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The impact of injury on depression in athletes: a systematic review

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Pepperdine University
Graduate School of Education and Psychology

THE IMPACT OF INJURY ON DEPRESSION IN ATHLETES: A SYSTEMATIC REVIEW

A clinical dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor of Psychology

by

Nergis Akkaya

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Dennis Lowe, Ph.D. – Dissertation Chairperson

Clinical dissertation, written by

Nergis Akkaya

under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF PSYCHOLOGY

Doctoral committee:

Dennis Lowe, Ph.D.- Dissertation Chairperson

LaTonya Wood, Ph.D.- Committee Member

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vii
LIST OF FIGURES	viii
VITA.....	ix
ABSTRACT	x
Chapter 1: Background and Rationale.....	1
Statement of the Problem	1
Stigma	5
Overview of Current Research	6
Sources of Stress.....	7
Overtraining.....	7
Injury	8
Life Transitions	9
Coaching and Expectations	11
Value to Stakeholders.....	12
Rationale for the Current Study.....	13
Research Questions	14
Chapter 2: Methodology	15
Systematic Review Approach.....	15
Eligibility Criteria.....	16
Search, Screening, and Selection Process	16
Data Collection and Extraction	18
Quality Appraisal.....	21
Data Management, Synthesis, and Analysis Plan	22
Final Article Selection.....	23
Summary.....	24
Chapter 3: Results.....	25
Study Characteristics	25
Conceptualization of Depression.....	28
Assessment of Depression.....	29
Other Assessments.....	30
Definition of Injury.....	31
Findings Research Question 1, In what ways do injuries impact athlete depression?	34
Reviews	34

Collegiate Athletes	34
Professional Athletes: Active	36
Professional Athletes: Retired	37
Findings Research Question 2 How is depression experienced and symptoms expressed among athletes as a result of an injury?.....	37
Thoughts, Emotions, and Behaviors.....	37
Stages and Phases Perspective.....	38
Chapter 4: Discussion.....	41
Risk Factors	41
Protective Factors	43
Discussion of Major Findings	44
Research Question 1	44
Research Question 2	46
Implications and Recommendations.....	47
Athletes.....	47
Cultivate Social Network and Build Supportive Relationships	47
Develop Coping Skills.....	48
Stories of Other Athletes	48
Mental Health Resources.....	50
Coaches and Team Personnel (See Figure 5 Resources of Coaches and Team Personnel)	52
Coaches and Team Personnel Recognizing Challenges of Disclosure.....	52
Coaches and Team Personnel Creating a Safe Culture	52
Education on Depression	53
Mental Health Professionals (See Figure 6 Resources for Mental Health Professionals)	55
Understand Athletic Culture.....	55
Impact of Injury on Athletes.....	56
Screening Measures.....	56
Differential Diagnosis	57
Evidence-Based Practice and Interventions for Consideration	57
Strengths and Limitations.....	59
Conclusion.....	61
REFERENCES	62
APPENDIX A: Summary of Tables.....	78
APPENDIX B: IRB Documentation	84
APPENDIX C: Search Documentation Record	86
APPENDIX D: Screening and Selection Record	89

APPENDIX E: PRISMA Flow Diagram.....	91
APPENDIX F: Data Collection and Extraction Form.....	93
APPENDIX G: Quality Appraisal.....	96
APPENDIX H: Evidence Table	99

LIST OF TABLES

	Page
Table 1: Assessment and Measures	32

LIST OF FIGURES

	Page
Figure 1. Number of Articles Published Per Year.....	25
Figure 2. Sports Represented.....	27
Figure 3. Median Age Distribution Amongst Articles	28
Figure 4. Resources for Athletes	50
Figure 5. Resources for Coaches and Team Personnel	54
Figure 6. Resources for Mental Health Professionals	59

VITA

EDUCATION

Pepperdine University, Graduate School of Education and Psychology Doctorate of Clinical Psychology (Psy.D.); Los Angeles, CA	July 2022
University of San Diego, School of Leadership and Education Sciences Master of Arts in Clinical Mental Health Counseling; San Diego, CA	August 2017
John F. Kennedy University Certificate in Sport Psychology; Pleasant Hill, CA	March 2017
University of San Diego Bachelor of Arts in Psychology, Minor in Education; San Diego, CA	January 2014

CLINICAL EXPERIENCE

Rancho Los Amigos National Rehabilitation Center Supervisors: Serina Hoover, Psy.D., ABPP, QME; Rajarathnam Sainath, Psy.D.	September 2020 – May 2021
UCLA Semel Institute for Neuroscience and Human Behavior, Adult OCD Intensive Outpatient Treatment Program Supervisors: Sarosh J. Motivala, Ph.D., Ana Ribas, Ph.D.	July 2020 – June 2021
Sports Concussion Institute Supervisors: Tony Strickland, Ph.D., FNAN; Katherine Kruser, Psy.D.	April 2020 – April 2021
Los Angeles County + University of Southern California Medical Center (LAC+USC); Augustus Hawking Campus; Adult Inpatient Psychiatric Services Supervisors: Elaine Eaton, Ph.D., Lucy Erikson, Ed.D., Louis Simpson, M.D., John Briere, Ph.D.	September 2019 – July 2020
UCLA Semel Institute for Neuroscience and Human Behavior, Aftercare Research Program Supervisors: Keith Nuechterlein, Ph.D.; Kenneth Subotnik, Ph.D.; Joseph Ventura, Ph.D.; Luana Turner, Psy.D.	July 2019 – June 2020
Wiseburn School District Supervisor: Keegan Tangeman, Psy.D.	September 2018 – June 2020
Rich and Associates Supervisors: Erika Rich, Ph.D. and Seth Shaffer, Psy.D.	July 2019 – August 2019
Neighborhood House Association–Project Enable Supervisor: Bernard Carrasco, MFT	September 2016 – July 2017

ABSTRACT

There are nearly 500,00 collegiate and professional athletes in the United States, and studies have shown how physical and mental demands of practice and competition (e.g., overtraining, exhaustion, injury) in addition to other external elements (e.g., trauma, retirement) adversely impact mental health. Injuries create a variety of emotional responses some of which can negatively affect athlete well-being. The focus of this systematic review was to build connections between mental health and sport and address two primary research questions:

1. In what ways do injuries impact athlete depression?
2. How is depression experienced among athletes as a result of an injury?

A mixed-methods methodological approach was utilized and results of included studies were synthesized narratively. This systematic review helped to identify gaps in the literature that may guide future research.

Chapter 1: Background and Rationale

The mental health of athletes has received increased attention over the past decade and continues to gain recognition. In recent years, several athletes have come forth with their psychological and emotional struggles, which has softened the stigma that continues to exist. As the National Basketball Association (NBA) commissioner, Adam Silver, openly discussed at the Massachusetts Institute of Technology Sloan Sports Analytics Conference, mental health issues are part of a “larger societal issue” (Maloney, 2019). It is imperative for campaigns such as *Heads Up*, began by the president of the Football Association of England, Prince William, to raise awareness and ignite conversation around athlete mental health (Heads Together, n.d.). NBA Cares has also developed a program called Mind Health to promote and bring awareness to emotional well-being of athletes (NBA Cares, n.d.).

Statement of the Problem

There are over 460,000 collegiate student-athletes (National Collegiate Athletic Association [NCAA], n.d.a), and more than 11,800 persons employed as professional athletes in the United States, which is expected to increase to 12,700 by 2026 (United States Department of Labor, 2019). Furthermore, according to the European Sports Charter (2001, para 7), *sport* is concerned with improving not only one's physical fitness but also mental well-being. The term encompasses more than what is typically assumed and highlights the need to continue the discussion around sport, athletes, and mental health. Due to a large number of athletes in the United States, at both collegiate and professional levels, more attention needs to be given to athlete well-being to better support and provide care to this community.

The American Psychiatric Association defines mental illness as a health condition “involving changes in emotion, thinking or behavior (or a combination of these). Mental

illnesses are associated with distress and/or problems in functioning in social, work, or family activities” (American Psychiatric Association, 2018, para. 1). Although definitions of what constitutes a mental illness may differ from one culture to another, it nevertheless impacts all people. It is further estimated that 20% of U.S. adults, approximately 47 million, experience a form of mental illness every year (National Alliance on Mental Illness [NAMI], 2019).

Prevalence rates may range from 15.6% to 21.2% (Trojian, 2016). While specific statistics are not available, if the 20% rate of mental illness applies to athletes, that means that approximately 100,000 athletes are experiencing mental illness annually.

Depression is the most commonly diagnosed mental health disorder both in the United States and globally, where 300 million people suffer (American Psychiatric Association, 2018; World Health Organization [WHO], 2004, 2018). However, in an international study representing seventeen countries and 85,000 participants, findings demonstrated that two-thirds of those affected did not receive treatment (Wang et al., 2007). Depressive disorders are therefore expected to be the leading cause of burden of disease by 2030 (WHO, 2004). Several risk factors can impact one developing depression including genetics, biochemistry, personality, and environmental factors (American Psychiatric Association, 2017). According to NAMI, in 2017, about 7% of the U.S. population above the age of 18 experienced at least one major depressive episode. Individuals ages 18–25 are the most susceptible, and this age group experiences the highest prevalence rate (13.1%) compared to other age groups. Depression rates are also higher among females (8.7%) than males (5.3%; NAMI, 2019).

There are several etiological factors for depression. Woo & Keatinge (2016) argue the critical role of genetics in the development of depression. Family and twin studies have shown that the heritability of depression is between 31% to 42% (Sullivan et al., 2000). In addition to

genetics, biochemistry also is critical to consider the development of depression.

Neurotransmitters, for instance, are the body's chemical way of communicating (Queensland Brain Institute, 2017). There are several neurotransmitters involved with depression that make up the dynamic system, and no single neurotransmitter is responsible (Saveanu & Nemeroff, 2012). First and Tasman (as cited in Woo & Keatinge, 2016) discovered that environmental factors and stressful life events could make one more susceptible to depression, such as early trauma and loss, child-rearing patterns, and low socioeconomic status. Specifically, early life trauma burdens the clinical course of depression such that individuals will have "lower rates of remission and recovery, longer episodes of depression, more chronic disease course, and earlier onset of depressive symptoms" (Saveanu & Nemeroff, 2012, p. 59). Genetics can shape how sensitive one is to stressful life events, and when biology and environmental factors influence one another, depression can emerge (Saveanu & Nemeroff, 2012). Epigenetics "investigates mechanisms that are not coded within a gene's DNA sequence, but which nevertheless can alter the gene's expression and function" (Woo & Keatinge, 2016, p. 423). Epigenetics can, therefore, help describe how resilient, or not, one is as a result of traumatic and stressful life events. It is important to note that depression is much more complex than any single contributing factor. Not everyone who faces life stressors develops a mood disorder, but these events certainly play a role (Saveanu & Nemeroff, 2012).

