recovery and more focused on overall recovery.⁴⁸

This study revealed mixed responses with teammate support, as well. While most participants stated that they had positive teammate support, the same participant who mentioned a negative coaching experience, also mentioned receiving negative support from their

teammates. This finding is consistent with the research showing that coaches influence the behaviors of their athletes.⁵⁰

Academic relationships were different based on online vs. in-person classes. In this study, the role of academic advisors was vital in ensuring that academic relationships were maintained throughout the recovery of the participants. This supports research stating that academic advisors are utilized to assist in the process of returning student-athletes to the classroom after sustaining a concussion.^{5,51,52} Academic support is necessary during SRC recovery to ensure success during the return-to-learn process.^{51,52}

External sources of support (i.e., friends, family, roommates, significant others, etc.) were very important to the participants in this study. The participants mentioned that having people away from athletics and academics that they could trust and gain support from was very helpful to them throughout their recovery. A study conducted by Covassin et al. showed that student-athletes rely on their family and friends more than teammates, athletic trainers, and coaches.²⁷ The findings in this study continue to mesh with current research supporting the importance of having a support system during recovery from injury.

4.5.3 Academic Experiences

In terms of overall experiences with RTL, there were mixed experiences between participants in online classes vs. in-person classes. Those in online classes had little to no issues; whereas those taking in-person classes had a harder time catching up on things that they missed. Academic accommodations were a crucial part in the recovery of all participants. A significant finding of this study is that one participant reported that they felt like their overall return process would have been slower, had they not received any accommodations. The utilization and benefits of academic accommodations have been heavily researched;^{3-5,7,21,22,34,51,52} however, there needs

to be future research conducted to look at the experiences of collegiate student-athletes as they receive those accommodations and their perceptions surrounding academic accommodations. All participants mentioned the importance of communicating with all academic staff to ensure that their needs are being met throughout their recovery process. Communication by all parties (i.e., the student-athlete, athletic trainers, professors, academic advisors, etc.) is crucial in ensuring the student-athlete's recovery is at the forefront of all decisions, especially throughout the RTL process.^{7,22,51,52}

4.5.4 Athletic Experiences

Throughout the interview process, it became apparent that student-athletes have a false sense of what return-to-play (RTP) truly encompasses. Some participants did not realize a RTP protocol existed, and others thought the process was going to be very long. While there has not been research conducted to specifically investigate the perception of RTP to student-athletes, there is research to support that the student-athlete's perception of the effects of concussions do not correspond with level of impairment.⁵³ These findings should tell clinicians that they need to do a more thorough job of educating student-athletes on the specifics of concussion recovery and what each aspect of the recovery process entails. Future research should be conducted to investigate student-athletes' perception of RTP and how their perceptions differ from the actual RTP policy.

Even though there was a false sense of what RTP was, all participants had positive attitudes surrounding their RTP process. Many of the participants mentioned the importance of trusting the process and understanding that the RTP protocol was put in place to allow their concussion to fully heal. To our knowledge, before this study, there has not been research specifically looking at the experiences of student-athletes as they reintegrate into sport after

sustaining a sport-related concussion. Future research should be conducted to investigate the experiences of student-athletes as they reintegrate into sport after sustaining a sport-related concussion.

4.5.5 Recommendations

The information revealed regarding recommendations to aid student-athletes as they reintegrate into academics and athletics after a sport-related concussion was very meaningful to the nature of this study. Academically, the participants had similar recommendations; however, the importance of limiting stress was mentioned by multiple participants. There has been a significant amount of research conducted to support the importance of decreasing stress throughout the recovery process.^{23,24,31,54,55} In regards to athletic recommendations, the reoccurring themes mentioned by the participants were to relax, to be honest and transparent about symptom reporting, and to not rush the recovery process. Research shows us that one of the most important approaches to the risk reduction of concussions is the honest and timely reporting of symptoms.³⁹ Future research needs to be conducted to determine the recommendations student-athletes have for clinicians to better aid student-athletes throughout the reintegration processes to ensure that clinicians are meeting the needs of student-athletes.

4.6 Limitations and Future Research

This study is not without its limitations. In an effort to promote generalizability, we attempted to recruit male and female athletes from all NCAA divisions; however, we were only able to recruit six, male NCAA athletes, who completed both parts of the study. Having a larger population would have allowed for the researchers to explore the possibility of more themes emerging. In addition, the majority of the participants (5/6) represented in this study are D1 football players who are all from the same institution. It is possible that the results are slightly

skewed to reflect the policies of their institution. Future research should expand on the results of this study to investigate the experiences of female student-athletes to determine if there are any gender discrepancies while reintegrating into school and sport. The findings of the study can also be used to promote future research to determine if any changes need to be made to current RTL and RTP protocols to focus on the well-being of the student-athlete, instead of the processes used to return them to school and sport after sustaining a sport-related concussion.