Although athletes are idolized and considered to be larger than life figures, they too are susceptible to mental illness (Hartmann et al., 2008). An idol is one whose "talents, achievements, status, or physical appearances are specially recognized and appreciated by his or her fans" (Yue & Chueng, 2000, p. 15). An athlete's clinical issues can impact how they perform, and likewise, athlete performance can negatively impact one's mental health (Souter et

al., 2018). Whether it is training for the NCAA Championship or the Olympics, athletes continuously train and work towards their next goal. Arnold & Fletcher (2012) provide a comprehensive list identifying nearly 650 different stressors for athletes categorized as leadership and personnel, cultural and team, logistical and environmental, and performance and personal issues. Therefore, when underlying stressors are present, it may not be feasible for athletes to realize the mental focus and preparedness required to achieve excellence (Souter et al., 2018). Sports and athletics are demanding and can take a toll on one's emotional well-being. The challenges and demands of the sport and its various dynamics and contexts are also significant sources of stress that are often experienced as uncontrollable and unpredictable. Athletes tend to be more at risk for mental health disorders during their peak competitive years due to the demands of their sport (Schinke et al., 2017).

Mental health disorders are just as common among athletes as non-athletes (Markser, 2011) and it is not always apparent that one may have a mental illness as it would be in the case of a physical illness or injury. Delenardo and Terrion (2014) argue that this can lead athletes to consider that their symptoms are a sign of weakness or personal flaws. There is a need for sports organizations to incorporate mental health professionals to provide consistent services that target athlete emotional well-being. The NBA has taken this step and is expanding its regulations that require teams to have at least one mental health professional to assist players with their mental health needs (Shapiro, 2019). Additionally, the Mental Health and Wellness Program, led by the NBA Players Association, created its wellness initiative outside of the team context. Similarly, the National Football League and NFL Players Association are standardizing mental health care given to athletes across the league (Greenbaum, 2019). Sport Science Institute, a division of the

NCAA, has also established best practices and resources for organizations to refer to for athlete mental health (National Collegiate Athletic Association, n.d.b).

Stigma

It is not uncommon for society to have negative attitudes and beliefs around individuals who experience mental illness. “There is no country, society, or culture where people with mental illness have the same societal value as people without a mental illness” (Rössler, 2016, Stigma Research, para. 2). There are several barriers individuals face in seeking psychological assistance. For instance, judgment and stereotypes about mental illness are significant factors for why individuals do not seek help (Clement et al., 2015). This stigma then leads to individuals becoming discriminated against and further discourages them from opening up about and seeking assistance for their mental illnesses (Henderson et al., 2013). Stigma not only creates a burden but also continues to impact one’s social–emotional well–being negatively. Individuals can feel uneasy and avoid talking about the pain that is out of their control due to the social repercussions they may face. Because stigma holds such power, it must continue to be discussed to reduce the negative impacts it creates. Although positive strides are being made, mental health must continue to be brought to attention and normalized.

Stigma is a critical barrier for young athletes seeking help for their psychological distress (Gulliver et al., 2012). Watson (2005) found that athletes, when compared to non–athletes, have more negative attitudes towards help–seeking. Athletes may be hesitant to share their psychological distress due to the notion that competing at high levels exempts one from having a mental disorder (Markser, 2011). High expectations of athletes can lead them to avoid appearing weak and unfit to perform their sport (Gulliver et al., 2012). Stigma has also been suggested as a factor that may prevent professionals from making appropriate referrals for athletes to mental

health professionals (Heaney, 2006). Stigma creates barriers in seeking psychological services and can impact the support one receives and the outcome of their treatment.

Overview of Current Research

It is essential to advance the research on athlete well-being. Although athletes are just as likely as the general population to report depressive symptoms, the exact prevalence rate of athlete mental illness may be underreported (Gorczynski et al., 2017). Athletes strive to improve their bodies and push themselves to their limits to compete efficiently at a high level (Burlot et al., 2016). Additionally, athletes may present themselves in a favorable light to demonstrate their psychological strength; therefore, symptoms may not only be overlooked but also dismissed. Often, they are not visible and require special attention.

Yang et al. (2007) reported that 21% of Division I student-athletes endorsed depressive symptoms and that females were at higher risk (1.32x) than males. Similarly, another study reported 21% of athletes reporting depressive symptoms in which females experienced more life stressors and were more at risk (Beable et al., 2017). More recently, Wolanin et al. (2016) examined the prevalence of depressive symptoms in Division I collegiate athletes over three consecutive years. Results indicated that regardless of sport, 23.7% of participants endorsed clinical levels of depression. They further concluded that female collegiate athletes are at greater risk (1.844x) and experience significantly higher rates of clinical depressive symptoms compared to male athletes. Similarly, male athletes are 52% less likely to report their depressive symptoms compared to female athletes (Gorczynski et al., 2017). Depression levels were also about twice as high for current college athletes (17%) compared to former or graduated athletes (8%) (Trojian, 2016).

In a study looking at depressive symptoms of German soccer players, Prinz, et al. (2016) found that what contributed to depression in female soccer players the most was: conflict with coach/management (49.7%); low in performance/injury (48.4%); psychological strain/stress (46.5%); too little support/acknowledgement by the coach (40.0%). Additionally, nearly 40% of players reported needing psychological support during their careers compared to 24% after their careers. However, only 10% received psychological support and services. What placed athletes at greater risk of experiencing depression was contemplating retirement, participating in an individual sport, and being younger than 25 (Beable et al., 2017). Additionally, failure-based depression can be present among athletes (Hammond et al., 2013). Hammond et al. (2013) further looked at this idea with elite swimmers competing for placement on the Canadian Olympic and World Championship teams. They discovered that 68% of this population met criteria for a major depressive episode before competing, whereas 34% of athletes still met diagnostic criteria after competition. When considering the life span of an athlete's career, the pressure to be successful can become a source of stress.

Sources of Stress

Overtraining

Several performance-related stressors can impact an athlete. Overtraining and exhaustion can lead to burnout and physical injury, which can then impact an athlete's mental health. Overtraining is characterized by "psychological and physiological disturbances, along with decreases in performance" (Wolanin et al., 2015, p. 58). Nederhof et al. (2006) reveal that overtraining syndrome has a significant overlap in presentation with depression. Overtraining syndrome/burnout has been reported in approximately 10% of elite athletes (Cresswell & Eklund, 2007).

For example, the number of “Tommy John” surgeries among baseball players has dramatically increased. This surgery is to repair the torn ligament on the inner elbow that helps to secure the elbow joint (Johns Hopkins Medicine, 2019). There has been a tenfold increase, since 2000, in high school and younger youth baseball players that now require this surgery. The operation was for professional athletes, but now 57% of surgeries are done for ages 15–19 and 25% for Major League Baseball (MLB) players. Pitching at high speeds stresses the ligaments compared to the non–pitching arm, beyond its limits (Ciccotti et al., 2014).

Injury

An athlete’s interpretation of their injury influences their adjustment. Injuries viewed as life–threatening, as opposed to mild or advantageous, generate unfavorable psychological effects (Kebede & Rao, 2013). More specifically, it is anticipated that an athlete will experience adverse emotional reactions such as depression when their injuries result in a loss of athlete identity.

Wolanin et al. (2015) stated that one of the earliest studies to examine the relationship between athlete depression and injury was Brewer and Petrie (1995). Their sample demonstrated that athletes who had an injury the previous season reported higher depressive symptoms (33%) than non–injured athletes (27%). It is important to note that a significant amount of non–injured athletes still endorsed depressive symptoms.

Leddy, Lambert, and Ogles (1994) found that half of the athletes (51%) endorsed mild to severe depressive symptoms as measured by the Beck Depression Inventory (BDI). More specifically, athletes with anterior cruciate ligament (ACL) injuries had more severe levels of depression compared to athletes with concussions (Mainwaring et al., 2010). There have been several studies supporting the association between athlete concussion and depression. Two

particular studies revealed that although athletes developed depressive symptoms post-injury, they resolved in 1–4 weeks' (King, 2017; Rice et al., 2018).

Sport organization schedules can get also be demanding. In sports such as baseball (162 games) and basketball-ice hockey (82 games) there are numerous games played in a given season. For instance, during the 2018–2019 NBA season, the Portland Trailblazers traveled 54,333 miles (Holdahl, 2018). An athlete's performance may suffer due to these demanding schedules and it may also increase their risk for injuries.

Doctors are also faced with several ethical dilemmas when working under pressure from management, coaches, and agents as they are asked to rapidly improve athlete performance (Devitt & McCarthy, 2010). When an athlete becomes injured, their career can be at stake, creating further mental distress. Their skills must be regenerated and the loss of their abilities can also create a loss of their athlete identity. When these factors are taken away, it can bring about several adverse emotional reactions. Even though full recoveries may be made from physical injuries, it may not always be the case for psychological injuries. This was the case for Kevin Ware, a guard for Louisville basketball who broke his tibia on national television during the Elite Eight games. The atmosphere to which he returned after his injury had such a strong psychological impact that he transferred to another team (Ware, 2016).

Life Transitions

Major life transitions were previously noted as a risk factor for depression. Transitions can impact athletes' relationships, roles, and routines which is correlated with behavioral and emotional distress (Stephan et al., 2003). Involuntary career termination (e.g., injury), compared to voluntary (e.g., own decision to retire) career termination, is expected to have more of a negative impact on athlete mental health (Erpic et al., 2004; Wippert & Wippert, 2008).

Similarly, another study found that voluntary retirement was associated with fewer adverse emotional reactions, including sadness, a criterion for depression (Alfermann et al., 2004). Yet, Wippert & Wippert (2008) noted that athletes' psychological distress after an involuntary career termination decreased over time, highlighting how difficult it is to adjust.