4.7 Conclusion

The results of this current study revealed that while student-athletes may have some similarities regarding their concussion recovery, each student-athlete has an individual experience recovering from a sport-related concussion. The results of this study show the importance for clinicians to establish and utilize an individualistic and collaborative approach to RTL and RTP. Taking this approach will allow for clinicians to use a “holistic” approach and ensure that student-athletes are receiving the tools and resources needed to successfully RTL and RTP. The results of this study could improve our understanding of the experiences of student-athletes as they reintegrate into school and sport post-SRC, as well as identify the strengths and weaknesses of current RTP and RTL protocols that are utilized at NCAA Institutions. These results could also promote future research to establish updated protocols that are focused more on the well-being of the student-athlete, instead of solely focusing on the processes used to return them to the classroom and to their sport.

APPENDIX SECTION
APPENDIX A. QUALTRICS SURVEY

Initial Demographics, Injury Hx and Emotion Dysregulation Survey- Original

Start of Block: 1. Introduction and Consent

StudyInfo Hello and thank you for your interest in completing the following survey and participating in a 1-on-1 interview.

The purpose of this study is to gather information about your experiences returning to sport and the classroom following a concussion that occurred during your Division 1, 2, or 3 National Collegiate Athletics Association career.

Initially, you will be asked to complete this survey. After completion of this survey, you may be contacted by the research team to set up a 1-on-1 Zoom interview so we can learn more about your experiences.

Eligibility requirements include:
 1. 18 years of age or older
 2. Fluent in English
 3. Current varsity-sport student-athlete at a Division 1, 2, or 3 National Collegiate Athletic Association Institution
 4. Sustained a sport-related concussion on or after February 1, 2021.
 5. Must have returned fully to school and sport.

Participation is voluntary. This online survey will take approximately 15-20 minutes to complete. The research team will review the data and then will randomly select individuals for a 1-on-1 interview. We will contact you using the contact information you provide us at the end of this survey. We request that you review that information prior to hitting submit to improve our ability to contact you.

If chosen for a 30-45 minute 1-on-1 Zoom interview, you will be asked questions concerning your return to sport and academic experiences following your most recent concussion. The interview will be recorded so the research team can accurately represent your thoughts and statements. Upon completion of the interview, your interview will be

transcribed and emailed to you for verification. You will not be able to change anything you stated in the interview; however, you will have the ability to expand on anything you said in the interview to ensure that we are fully representing your experiences. After you verify the accuracy of the transcript the video will be securely deleted.

Upon completion of the survey and interview, your responses will be reviewed by members of the research team. After data transcription of the 1-on-1 interview has occurred, the transcript will be securely emailed to you using the email you provided the researchers in the Qualtrics survey within 1-2 weeks after the interview. You will be asked to validate the interview content to ensure that the researchers are correctly representing their thoughts and meanings within 10 days of receiving the transcript. The Texas State University Office of Research Integrity and Compliance (RIC) may access the study data. The RIC monitors research studies to protect the rights and welfare of research participants. All data, excluding the videos, will be kept for at least three years (per federal regulations) after the study is complete.

This study is associated with limited risk to the participants. The Qualtrics online survey questions do not impose any threat to your health or well-being. There is always a risk of breach of confidentiality with video and audio recordings. The videos will be saved on TXST password-protected servers and deleted immediately following your transcription verification. You may experience slight emotional discomfort in honestly answering some of the survey or interview questions. If selected for a 1-on-1 interview, the researchers will remind you that you do not have to answer questions that make you uncomfortable.

There will be no direct benefit to you from participating in this study. However, this new information could bring light to this topic and foster further research into the experiences of student-athletes as they reintegrate into school and sport post-concussion, and what, if anything, clinicians can do to better aid them in those processes.

You will not

receive any compensation for your participation in this study.

If you have any questions or concerns feel free to contact Mary Catherine Lee or her faculty advisor, Dr. Missy Fraser, Assistant Professor in the Department of Health and Human Performance.

Mary Catherine Lee, BS, LAT, ATC maryclee@txstate.edu
Missy Fraser, PhD, LAT, ATC missyfraser@txstate.edu



Consent Your participation in this research study is voluntary, and will help us to gather information about your experiences returning to sport and the classroom following a concussion that occurred during your Division 1, 2, or 3 National Collegiate Athletics Association career. No participant names will be identified in any report or publication. All research records will be kept confidential.