Athlete identity can impact how one transitions out of their respective sport. Athlete identity is "the degree to which an athlete defines himself or herself in terms of the athletic role" (Brewer et al., 1993, p. 237). Wolanin et al. (2015) shared that athletes rated to have high athletic identity experienced more stress, anxiety, and emotional and social adjustment issues after their career (Lavalley et al., 1997; Baillie & Danish, 1992). More recent studies hypothesized that due to loss of athletic identity, former college athletes would report more depressive symptoms compared to current college athletes. Results revealed the contrary, such that 17% of current college athletes, compared to 8% of former college athletes, presented symptoms to meet diagnostic criteria for depression (Weigand et al., 2013). A recent example is former NBA player Lamarcus Aldridge who abruptly retired due to a heart condition in April 2021. He revealed suffering from depression due to the difficulties of adjusting to abrupt career terminated. He stated:

I've been depressed, and I'm trying to figure out how to navigate through not competing on the floor, learning not to be depressed. I still love basketball. I still feel like I have a lot to give. But even now, I'm still trying to find myself. When you go from doing something you love for so long and you lose it overnight, it's a shock. (Charania, 2021, para 3)

Coaching and Expectations

There are also direct stressors within the sporting environment. One significant stressor for athletes is rising to internal and external pressures. Pressures to succeed and live up to personal and audience expectations can create enormous psychological pressure. Gencer and Ozturk (2018) summarized the research on goal orientation and motivation climate in university student-athletes. Results revealed that coaching style and the external pressures they create play a role. University coaches who adopt an ego-oriented motivational climate, compared to mastery motivational climate, tend to value demonstration of superior performance over opponents (Duda, 1993). When coaches take this approach, it creates more anxiety and distress and places athletes at risk for adverse outcomes (e.g., burnout; Thompson, 2014). Coaches are not the only ones to critique and be demanding of athletes. Family, fans, and others can negatively evaluate athletic performance, which can be exacerbated by social media (Kroshus, 2014). This can lead to further pressure and criticism that can create a continuous cycle in which an athlete's mental health further deteriorates.

Student-athletes have extensive training, in addition to their educational requirements, that they must fulfill. Balancing the demands of both academics and sport can result in elevated stress and inadequate sleep (Kroshus, 2014). Kroshus (2014) asserts that sleep allows individuals to respond effectively to stressors, have mental acuity, and positively impacts sport performance and injury prevention. More significantly, there is the pressure to maintain one's scholarship, which can impact athletic performance (Kroshus, 2014). The amount of time athletes dedicate to their respective sports is immeasurable, and the sacrifices made to attain their goals are immense. Risk factors and sources of stress can vary from one athlete to another. Some stress was in direct

relation to sport (e.g., sport organization), while other stressors were life-related (e.g., miscarriage; Reardon & Factor, 2010).

Value to Stakeholders

Today's athletes differ significantly from ten, twenty, and thirty years ago. Records are being broken, and human potential is being pushed to the limit. Athletes are stronger and faster than ever before (World Athletics, n.d.). Great attention is given to athletes to reach their full potential. Considering that the number of athletes is growing, the same care should be given to athlete mental health. Team personnel may not always be equipped to identify athlete psychological distress and therefore can go undiagnosed. Kevin Love (2018) stated:

In the NBA, you have trained professionals to fine-tune your life in so many areas.

Coaches, trainers, and nutritionists have had a presence in my life for years. But none of those people could help me in the way I needed when I was lying on the floor struggling to breathe. (para 21)

Despite having several team personnel around, there were no individuals to assist Kevin Love with the anxiety and panic attacks he was experiencing. Sports personnel directly influence athlete development and well-being, so it is critical to advocate for the athlete community to change community attitudes and misconceptions and promote positive change towards mental health.

There is a need for additional training for coaches and staff. Hegarty et al. (2018) examined how knowledgeable collegiate coaches are regarding depression. Although coaches demonstrated a basic understanding of depression, 57% believed that depression is curable, and 55% believed that men and women have the same prevalence rates of depression. Educating sports staff and filling in gaps can improve team personnel recognizing depressive symptoms and

behaviors early on to make appropriate referrals. Coaches and staff may be unaware that athletes are struggling and often find out about athlete mental distress through self-report. Kroshus (2016) suggests there is substantial variability in mental health screenings across NCAA institutions. Only 39% of respondents stated they had a written plan for athlete mental health concerns, while only 32% reported administering an assessment to screen for depressive symptoms. It is an encouraging development that 77% of coaches shared their interest in continuing education to advance their knowledge and awareness about depression (Hegarty et al., 2018). Understanding change in athlete performance due to mental health elements can lead to appropriate referrals and allow professionals to develop individualized coping mechanisms for athletes. This systematic review aims to improve understanding of depression and build connections between mental health and sport.

Rationale for the Current Study

As previously discussed, there are nearly 500,00 athletes, and depression is the most widely experienced mental health disorder globally. Studies have shown how physical and mental demands of practice and competition (e.g., overtraining, exhaustion, injury) and other external elements (e.g., trauma, retirement) negatively impact mental health.

Injuries create various emotional responses, and adverse emotional reactions can lead to one developing depression (Armstrong et al., 2015; Kebede & Rao, 2013). The type of injury that has been the main focus of research has been concussions, which reveal the association between concussions and depression in collegiate and elite athletes (King, 2017; Rice et al., 2018). Nevertheless, literature has also demonstrated that athletes may perceive their injuries positively. An injury may be a way for an athlete to enhance their non-athletic pursuits, better time management skills, escape from the distress from the involvement of one's sport, and return

to their sport sooner (Arden et al., 2012; Kebede & Rao, 2013).

Research Questions

This systematic review focuses on examining how injuries affect athletes' mental health, with particular attention to injuries ranging from minor to those requiring significant recovery, are season-ending, or career-ending and their impact on depression. The review addressed two primary research questions:

1. In what ways do injuries impact athlete depression?
2. How is depression experienced and symptoms expressed among athletes as a result of an injury?

These questions were considered in the context of variability among athletes on variables such as age, gender, race-ethnicity, and specific sport.

Chapter 2: Methodology

Systematic Review Approach

This systematic review utilized a mixed-methods methodological approach. It considered studies using qualitative research designs such as phenomenological, case study, grounded theory, and narrative inquiry. It also considered quantitative research designs such as descriptive, correlational, quasi-experimental, and experimental. The National Institute of Health [NIH] Office of Behavioral and Social Sciences (2018) states the intentional integration of these two methodologies allows for the strengths of each approach to be utilized. They further argue that this is an appropriate methodology when research questions “call for real-life contextual understandings, multi-level perspectives, and socio-cultural influences” (NIH Office of Behavioral and Social Sciences, 2018, p. 3). Meta-analyses and other statistical tests were not included; instead, the results of included studies were synthesized narratively. A narrative synthesis refers to the

Synthesis of findings from multiple studies that relies primarily on the use of words and text to summarize and explain the findings of the synthesis....the defining characteristic is that it adopts a textual approach to the process of synthesis to ‘tell the story’ of the findings from the included studies. (Popay et al., 2006, p. 5)

However, Thomson and Campbell (2020) argue that this definition is vague and add synthesizing information includes bringing evidence together from several resources to gain greater value. They encourage researchers to explore similarities and differences along with other patterns presented in the data of studies.

Eligibility Criteria

IRB approval was obtained prior to the beginning of this dissertation (See Appendix A). Several inclusion criteria were used for this systematic review. Years of publication were limited from 2000 to 2020 and this decision was informed by a preliminary review of research. Articles included were published in English. However, studies that were originally published in another language but then translated into English were also accepted.

Studies that were eligible for inclusion were those that included athlete samples of any gender or gender identity, of any sexual orientation, racial–ethnic identification or socioeconomic status. More specifically, participants in the studies reviewed were required to be a minimum of 18 years old and current or former athletes playing in college, or are professional and/or elite. College athletes could attend either a two–year or four–year university. Professional and/or Elite athletes were considered as those who regularly compete at statewide/national/international levels and events. Types of settings where data was obtained were not limited and could include universities and colleges, as well as sports organizations. Studies were not limited to a geographic location, and data obtained outside of the United States was considered.

Exclusion criteria was utilized to exclude studies that focus on other mental health conditions and do not include depression. For instance, articles dealing solely with anxiety were to be excluded. However, articles examining anxiety in conjunction with depression were acceptable.

Search, Screening, and Selection Process

A set of keywords were used to find relevant studies to inform the systematic review. Search terms and keywords included are as follows: athlete (college athletes, elite athletes,

professional athletes, athletics); sources of Stress (stress, stressful, athlete stressors, athlete stress); mental health (mental health, mental illness, mental disorder, psychiatric health, psychiatric illness, psychiatric disorder, well-being); depression (mood disorder, depressive disorder, depressive symptoms, major depressive disorder, clinical depression, depressive mood); injury. Search terms were combined and searched for to generate relevant results. Search terms were combined with capitalized “AND” to narrow results. Athlete AND injury AND depression illustrates how this search method was used. They were combined with capitalized “OR” to expand the results with similar search terms. For example, depression OR depressive disorder OR depressive mood. An asterisk (*) was used to further broaden a search by finding words that start with the same letters. It allowed the search engine to retrieve variations of a term. For instance, athlet* encompasses athlete, athletes, athletics. Each search term was given an identification number (See Appendix C: Search Documentation Record). Furthermore, articles related to concussion (concuss, concussion disorder) were not included.

A comprehensive review was conducted utilizing Pepperdine University’s library system. Different sources were utilized, but were not limited to, organizations (American Psychiatric Association); electronic databases (Sports Discus, PsycINFO, SCOPUS); and scientific journals including peer-reviewed journals (*Frontiers in Psychology*, *American Journal of Sports Medicine*, *British Journal of Sports Medicine*, *Clinical Journal of Sports Medicine*, *Journal of Applied Sport Psychology*, *Psychological Review*, *Official Journal of the Association for Applied Sport Psychology*, *International Journal of Sport and Exercise Psychology*, *British Medical Journal of Psychiatry*). An excel spreadsheet kept track of the “Search Type” (e.g., Electronic Database); “Databases or Sources” (e.g., Scopus, PsycINFO); “Search Term ID(s)” from that were previously described as well as the “Search Syntax” (e.g., “athlete” AND “depression”

AND “injury). The reference list of related articles were examined for sources relevant to the current study.

There were three phases in the screening and selection process. Phase 1 included screening the title, keywords, abstract and the decision date. Decision Codes that were used in this section were: Include (IN); Continue to Abstract (CAB); Continue to Full Text (CAB); Undecided (UN); Exclude (EX). Phase 2 was a full-text review to determine eligibility and phase three revealed the final decision (e.g., include, exclude) and the final date decision (e.g., 01/01/20; See Appendix D: Screening and Selection Record). The author, year, abbreviated title, and databases/sources of each study was noted.

The PRISMA Flowchart was created which depicts the phases of the systematic review (Page at al., 2021; See Appendix E: Flow Diagram Template). It first reveals the number of records identified through database searching. Then it shows the total number of sources after duplicates were removed and the inclusion criteria was applied. It then reveals the number of articles that were excluded, the number that remain, and additional records identified through the snowballing technique. Next, it shows the number of sources where the full-text article was assessed for eligibility and the number of sources where the full-test articles were excluded. This results in the total number of qualitative studies, the total number of quantitative studies, and the total number of other studies included in the systematic review. All included and excluded studies were reviewed a second time to ensure they met full criteria and eligibility for the study. A list of final included studies can be seen in Appendix A.

Data Collection and Extraction

The *Data Collection and Extraction* form provided by Pepperdine University (See Appendix F: Data Collection and Extraction Form) was utilized. This form was a modification of

Effective Practice and Organisation of Care (EPOC, 2013). This form was divided into eight sections: *General Information, Design Characteristics and Methodological Features, Assessment of Research Variables, Study Participant Characteristics and Recruitment, Setting Characteristics, Analyses Conducted, Results, Conclusions and Follow-Up*. These categories are further described below.

Two Pepperdine master's level students volunteered to become research assistants to the doctoral student's dissertation. They aided in completing the Data Collection and Extraction form for each study. The doctoral student completed a validity check to ensure that the form was getting completed correctly. When there were discrepancies between research assistants with data extraction, the doctoral student critically evaluated the data and conducted further review to clarify the uncertainties in the results. This approach minimized incongruencies and ensured correct data was extracted. The doctoral student completed a confirmatory review to verify what studies would be included in the final study for this systematic review.

General Information required the date the form was completed (e.g., dd/mm/yyyy), the initials/ID of the person extracting the data, the source/publication type (e.g., journal, book, conference, report, dissertation, abstract), source name (e.g., title of journal, book, organization), publication status (e.g., published or unpublished), document language, and any other notes as seen necessary for this section.

Design Characteristics and Methodological Features required the reviewer to describe the aim of the study, general method (e.g., quantitative, qualitative, mixed), design or specific research approach as stated in the report/paper and locate in the text (e.g., page, paragraph, figure, table). Other notes as seen necessary for this section were also included.

Assessment of Research Variables required a listing of the research variables and how each was assessed (e.g., Measure, Observation, Interview Question, Archival, etc.), the reliability/validity/utility of each variable, and the location in the text (e.g., page, paragraph, figure, table).

Study Participant Characteristics and Recruitment required the description as stated in the report/paper and the location in the text for the following: population of interest, recruitment methods, sample size, age, gender, race/ethnicity, and any other notes as seen necessary.

Setting Characteristics required the description as stated in the report and the location in the text for the study location, data collection setting, and any other notes as seen necessary.

Analyses Conducted required the description as stated in the report/paper and the location in the text for descriptive statistics used, inferential statistics used, qualitative analyses conducted and any other notes as seen necessary.

Results included a description as stated in the report/paper and the location in the text for all the key results in the studies.

Conclusions and Follow-Up required the following information:

- Key conclusions of study authors
- General takeaways
- Study limitations
- Study author's recommendations for future research
- Does the study directly address your review question?
- References to other relevant studies

Quality Appraisal

A *Quality Appraisal Form* (See Appendix G: Quality Appraisal form) was used to evaluate the quality of the included studies in which 13 indicators were assessed. The author(s) and year were identified and an identification number was given for each study. First, the methodology of the study was determined (quantitative, qualitative, mixed methods), followed by the specific design/inquiry approach. The following sections discussed were evaluated on a rating scale (Strong = 3; Good/Adequate = 2; Weak = 1; Missing = 0; N/A). The strength of the literature foundation and rationale for the study was discussed while also considering the current and relevant references. The researcher determined the clarity and specificity of the research aims, objectives, and questions outlined in the study.

Next, the quality of the research design or methodological approach was rated by the reviewer. Possible considerations for this section were: whether the study provided rationale for the chosen design, the appropriateness of the research questions, a clear description of the design and methodological approach, the strength of the design characteristics utilized (e.g., randomization, blinding, triangulation, etc.), potential confounds identified and addressed in some way, and consideration of internal and external validity in design. Furthermore, the sample selection and characteristics was rated based on the adequacy of the sample size in context of the design, detailed description of sample characteristics, representativeness of the sample, adequacy of the sample characteristics in context of the research aims, detailed description of recruitment and selection of participants, or sample bias. Additionally, the measures and data collection tools were evaluated, and the following was considered: rationale for selection, appropriateness for assessing variables, development of new tools clearly described, psychometric properties described (reliability, validity, utility), adequacy of psychometric properties.

The data collection process of the study was rated based on, but not limited to, the quality of the description of the data collection procedures and the intervention strategies and implementation. Next, the analysis of the data was critiqued and rated. Possible considerations included the appropriateness of the analysis for the research questions and the type of data, power, and effect size presented, if the results were presented clearly and comprehensively. This was followed by rating the overall discussion of the study limitations. In this section, possible considerations included, identification and discussion of the limitations in the context of the design/strategy utilized (e.g., various forms of bias, internal validity, external validity (generalizability), ecological validity, transferability, credibility, transparency, etc.), and overall comprehensiveness of the limitations identified. Another factor that was evaluated was the consideration of culture and diversity in each article. For this section, possible considerations included the attention to diversity within the sample, the inclusion of culturally appropriate methods and tools, avoidance of biased language, and the use of appropriate terminology. Once all of these factors were evaluated and rated, an overall rating was given to the study based upon the ratings given (Exemplary [All 3's]; Strong [Mostly 3's]; Good/Adequate [Mostly 2's]; Weak [Mostly 1's]).

Data Management, Synthesis, and Analysis Plan

A database was developed to organize data collected from the *Data Extraction Form* and *Quality Appraisal Form*. Each form was reviewed and data was transferred into an Excel document. All extracted data was managed with this spreadsheet. This database was beneficial for extracting relevant statistical information to better address the identified research questions. The data helped to recognize significant material that applied to this systematic review while excluding information that did not meet study criteria.

As a first step in the synthesis process, included studies key findings of the included studies were summarized. They were grouped, for example, based on intervention, population, study design, type of sport or outcomes. Additional information from studies were included to help identify patterns that were further analyzed.

An Evidence Table of included studies was created to present key data from each study (See Appendix H). The table was organized into columns that included (A) Authors; (B) Year; (C) Nation; (D) Focus of Study (Variables, Key Words, Population, etc.); (E) Research Methodology and Design; (F) Sample Characteristics (size, gender, ethnicity); (G) Depression; (H) Assessment Measures for Depression; (I) Type of injury; (J) Type of Sport; (K) Level of Play; and (L) Results/Main Findings. Additional columns for noting data was created as needed. Other tables, charts, and figures were developed as needed to present the data.

Final Article Selection

The final literature search occurred on June 21st, 2020. The databases that were utilized were APA PsycArticles, APA PsychInfo, and SPORTDiscus. The following search terms were used in the final search and were limited to the years 2000 to 2020: (athlete OR athletes OR athletic OR sport OR sports) AND (injury OR injuries OR sport injury OR sports injury OR accident OR trauma OR pain) AND (depression OR depressed OR depressive disorder OR depressive symptoms OR major depressive disorder OR major depression) NOT concus*.

The search yielded 727 articles, which were then limited to only academic journals, resulting in 615 articles. After articles were limited to English and duplicates were removed, 557 articles remained. Of the 557 articles, the screening process was utilized and 520 articles were removed. Thirty-seven articles remained and the snowballing technique yielded 11 articles to include in the data extraction process. Data extraction was completed on 48 articles and a total of

19 articles were included in the final study. Of the 19 articles, four were qualitative studies, 10 were quantitative studies, and five were mixed methods or other types of studies.

Summary

In Chapter 2, the methodology of the systematic review was defined. The eligibility criteria were noted and the search criteria and strategies were discussed. From there, the data collection phase was outlined and described the application of the quality appraisal method. Extracted data from the finalized set of articles was then analyzed.

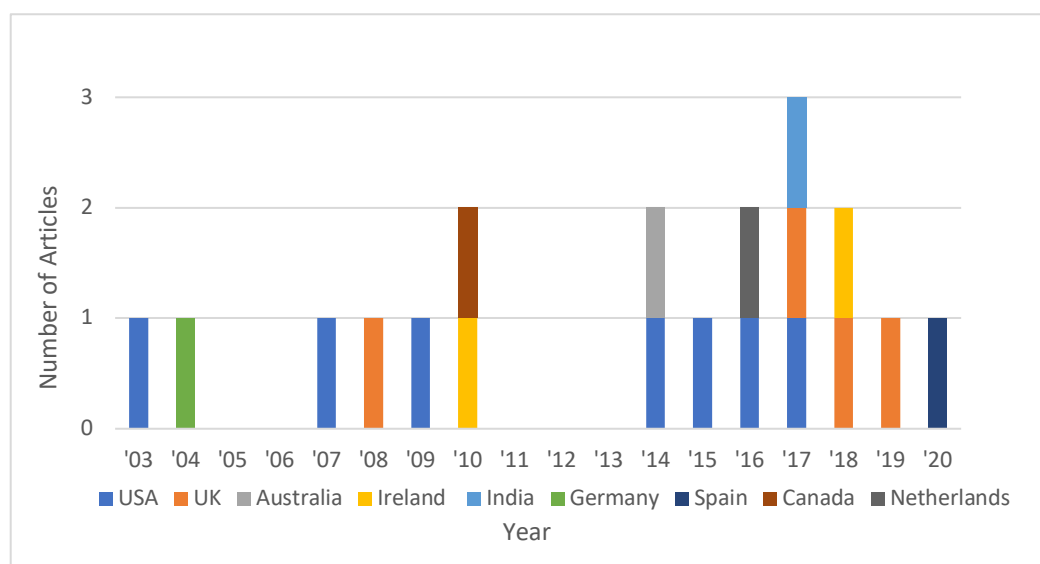
Chapter 3: Results

Study Characteristics

The search produced 19 studies that were published from 2003 to 2020. Figure 1 illustrates the number of studies published per year, along with the countries where the articles were published. One can observe that there has been consistent research in this topic area since 2003, with at least one paper in the majority of these years. After a brief gap between 2011 and 2013, the rate of research increased.