 Do you consent to participate?<p></p><div></div>

☐ Yes

☐ No



VideoConsent I give permission for the 1-on-1 Zoom interview to be recorded if selected to participate in this portion of the study.

☐ I agree

☐ I disagree

ThankYou Thank you for consenting to participate in our study!

Please complete the following questions to the best of your ability. If you do not wish to respond to a particular question(s), you have the right to leave it (them) blank.

End of Block: 1. Introduction and Consent

Start of Block: 2. Inclusion Criteria



English Language Are you fluent in English?

☐ Yes

☐ No



AGE Are you 18 years of age or older?

☐ Yes

☐ No



Varsity Sport Are you a current varsity-sport student-athlete at a Division 1, 2, or 3 National Collegiate Athletic Association (NCAA) Institution?

☐ Yes

☐ No



ConcHx Since becoming a Division 1, 2, or 3 National Collegiate Athletic Association varsity-sport student-athlete, have you been diagnosed with a sport-related **concussion**?

A concussion is a blow to the

head followed by a variety of symptoms that may include any of the following: headache, dizziness, loss of balance, blurred vision, "seeing stars", getting "dinged", feeling in a fog or slowed down, memory problems, poor concentration, nausea, or throwing-up. Getting "knocked out" or being unconscious does NOT always occur with a concussion. </div>

☐ Yes

☐ No



24months Did your most recent diagnosed concussion occur on or after February 1, 2021?

☐ Yes

☐ No

FullReturn Have you fully returned to both school and sport?

☐ Yes

☐ No

End of Block: 2. Inclusion Criteria

Start of Block: 3. General Questions

BirthSex What was your assigned sex at birth?

☐ Male

☐ Female

☐ Prefer not to say

Age How old are you?

☐ 18

☐ 19

☐ 20

☐ 21

☐ 22

☐ 23

☐ 24

☐ 25

☐ 26

☐ 27

☐ 28

☐ 29

☐ 30

AthleticEligibility What is your athletic eligibility status?

- ☐ Freshman
- ☐ Redshirt Freshman
- ☐ Sophomore
- ☐ Redshirt Sophomore
- ☐ Junior
- ☐ Redshirt Junior
- ☐ Senior
- ☐ Redshirt Senior
- ☐ Graduate Student

PrimarySport What is your primary sport at your NCAA institution?

- ☐ Baseball
- ☐ Basketball

☐ Beach Volleyball

☐ Bowling

☐ Cheerleading

☐ Cross Country

☐ Fencing

☐ Field Hockey

☐ Football

☐ Golf

☐ Gymnastics

☐ Ice Hockey

☐ Lacrosse

☐ Rifle

- ☐ Rowing
- ☐ Skiing
- ☐ Soccer
- ☐ Softball
- ☐ Swimming and Diving
- ☐ Tennis
- ☐ Track and Field (Indoor)
- ☐ Track and Field (Outdoor)
- ☐ Volleyball
- ☐ Water Polo
- ☐ Wrestling



SportSex Do you participate on a male or female varsity collegiate team at your NCAA institution?

☐ Male

☐ Female

NCAADivision What NCAA Division do you compete in?

☐ D1

☐ D2

☐ D3

AthleticConference Select your sport's athletic conference

☐ American Athletic Conference (AAC)

☐ American Coastal Conference (ACC)

☐ Big 12

☐ Big Ten

☐ Conference USA (C-USA)

☐ FBS Independents

☐ Mid-American

☐ Mountain West

☐ Pac - 12

☐ Southeastern Conference (SEC)

☐ Sun Belt

☐ ASUN - WAC

☐ Big Sky

- ☐ Big South
- ☐ Colonial Athletic Association (CAA)
- ☐ FCS Independents
- ☐ Great West
- ☐ Ivy
- ☐ Mid-Eastern Athletic Conference (MEAC)
- ☐ Missouri Valley
- ☐ Northeast
- ☐ Ohio Valley
- ☐ Patriot League
- ☐ Pioneer
- ☐ Southern
- ☐ Southland

☐ Southwestern Athletic Conference (SWAC)

End of Block: 3. General Questions

Start of Block: 4. Concussion Information



DxConc How many **concussions** have you had that **were** **diagnosed** by an athletic trainer, or a doctor? Include both sport-related and non-sport-related concussions.