Figure 1

Number of Articles Published Per Year



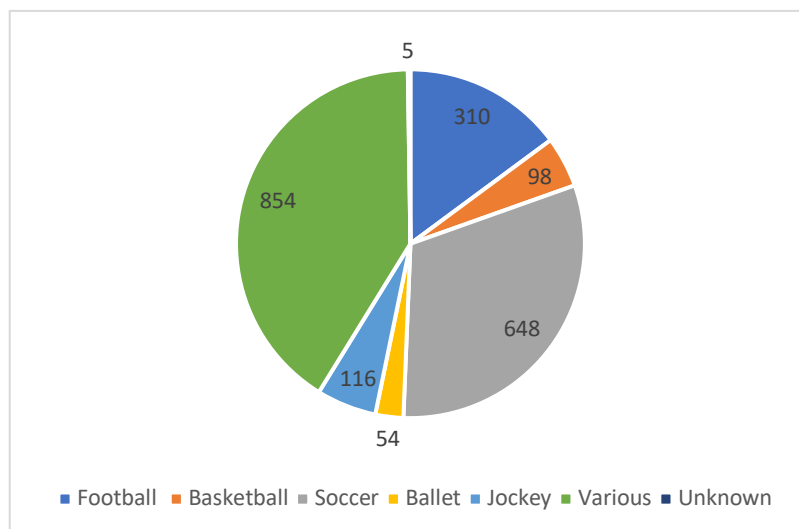
The majority of the research in this field has been conducted in the United States and the British Isles (United Kingdom and Ireland), accounting for around 37% and 32% of the articles published in this time frame. The remaining articles on athlete mental health were published in various countries including Australia, India, Germany, Spain, Canada, and the Netherlands.

Three of the 19 studies were reviews about the current state of knowledge regarding the psychological response to athletic injury and described the resources necessary to direct the

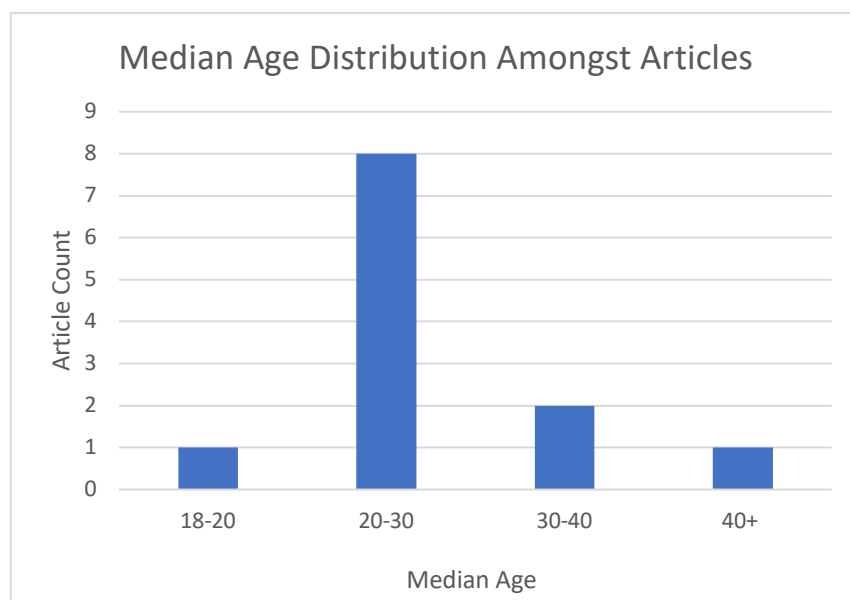
injured athlete to a mental health care providers as needed (Herring et al., 2017; Putukian, 2016; Wolanin et al., 2015). A total of 2,085 athletes (74% male, 25% female, 1% unknown) were included across the studies and athletes playing abilities ranged across collegiate and professional levels. Approximately three-fourths of the athletes were active (1,549) while the remaining were retired (536).

Of 16 studies (non-review), only four reported ethnic/racial backgrounds of athletes. Of these four, three studies (Appaneal et al., 2009; Yang et al., 2014; Yang et al., 2007) were conducted in the U.S. while one study was conducted in India (Kaul, 2017). The study in India consisted of eight Indian athletes. The other three studies had bigger sample sizes of predominantly Caucasian athletes (Study 1: $n = 593$, 74.9% Caucasian; Study 2: $n = 257$, 89.9% Caucasian; Study 3: $n = 257$, 72% Caucasian).

The types of sports included in the studies is illustrated in Figure 2. Regarding the total number of athletes ($n = 2,085$), 854 were not designated to a sport. Soccer represents the largest population of athletes (648), followed by football (310), horseracing (116), basketball (98) and ballet (54). Some studies did not specify the athlete's sport; therefore, five athletes' sport participation was unknown.

Figure 2*Sports Represented*

Of 16 studies (non-review), one article was a case study (McArdle, 2010) and reported the participant's age as 18 years old. Four of the studies did not report the age of their participants (Carson & Polman, 2008; Yang et al., 2014; Yang et al., 2007; San-Antolin et al., 2020). The remaining twelve articles reported the median age of the participants. The median ages were grouped as followed: 18 to 20; 20 to 30; 30 to 40; 40+ (Figure 3). A total of 1,439 participants ages were accounted for, making up 69% of all included studies. The majority of the research, eight of 12 articles, fell within the 20 to 30 median age range. These eight articles consisted of 745 athletes, making up about 52% of the total participant pool of age-reported articles. Only one (Sanders & Stevinson, 2017) study accounts for roughly 21% of participants, and this study had a mean age range of 46.8, allocating it to the 40+ age range group.

Figure 3*Median Age Distribution Amongst Articles***Conceptualization of Depression**

The systematic research yielded literature on mental health and the various terminology used to describe depression. The term depression was used to reflect both mood and psychiatric disturbance while also applying it more broadly to describe mental well-being, distress, mental health challenges, and psychological distress. Four of 19 articles, about 21%, described their use of the term depression in their study. Two articles used the *Diagnostic and Statistical Manual of Mental Disorders (DSM5)* definition of depression (Lebrun et al., 2018; Herring et al., 2017). The *DSM5*, defines and classifies mental disorders in order to improve diagnoses, treatment, and research (American Psychiatric Association, 2013). According to the *DSM5* (American Psychiatric Association, 2013), depression is associated with feelings of sadness and can lead to emotional and physical problems that negatively impact one's ability to function in various settings (e.g., work, home, school, etc.). The *DSM5* (American Psychiatric Association, 2013) indicates the following as symptoms of depression: depressed mood, reduced interests, changes

in weight/appetite, sleep disturbance, psychomotor restlessness, feelings of worthlessness/guilt, excessive fatigue, difficulty concentrating, thoughts of self-harm. To be diagnosed with major depressive disorder (MDD), one must present with a minimum of five of the aforementioned symptoms during the same two week period. Of the five symptoms, it is required that one be depressed mood or loss of interest/pleasure. However, not all studies utilized the *DSM5* (American Psychiatric Association, 2013) conceptualization of depression. Some indicated clinically relevant symptoms of depression rather than a diagnosis of a MDD (Sanders & Stevinson, 2017)

One article (San-Antolin et al., 2020) conceptualized the degree of an athlete's depression based on scores and severity categories of a self-report questionnaire. However, the self-report measures did not preclude a psychiatric diagnosis for depression. The causes of depression are complex and diagnosing one with depression must include an in-depth evaluation by a professional (San-Antolin et al., 2020).

Of note, studies that solely examined anxiety in relation to injuries were ineligible for the study. However, due to the limitations of the number of articles, those that met all other criteria and answered the research questions were included. For example, one article examined depression and anxiety as one construct, as opposed to two (Gouttebarga et al., 2016).

Assessment of Depression

Various screening measures were used in the included studies and all of these measures have established psychometric properties (e.g., validity, reliability). Of the 19 articles, 73% utilized an instrument to assess well-being, mood, and depression. One of the review articles (Herring et al., 2017) suggested the Patient Health Questionnaire (PHQ-9), Beck Depression Inventory-Fast Screen (BDI-FS), and Center for Epidemiologic Studies-Depression (CES-D) as

screening tools for depression (Herring et al., 2017). Only one article used the PHQ-9 (Putukian, 2016), while six utilized the CES-D (Appaneal et al., 2009; Yang et al., 2014; Gulliver et al., 2015; Losty et al., 2018; Yang et al., 2007; Wolanin et al., 2015). Although the BDI-FS was not utilized, the full version of the BDI-II screener was used by two articles (San-Antolin et al., 2020; Wolanin et al., 2015). One article assessed an athlete's symptomology with a senior psychologist as they confirmed the athlete was demonstrating signs of clinical levels of depression (McArdle, 2010).

Other measures include the Short Depression-Happiness Scale (SDHS; Sanders & Stevinson, 2017), Hamilton Rating Scale for Depression (or SIGH-D; Appaneal et al., 2009; Wolanin et al., 2015), Symptom Checklist-90-R (SCL-90-R; Wolanin et al., 2015), Warwick-Edinburgh Mental Well-being Scale (WEMWBS; Abbott et al., 2019), Kessler Psychological Distress Scale (K10; Losty et al., 2018), Cohen Perceived Stress Scale (PSS), Profile of Mood States (POMS; Adam et al., 2004; Mainwaring et al., 2010), 12-item General Health Questionnaire (GHQ-12), Patient-Reported Outcomes Measurement Information System (PROMIS), and Distress Screener based on the 4-dimensional symptom questionnaire (4DSQ; Gouttebarga et al., 2016).

Other Assessments

Those assessments that measured different constructs and were relevant to the particular study are referenced below. Several instruments were incorporated to better understand athlete's experiences of pain like the Sports Inventory for Pain questionnaire (SIP; Carson & Polman, 2008), and the Visual Analogue Scale (San-Antolín et al., 2020). One article measured self-reported pain with an 11-point numeric rating scale (NRS-11), with zero indicating "no pain" and 10 indicating "the worst pain the respondent had ever felt" (Yang et al., 2007).

Measures were also used to better understand coping and social support of athletes. For instance the Emotional Responses of Athletes to Injury Questionnaire (ERAIQ); Coping with Health, Injuries, and Problems inventory (CHIP; Carson & Polman, 2008); Social Support Appraisals (SS–A) scale (Adam et al., 2004) provide information in these areas. Other assessments administered that were relevant include the Pittsburgh Sleep Quality Index (PSQI; Adam et al., 2004), Perceived Stress Scale (PSS), Rosenberg’s Self–Esteem Scale (RSES; Losty et al., 2018).

Definition of Injury

A limited number of articles provided their definition of an injury, which ranged from restricted participation for at least one day (Adam et al., 2004) to being absent from training or match for more than 28 days (Gouttebarga et al., 2016). Two articles agreed that an injury was a period with restricted participation in one’s sport or inability to complete training for a minimum of one week (Appaneal et al., 2009; Abbott et al., 2019).

Table 1*Assessment and Measures*

Measure/Construct	# of Items	Response Options	Scoring	Articles
PHQ-9 Depression	9-Item	0 = Not at all 1 = Several Days 2 = More than half the days 3 = Nearly every day	Scores range from 0 to 18, with high scores indicating greater depressive symptoms.	Putukian (2016)
CES-D Depression	20-Item	0 = Rarely/None of the Time 1 = Some/Little of the Time 2 = Moderately/Much of the time 3 = Most/Almost All the Time	Scores range from 0 to 60, high scores indicating greater depressive symptoms.	Appaneal et al. (2009) Yang et al., (2014) Gulliver et al. (2015) Losty et al. (2018) Yang et al. (2007) Wolanin et al. (2015)
BDI Depression	21-Item	Respondents are asked to rate each question on four response choices ranging from 0-3.	Scores range from 0-63, higher scores indicate greater depressive symptoms. Categories are as follows: 0-9 (minimal), 10-18 (mild), 19-29 (moderate), 30-63 (severe).	San-Antolin et al. (2020) Wolanin et al., (2015)
SDHS Depression & Happiness	6-Item	0 = Never 1 = Rarely 2 = Sometimes 3 = Often	Scores range from 0 to 18, with lower scores indicating greater depression.	Sanders & Stevinson, 2017
SIGH-D Depression	17-Item	<u>5-point scale</u> 0 = Absent 1 = Mild 2 = Moderate 3 = Severe 4 = Incapacitating *Used to quantify the results of an interview <u>3-point scale</u> 0 = Absent 1 = Doubtful/Trivial 2 = Present	Scores range from 0-54, with higher scores indicating more severe depression. More specifically scores of mild are 10-13, mild-moderate 14-17, moderate to severe 17+.	Appaneal et al., (2009) Wolanin et al. (2015)
Symptom Checklist-90-R Psychopathology	90-Item	0 = Not at all 1 = A little bit 2 = Moderately 3 = Quite a bit? 4 = Extremely	Scores are given for the following dimensions: Somatization, Obsessive Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, Psychoticism, Additional Items.	Wolanin et al. (2015)

Measure-Construct	# of Items	Response Options	Scoring	Articles
PROMIS	Unspecified	Likert scale	Unspecified	Gouttebarga et al. (2016)
K10 Psychological Distress	10-Item	1 = None of the time 2 = A Little of the time 3 = Some of the time 4 = Most of the time 5 = All of the time	Scores range from 10–50, with higher scores indicating more psychological distress.	Losty et al. (2018)
GHQ-12 Mental Health– Psychiatric Disorders	12-Item	1=Less than usual 2=No more than usual 3=Rather more than usual 4=Much more than usual *reverse coding on certain items	Scores rang from 0–36, with higher scores indicating worse health.	Gouttebarga et al. (2016)
WEMWBS Mental Well-Being	14-Item	1 = None of the time 2 = Rarely 3 = Some of the time 4 = Often 5 = All of the time	Scores range from 14–70, with higher scores indicating better mental well-being.	Abbott et al. (2019)
POMS Mood	65-Item	0 = Not at all 1 = A little 4 = Extremely 2 = Moderately 3 = Quite a Lot Items 22 and 54 are reverse scored 0 = Extremely 1 = Quite a Lot 2 = Moderately 3 = A little 4 = Not at all	Scores are obtained for 6 subscales: tension, depression, anger, vigor, fatigue, confusion and total mood disturbance. Lower scored indicate more stable mood profiles.	Adam et al. (2004) Mainwaring et al. (2010)
PSS Stress	4-Item	<u>Item 1,4</u> 0 = Never 1 = Almost Never 2 = Sometime 3 = Fairly often 4 = Very often	<u>Item 2,3</u> 4 = Never 3 = Almost Never 2 = Sometimes 1 = Fairly Often 0 =Very Often	Scores range from 0–16 to receive a global scale with higher scores indicating higher perceived stress level. Adam et al. (2004) Mainwaring et al. (2010)

Findings Research Question 1 In what ways do injuries impact athlete depression?

Reviews

Three of the nineteen articles included were reviews that examined the current literature (Wolanin et al., 2015; Putukian, 2016; Herring et al., 2017). They described an injury as a stressor that has physical as well as psychological responses. Having a psychological response to an injury is normative. However, when the emotional response worsens and becomes persistent, mental health issues such as depression can be triggered. Further, emotional responses may vary from one athlete to another and it is essential to consider an athlete's experience as individualized and can oscillate with time (Putukian, 2016). Although some may believe that athletes are immune to depression, there are multiple risk factors particular to an athlete population, that increase the risk of depression. Compared with the general population, athletes experience performance expectations, injuries, and involuntary career termination, all unique to their sport.

When discussing the relationship between athletes' injuries and depression, one study found that depressive symptoms were elevated for one week after an injury and remained that way one month after the injury (Wolanin et al., 2015). A negative cycle of stress and depressed mood can hinder an athlete's recovery from an injury and overall treatment (Herring et al., 2017). This can be further negatively impacted as it was more likely for athletes that were experiencing severe depression and psychological symptoms to misuse alcohol (Putukian, 2016). Critical quality social support can buffer the effects of stress and depression and impact how athletes perceive their pain and engage in pain avoidance (Herring et al., 2017).

Collegiate Athletes

Five articles examined the experiences of collegiate athletes (Appaneal et al., 2009; Yang et al., 2007; Tracey, 2003; Yang et al., 2014; Mainwairing et al., 2010). After sustaining a severe

sport injury, it is common for athletes to experience elevated depressive symptoms that persist for one month, regardless of gender. Nevertheless, female athletes exhibited greater depressive symptoms despite injury status and severity (Appaneal et al., 2009). More specifically, one article indicated female athletes are 1.32 times more likely than male athletes to experience depression. Collegiate class was also factor associated with an increased risk of experiencing symptoms of depression. Specifically, freshmen class athletes are 3.27 times more likely, compared to senior class athletes, to experience depression (Yang et al., 2007). In one sample, about 9.6% and 4.4% of athletes would meet criteria for MDD utilizing a symptom checklist (Appaneal et al., 2009). Using the same symptom checklist, another article's findings suggest that more than 20% of collegiate student-athletes reported experiencing symptoms of depression. Athletes with a history of clinically diagnosed depression, history of injury, and those who reported pain experienced significantly more symptoms of depression (Yang et al., 2007). Furthermore, athletes with ACL injuries reported higher levels of depression for a longer duration than, for example, athletes with concussion (Mainwairing et al., 2010).

There was a chronological pattern such that depressive symptoms and severity decrease over time for both men and women (Appaneal et al., 2009). Upon returning to play, 22.2% of athletes with injury events reported symptoms of depression. What aided athletes to become less likely to report depressive symptoms upon return to play was the satisfaction with the social support they received from athletic trainers (Yang et al., 2014). What further impacted an emotional response is the cause of the injury, such as when an athlete believed that the injury resulted from deliberate action by an oppositional player. Such events also lead to moderate to clinical levels of depression, confirmed by a psychologist (Tracey, 2003).

Professional Athletes: Active

Four articles examined the symptoms of depression within professional athletes who are active in their respective sports (Adam et al., 2004; Losty et al., 2018; Gulliver et al., 2015; Abbott et al., 2019). These articles found an association between injuries, well-being and athlete's having symptoms of depression.

One study utilized the Warwick-Edinburg Mental Well-being Scale with soccer players, a questionnaire shown to closely correlate with clinical depression scales. They reported mental wellness of athletes was significantly lower when injured. Similarly, another study revealed one-quarter of their sample, about 24% males and 31% females, indicated a possible depressive disorder (Gulliver et al., 2015). The length of time injured had the strongest influence and accounted for about 40% of the variance on mental well-being (Abbott et al., 2019). Overall, injury is a factor implicated in depression in athletes as their scores on symptom questionnaires are higher compared to non-injured athletes (Gulliver et al., 2015).

In a jockey sample, results indicated those with a current injury were 46.42 times more likely to report depression than those without a current injury. Professional jockeys, compared to amateur jockeys, are also likely to endorse greater psychological distress, depression, anxiety, and perceived stress. For instance, professional jockeys demonstrated negative mental health symptoms such that 57%, compared to 32% of amateur jockeys, specifically demonstrated symptoms of depression. High-performance athletes are at greater risk for mental health problems which are influenced by multiple factors including past injury incidence and severity and current injury status (Losty et al., 2018).

Dancers missing rehearsal and performance reported various symptoms including stress, depression, fatigue, anger, etc., compared to uninjured athletes. Inability to participate in one's

sport due to injury led to psychological distress. This was evident as dancers reported several mood states on the POMS, including depression–dejection, in reaction to their injury (Adam et al., 2004).