A concussion is a blow to the head followed by a variety of symptoms that may include any of the following: headache, dizziness, loss of balance, blurred vision, "seeing stars", getting "dinged", feeling in a fog or slowed down, memory problems, poor concentration, nausea, or throwing-up. Getting "knocked out" or being unconscious does NOT always occur with a concussion.

For example: If you've got **1** concussion from sports, **1** from falling out of a tree and **1** in a car accident and you were told by your athletic trainer or a doctor that you had a concussion only for the first two injuries you

would answer `<b><u><span style="background-color:#FFFF00;">2</span></u></b><span style="background-color:#FFFF00;">.</span> </div> </div>`

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10+

DxConc_MOI What caused your most recent concussion?

- ☐ Varsity sport participation
- ☐ Recreational sport participation
- ☐ Car accident
- ☐ Fall
- ☐ Assault
- ☐ Hit head on furniture
- ☐ Other _____



NDxConc How many concussions have you had that were <u>NOT</u> diagnosed by a medical professional? Include both sport-related and non-sport-related concussions. <div> </div>
<div>A concussion is a blow to the head followed by a variety of symptoms that may include any of the following: headache, dizziness, loss of balance, blurred vision, "seeing stars", getting "dinged", feeling in a fog or slowed down, memory

problems, poor concentration, nausea, or throwing-up. Getting "knocked out" or being unconscious does NOT always occur with a concussion.

These include if:

- a. you didn't know at the time what the signs or symptoms of a concussion were, but after reading the description above you now think you may have had a concussion
- b. you had any of the signs or symptoms of a concussion, but didn't tell anyone
- c. you had signs and symptoms of a concussion and you went to see an athletic trainer or doctor and they told you that you did not have a concussion

For example:

If you've got 1 concussion from sports, 1 from falling out of a tree and 1 in a car accident and you were told by your athletic trainer or a doctor that you had a concussion only for the first two injuries you would answer

<u>1</u>. </div> </div>

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10+



Mis_Time Did you miss any practice or playing time for any of these concussions? **Whether they were diagnosed or undiagnosed.**

☐ Yes

☐ No



Acad_help Were you given reduced school responsibilities or class load after any of these concussions?

Examples of reduced class load include: attending school less than full time for 1 or more days; extensions or assistance with homework, quizzes, and/or exams

☐ Yes

☐ No

☐ I was not made aware of any academic accommodations



Days_out Please estimate how many days you were out of full participation and/or were at a reduced class load for your most recent diagnosed concussion. Please use numeric values for answers. If you are unsure of exact numbers, please estimate to the best of your ability.

	Number of days out of full athletic participation	Number of days with a reduced academic load	Number of days you missed school
Most Recent Concussion			

End of Block: 4. Concussion Information

Start of Block: 5. Personal Info

PI Please complete the following personal contact information so we can contact you in the event that you are selected for an interview. Make sure to include the area code for you cell number. If it does not accept your email address or name check the following: 1) Did you use punctuation in your name other than a dash? The program does not recognize apostrophes, etc.. If you remove them from your name, it will probably fix

the error. </p> <p>2) Did you put a space before your name or email address?</p> <p>3) Did you list the entire address (i.e., @txstate.edu, @gmail.com, @yahoo.com, etc.)? </p>

☐ Given First Name _____

☐ Last Name _____

☐ Preferred email _____

☐ Cell Phone Number _____

End of Block: 5. Personal Info

Start of Block: 6. Conclusion

End Thank you for your interest in participating in this study and for completing this questionnaire! Your responses will remain confidential and are greatly appreciated. Your name will be replaced with an ID number and your name will not be associated with your data.

A member of the research team will be in contact with you if you are selected to complete an interview concerning your concussion recovery experiences.
<div>
</div><div>Please hit the ">>" button to submit this

APPENDIX B. INTERVIEW PROTOCOL

“The purpose of this interview is to gain further insight into your experiences while recovering and reintegrating into athletics and academics after your sport-related concussion.”

“If at any point throughout this interview you feel uncomfortable answering a question, please let me know and we will continue to the next question.”

“Before we begin, I would like to remind you that to protect your privacy, all transcripts will be coded using pseudonyms, or fake names. If you say anything during the interview that would allow for you or someone else to be identified, that information will be removed during the transcription process.”

“The length of this interview will be approximately 20-30 mins. I will record the interview utilizing zoom to ensure that the interview is accurately notated. The interview will be typed out verbatim and emailed to you for approval. This is to ensure everything you stated in the interview is an accurate representation of your experiences and I accurately represent you in this study. You will be allowed to add clarifying information, but you will not be able to delete anything from the transcript.”