Professional Athletes: Retired

Four articles examined the symptoms of depression within a retired professional athlete population (Gouttebarga et al., 2016; Sanders & Stevinson, 2017; Kaul, 2017; Lebrun et al., 2018). Injury was one reason athletes cited for retirement (Lebrun et al., 2018), such that in one study, approximately 42% retired because of an injury. The prevalence of depressive symptoms was about 39%, when retiring mainly due to an injury. Similarly, another article found 35% of athletes endorsed symptoms of anxiety/depression (Gouttebarga et al., 2016). Those with depressive symptoms were younger with a mean age of 34.2., more recently retired, and displayed higher athletic identity. More participants with depression also reported the presence of on–going intensive pain (Sanders & Stevinson, 2017). Through interviews, athletes expressed that they initially went through a series of negative feelings until they go into "a state of depression" once they had to end their careers due to injury (Kaul, 2017). More specifically, relationships were established between career injury and long–term mental health issues in professional football (Gouttebarga et al., 2016).

Findings Research Question 2: How is Depression Experienced and Symptoms Expressed Among Athletes as a Result of an Injury?

Thoughts, Emotions, and Behaviors

This study examined themes in athletes' cognitions, emotions and behavioral and physiological reactions when they could not participate in training or compete in their sport. The results revealed athlete's thoughts shifted as result of an injury and displayed confusion, change

in concentration and attention, and indecisiveness. Additionally, the participants experienced various thoughts, but with a common theme of waiting to get back to their sport. Because of their inability to get back to their sport, many participants developed bitterness towards other people, like friends who were doing well in their life (Kaul, 2017). Athletes further had helpless thoughts like "Why is this happening to me?" and negative thoughts about the future (Kaul, 2017). Some athletes also indicated being unable to envision their future without their sport and that their life would have little meaning (McArdle, 2010).

Athletes who missed practice and/or rehearsal and performance days, compared to healthy athletes, experienced more negative mood states. Emotional responses included sadness, avolition, anhedonia, irritability, anger, guilt, psychomotor restlessness, helplessness, hopelessness, and low self-esteem (Kaul, 2017; Herring et al., 2017; Putukian, 2016; Adam et al., 2004).

For the behaviors theme, there were several common behaviors post-injury. Due to spending time away from their sport, athletes were isolated from their teammates and team personnel and had little interest in socializing and engaging with others (McArdle, 2010). They experienced changes in appetite, sleep disturbance, substance misuse, performance decrement, at-risk behavior, crying, outbursts, loss of temper, boredom (Abbot et al., 2019) and personality changes (Lebrun et al., 2018).

Stages and Phases Perspective

Two articles (Carson & Polman, 2008; Tracey 2003) looked at the impact of injury on depression from a stages and phases perspective and observed athletes' emotional-behavioral responses in each stage. For instance, one article (Carson & Polman, 2008) defined six stages of the rehabilitation process based on a case study. They defined the stages as follows: (a) initial

injury phase, (b) presurgery phase, (c) postsurgery phase, (d) early limited participation, (e) late limited participation, and (f) return to play. Reactions of an athlete in each phase was discussed. When an athlete was initially injured, they experienced shock and could not believe the seriousness of their injury and the length of time required for rehabilitation. They felt helpless and depressed as they lost their independence and were anxious about missing games and being unable to achieve their goals. They further gathered information about the rehabilitation process. As surgery neared, the athlete experienced apprehension and continued anger while also engaging in various coping strategies (problem-focused, emotion-focused, avoidance). Social support was crucial in enhancing their well-being during their rehabilitation process. Once surgery was completed, feelings that emerged included relief and continued anxiety about their rehabilitation. Yet, the athlete was able to focus on their medical recovery with the support of friends and family. Once they were allowed to engage in limited participation in their sport, they felt encouraged by the progress since the initial injury, which motivated them to continue to make improvements. This was influenced by previous injury knowledge. Yet, there was unease about being unable to recover and longing to be part of the team. Goal setting became crucial in rehabilitation as it allowed the athlete to focus on specific targets to obtain, despite specific guidelines determined by medical personnel. The athlete found becoming involved in other aspects of sport helpful in their coping. As the athlete improved, they became motivated to return but were concerned about setbacks they may face in rehabilitation. Feelings of depression and frustration arise once again due to the inability to compete. Nevertheless, they began to have a sense of control and increased confidence as targeted goals were achieved. Upon returning to their sport, the athlete was apprehensive about their performance but simultaneously felt relief about playing once again. It was crucial for them to work on confidence building and goal setting

to continue to enhance their reengagement in their sport. Social support and good communication between the athlete and team personnel helped them feel integrated into the team.

Similarly, an additional article (Tracey 2003) categorized their findings into three phases: (a) onset of injury, (b) 1-week post-injury, and (c) 3-weeks post-injury. During the onset of an athlete's injury, the severity and type of injury were less of concern. Affective states during this phase included depressed, down, afraid, confused, frustrated and worried. As time progressed, the prominent affect expressed was frustration along with fear. However, it was not fear of reinjury but rather missing out on practice and fear they would be unable to participate in their sport. After three weeks post-injury, athletes that could return to practice/competition experienced emotions such as confidence, relief, less tension and a sense of being "free." Athletes further observed that their thoughts and cognitive appraisals influenced their emotional states while recovering and how their mood improved upon return to play.

Chapter 4: Discussion

This study attempted to discover how athletes respond to an injury, mainly if they develop depressive symptoms and how those symptoms are experienced. The review examines and presents the literature to address these concerns regarding athlete mental health. How athletes respond to stressors varies and are dependent on multiple psychosocial factors. Athletes are not immune to experiencing mental health disorders. Several physical and psychological influences previously discussed are unique to an athlete population and can place them at increased risk for developing mental health symptoms.

Risk Factors

The American Psychological Association defines a risk factor as “a clearly defined behavior or constitutional (e.g., genetic), psychological, environmental, or other characteristic that is associated with an increased possibility or likelihood that a disease or disorder will subsequently develop in an individual” (American Psychological Association, 2020, para 1). There are multiple factors that increase the likelihood of an athlete experiencing depression. Specifically, reasons such as injuries, involuntary career termination, performance pressures, and overtraining increase the likelihood of an athlete experiencing depression.

Certain variables make athletes more prone to depression following an injury. This study revealed how the severity of an injury and the length of time injured elicited an emotional response in athletes. Injuries can range from minor to severe and can even be season–ending or career–ending. For this reason, injuries make athletes more vulnerable and can provoke symptoms of depression. These injuries can occur suddenly or may be more chronic. The loss of skills, reduced opportunities to further their careers, and inability to engage in their sport may exacerbate their depressive symptoms. Some injuries also require more extended recovery

periods and rehabilitation to regain physical functions and abilities. The rehabilitation process is outside of one's athletic routine, and can be emotionally demanding, particularly if the recovery and return to play timeline is uncertain (Putukian, n.d). Nevertheless, athletes must adjust to the onset of their injuries. The longer an athlete is away from their sport, the more likely they are to have physical and emotional consequences (Putukian, n.d). As they become isolated from their teammates, a source of social support, their quality of life may be reduced (McArdle, 2010).

When one has dedicated a significant portion of their life to their sport, it can be psychologically and physically challenging to step away. The endless hours of training and competing in their respective sports serve purpose and meaning for athletes. It becomes even more complicated when an athlete encounters unforeseen events that impose an involuntary career termination. While most athletes have the autonomy to determine when they retire, others do not, resulting in sudden cognitive, emotional, and behavioral changes (Ivarsson et al., 2017). Lack of autonomy in the decision-making process can make it difficult to adapt to life after sport. Involuntary retirement, mainly due to an injury, can have adverse effects on an athlete's mental health (Ivarsson et al., 2017). When one's physical abilities are abruptly taken away without an adjustment period, changes in self-concept and athletic identity can develop. Transitioning into the unknown after an unanticipated sport termination is a great source of distress as an athlete navigates their post-injury life (Ivarsson et al., 2017).

Athletes face the unique pressures of their performance environment. Stressors may be dependent on competition level, such that collegiate and professional athletes may have differing stressors. However, underlying pressures are also present regardless of the level of competition. For instance, collegiate athletes face the pressures of maintaining their athletic status within their university, including retaining their scholarships (Lopes Dos Santos et al., 2020; Kroshus, 2014)

Collegiate athletes may also be at the beginning of their trajectory to have professional careers, placing greater demands to perform consistently at a competitive level. On the other hand, professional athletes face pressures of job security (e.g., preserving contracts), fan and public perception, sponsorships, and future career opportunities (Arnold & Fletcher, 2012). At times, athletes' worth and value are dependent upon their performance, which can be hindered by an injury (Herring et al., 2017)

Athletes' practice schedules lie outside of traditional life demands. To maintain peak physical status, athletes train regularly, which requires excessive time commitments. However, the training regimen can place athletes at greater risk for unfavorable physical and emotional well-being outcomes (Nederhof et al., 2006). Subsequently, overtraining, or burnout, can be costly to athletes. For example, as the intensity and duration of training increases, so does the risk of an injury. Emotionally, an athlete's inability to perform to expectations consistently can negatively impact their self-esteem and athletic identity (Kroshus, 2014). However, it is important to recognize that each athlete is individual in their reactions to an injury.

Protective Factors

The American Psychological Association defines a protective factor as:

A clearly defined behavior or constitutional (e.g., genetic), psychological, environmental, or other characteristic that is associated with a decreased probability that a particular disease or disorder will develop in an individual, that reduces the severity of an existing pathological condition, or that mitigates the effects of stress generally. (American Psychological Association, 2020, para 1)

Examples of protective factors include supportive social networks and positive coping skills that aid in the reduction of adverse effects of life stressors.

For athletes, support systems can include their families, friends, teammates, coaches, doctors and other team personnel. Social support contributes to psychological health and can lead to greater positive outcomes, particularly after an injury. It can offer a buffering effect for injured athletes, which is critical for both physical and psychological recovery (Herring et al., 2017). Furthermore, coping skills allow athletes to best manage the challenges that come their way following an injury. Because emotional changes tend to occur when handling setbacks, being equipped with strategies to handle the distress promotes resiliency. Having adequate skills helps reduce or eliminate the stress one faces. Specific coping skills that may be beneficial for athletes after an injury will be discussed later in this chapter.

Discussion of Major Findings

Research Question 1

Collegiate athletes, regardless of gender, demonstrated symptoms of depression after a sustained injury. Similar to the general population, female collegiate athletes experience greater rates of depression than males (Appaneal et al., 2009). Being a student-athlete places further demands because athletes must juggle their two identities, being a student and an athlete. When an athlete is injured, they may become isolated from their teammates and feel disconnected, which further impacts their high athletic identity. Subsequently, this can hinder their overall mood and create symptoms of depression.