“Throughout this interview, I will be taking notes to assist me later in the research process.”

“During this interview I will be asking you three sets of questions. The first set of questions will be regarding your general concussion experience. The second set of questions will be regarding your recovery experiences while returning to sport. Finally, the third set of questions will be regarding your recovery experiences while returning to academics.”

“Do you have any last-minute questions before we begin?”

“Again, this first set of questions will be about your overall concussion experience.”

GENERAL QUESTIONS

Note to Researcher: Make sure you ask positions of any individuals they may mention, the participants may just give names and that won't be super helpful. We need to know if they were ATC, AD, coaches, counselors, teachers, parents, teammates, etc. That way we can group their answers appropriately.

1. In a few sentences, please describe your overall concussion injury experiences.
 - a. What was the most manageable part of your recovery?
 - b. What was the most difficult part of your recovery?
2. Describe how your life changed after your concussion.
 - a. Why do you think that is?
 - b. How did that make you feel?
 - c. How were other aspects of your life affected, such as sport, school, work, or relationships?
3. How were your relationships with your teammates, coaches, athletic trainers, and other athletic staff affected by your concussion?

- a. If they say, “they weren’t” - Why do you think that is?
4. How were your relationships with other students, teachers, and academic staff affected by your concussion?
 - a. If they say, “they weren’t” - Why do you think that is?

“I am now going to ask you the second set of questions. These questions are related to your experiences surrounding the recovery process, specifically your experiences while returning to sport.”

“Return to Sport involves the experiences you had from the time of your concussion until full sport participation. This includes the time you were asked to rest or reduce your physical and mental activities, the training or rehabilitation you may have done prior to starting your 5-day return to play protocol, and the RTP protocol activities.”

RTS QUESTIONS

1. Describe your overall experience during the return-to-sport process.
 - a. What was the most manageable part of your return-to-sport recovery?
 - i. Why?
 - b. What was the most difficult part of your return-to-sport recovery?
 - i. Why?
2. Once you were diagnosed with a concussion, what did you expect your return-to-sport process to look like?
 - a. How did it differ from what you expected?
3. Tell me about who helped you throughout your return-to-sport process?
 - a. What kind of rehab did you do for your concussion?
 - b. Who did you turn to for help/support during your recovery? Were they helpful and did they listen?
4. Please talk about any restrictions or limitations you had after completing your return-to-sport protocol.
 - a. If you didn’t have any – Why do you think that is? What limitations or restrictions do you think may have improved your recovery experience and why?
5. Based on your concussion experience, what recommendations would you give to better aid student-athletes in reintegrating back into sport after a concussion?

“The last set of questions is about your recovery process, specifically your experiences while returning to academics.”

RTL QUESTIONS

1. What does the term “return to learn” mean to you?
 - a. No matter what they say, give them this answer: “Return to learn is simply the process someone goes through as they are returning to the classroom after concussion. This process can be a few days or several months. The return to learn process may include but isn’t limited to, removal or decreased class time, assignment and exam extensions, note takers, counseling, and medications.”
2. Describe your overall experience during your return to learn process.
 - a. What was the most manageable part of your return to learn recovery?

- i. Why?
 - b. What was the most difficult part of your return to learn recovery?
 - i. Why?
- 3. Tell me about who helped you throughout your return to learn process and how they helped/supported you.
 - a. If no one helped them,
 - i. If no one helped you directly, please talk about who spoke to you or who you sought out for help with the return to learn process.
 - ii. If they say no one helped at all: How did that make you feel?
 - iii. What did you do to help advocate for yourself? Were your efforts successful?
 - iv. Who did you think/hope would help you return to academics?
- 4. Oftentimes, campuses will give resources such as extended test time, quiet exam spaces, notetakers, etc. What accommodations were available to you after your concussion, and did you use them?
 - a. If they used them
 - i. How did those accommodations help your recovery?
 - ii. What were your perceptions surrounding accommodations before your concussion?
 - iii. How did your perceptions change after you received accommodations?
 - b. If not, how would those types of resources have been helpful to you?
- 5. Based on your concussion experience, what recommendations would you give to better aid student-athletes in reintegrating back into the classroom after a concussion?

“Is there anything else you would like myself and the research team to know about your concussion experiences?”

“That wraps up our interview. I truly appreciate you taking time out of your day to meet with me.”

“As I mentioned earlier, the interview will be typed out verbatim and emailed to you for approval. This is to ensure everything you stated in the interview is an accurate representation of your experiences and I accurately represent you in this study. At that time, you’ll be able to add in any additional clarifying information, but nothing can be deleted.”

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