College athletes' class level impacts their experiences of depression after an injury. Freshman athletes are more likely to experience depression than, for example, seniors (Yang et al., 2007). Freshman athletes' collegiate playing career is ahead of them, therefore, they may fear the impact of an injury affecting their career. When considering the perspective of a senior athlete, they may not have the opportunity to pursue their sport professionally, or otherwise, after

college. Their collegiate careers could abruptly end due to an injury. Nevertheless, seniors may already have the experience and fulfillment of participating in their sport. Furthermore, as graduating students, they are already aware that their college playing career is coming to a near end and may be more prepared to end their careers, even if it occurs by injury. Intensity of pain was a contributing factor to a college athlete's depressed mood (Yang et al., 2007). Those experiencing more significant pain were more likely to report symptoms of depression. An athlete's perception of how their injury occurred also impacted their emotional response to the injury itself. Yet, athletes' severity of depression decreased over time, regardless of gender. Social support from athletic trainers positively influenced the emotional well-being of an athlete and aided in the reduction of depressive symptoms.

Professional athletes who are active in their sport had worsened mental wellness when injured and reported greater rates of depression. More specifically, nearly 50% of athletes are more likely to report depressive symptoms when injured (Losty et al., 2018). The length of time injured also substantially impacted athletes. The longer an athlete was injured, the more negatively influenced their mental well-being. Incidence of past injury, missing practice, and the presence of intensive pain contributed to higher rates of depressive symptoms.

There are multiple factors that contribute to a professional athlete's retirement. However, a sustained injury continues to be a primary reason. Athletes who retired due to an injury appear to experience significant symptoms of depression. Younger athletes, those recently retired and displaying higher athletic identity, exhibited greater depressive symptoms. Similar to collegiate athletes, pain appeared to influence and hinder one's mood. Professional athletes experienced personal adjustments to terminating their careers and navigating the social and emotional challenges they encounter. They may have difficulty transitioning out of their sport if they lack

the autonomy to make their own decision and not have time to plan for their future endeavors. Reflecting on the career commitments of professional athletes, they dedicate their time to practicing endless hours to compete at an elite level. An injury can temporarily or permanently affect an athlete's desires and ambitions, resulting in depressive symptoms.

Research Question 2

This study examined themes in athlete's thoughts, feelings, and behaviors when they could not participate in their sport due to an injury. Athlete's observed a change in their concentration, attention, and indicated having negative thoughts about their future as their life had less meaning without their sport and they feared they would be unable to return. Athletes further experienced negative mood states such as sadness, irritability, guilt, anxiety, and hopelessness as they missed their performance days. As athletes were isolated from their sport, including their teammates and coaches, they had less interest in engaging with others. They further experienced changes in their appetite, sleep, and engaged in risky behavior and substance misuse.

Athletes response to injury can also be viewed from a stages or phases perspective. Following an injury, athletes initially experienced a mixture of emotions including shock, helplessness, frustration, and depression. They can feel of loss of independence when injured. When isolated from their teammates and unable to engage in practices and competition, they began to fear they will be unable to participate in their sport as they once did. Social support became crucial in their rehabilitation process as they felt more integrated, improving overall mood. As an athlete progresses in rehabilitation and they are able to reengage in their sport, their mood may improve.

Implications and Recommendations

Athletes

When an individual experiences an adverse event, normative emotional reactions and distress may emerge.

Athletic trainers, team physicians as well as athletes, coaches and administrators must understand that emotional reactions to injury are normal, but problematic reactions are those that either do not resolve, worsen over time or where the severity of symptoms seem excessive. (Putukian, 2016, p. 2)

There are multiple stressors of training, competing and injuries that may require an athlete to seek mental health services to best manage these difficulties. However, stigma about mental illness, and depression specifically, can prevent athletes from acknowledging their needs and reaching out for help (See Figure 4 Resources for Athletes).

1. Cultivate Social Network and Build Supportive Relationships

Athletes would benefit from developing protective factors, such as social support and coping skills, prior to their injury. It is recommended that athletes build their support networks early on, so they are in place when emotional distress and symptoms of depression arise. Social networks can include people outside of one's sporting community and can include family members, friends, and religious groups. Support can also be sought from various online groups with others having similar experiences and mental health professionals. Utilizing trusted individuals can help to cultivate one's social network. When an athlete's career is disrupted by an injury, it brings about various emotional and physical changes and can also impact their athletic identity. Having trusted and valued individuals in their lives with whom they feel comfortable and understood can help to alleviate the depressive and emotional consequences of

an injury. Continuing to expand and enhance healthy support systems prior to an injury can help athletes to stay connected and better manage the stressors that injuries introduce.

2. Develop Coping Skills

Individuals respond to life stressors and adversity in various ways. Coping mechanisms allow individuals to learn ways to best deal with difficult emotions they face as a result of adverse events. How athletes handle their stressors and injuries can differ from one another, but coping skills can become helpful when encountering an injury and managing symptoms of depression. Developing coping techniques to manage one's emotional distress can be beneficial rather than utilizing skills only when an event has occurred. Although there are various techniques to reduce one's emotional distress, athletes can decide which type of coping skill works best for them in particular circumstances. Coping skills can include the following:

- Imagery
- Self-Talk
- Goal-Setting
- Guided Meditation
- Journaling
- Breathing Exercises

3. Stories of Other Athletes

Several athletes have come forth regarding their mental health struggles and how they have been impacted. Athletes can discover the stories of other athletes that are fighting the stigma associated with mental health challenges. Their stories can help change the culture of mental health, which can further shape elite sport competition.

- Michael Phelps:

I struggled with anxiety and depression and questioned whether or not I wanted to be alive anymore. It was when I hit this low that I decided to reach out and ask for the help of a licensed therapist. This decision ultimately helped save my life. You don't have to wait for things (Phelps, 2019).

- Rhonda Rousey:

It's not a weakness we should condemn. I've never shied away from talking about suicide or anything like that. It's really heavily affected [my] family, and anything that I could do to make sure it affects as few people as possible; I'd be happy to do that. I do not see why it's looked at as a bad thing (Spies-Gans, 2018, para 12).

- Demar DeRozan:

It's one them things that no matter how indestructible we look like we are, we're all human at the end of the day. We all got feelings.. all of that. Sometimes... it gets the best of you, where times everything in the whole world's on top of you" (Smith, 2018, para 4).

- Kevin Love:

Everyone is going through something that we can't see. The thing is, because we can't see it, we don't know who's going through what and we don't know when and we don't always know why. Mental health is an invisible thing, but it touches all of us at some point or another. It's part of life (Players' Tribune, 2018, para 31).

- Tyson Furry:

I have been so dark that everything was pitch black," he says, with the kind of searing honesty that demands an audience. Before, every single day for me was a grey day. And some people might not know what I am talking about when I say that, but every day shouldn't be a grey day. Because life is a blessing. And now I know that every day is a rose-coloured, sunshine day. Which I appreciate. I appreciate every second, every hour, every day, because life is so very short (Brown, 2018, para 37).

- Naomi Osaka:

More importantly I would never trivialize mental health or use the term lightly. The trust is that I have suffered long bouts of depression since the US Open in 2018 and I have had a really hard time coping with that (Osaka, 2021).

4. Mental Health Resources

The emotional challenges experienced can be more uncomfortable to discuss than a physical injury and athletes may not know what professional to talk to. It is important for athletes to know the available local mental health resources and how to access them. Having opportunities to ask clarifying questions to mental health professionals can help to reduce concerns they may have and build a bridge to get connected with resources. Athletes can further benefit from seeking mental health referrals from trusted individuals (e.g., friends, family, other athletes, training staff, physicians, etc.).

Figure 4

Resources for Athletes

<u>Cultivate Social Network and Build Supportive Relationships</u>
<p>With a Little Help From My Friends: Using Your Social Support Network When Dealing With Injury https://appliedsportpsych.org/resources/injury-rehabilitation/with-a-little-help-from-my-friends/</p>
<u>Coping Skills</u>
<p>Imagery https://appliedsportpsych.org/resources/injury-rehabilitation/using-the-mind-to-heal-the-body-imagery-for-injury-rehabilitation/ https://www.psychologytoday.com/us/blog/the-power-prime/201211/sport-imagery-athletes-most-powerful-mental-tool</p>
<p>Self-Talk https://www.coachestoolbox.net/mental-toughness/positive-self-talk-for-your-athletes https://www.youtube.com/watch?v=Qjy9MmvJNMg</p>
<p>Goal Setting https://metrifit.com/blog/the-importance-of-goal-setting-for-athletes/</p>
<p>Meditation https://www.headspace.com</p>

<https://www.therapistaid.com/worksheets/how-to-practice-mindfulness-meditation.pdf>

Journaling

<https://www.therapistaid.com/worksheets/gratitude-journal.pdf>

Relaxation Techniques

<https://www.helpguide.org/articles/stress/relaxation-techniques-for-stress-relief.htm>

Athlete Stories

Tyson Furry

<https://open.spotify.com/episode/6hChfQF2Sj5aSkyr9peT7R>

Olympian Sara True

<https://www.teamusa.org/USA-Triathlon/News/Articles-and-Releases/2018/November/02/Olympian-Sarah-True-Breaks-The-Stigma-To-Talk-About-Mental-Health>

USC Volleyball player Victoria Garrick

<https://www.youtube.com/watch?v=Sdk7pLpbIls>

NBA Player Kevin Love

<https://www.theplayerstribune.com/articles/kevin-love-everyone-is-going-through-something>

22 Male Athletes Speaking Out About Depression

<https://headsupguys.org/22-male-athletes-speaking-depression/>

Other Mental Health Awareness Stories

<https://www.theplayerstribune.com/collections/mental-health-awareness>

Mental Health Resources

American Psychological Association

<https://www.apa.org/helpcenter>

Mental Health Professional Locator

https://locator.apa.org/?_ga=2.164581567.1210097362.1622935203-727123727.1620330242

Mental Health First Aid

<https://www.mentalhealthfirstaid.org>

Athletes Against Anxiety and Depression*

<https://www.aaadf.org>

Student Athlete

<http://www.supportforsport.org/index-mental-health.html>

Professional Athletes

<https://athletesforcare.org/page/AthleteHome>

<https://olympics.com/athlete365/mentally-fit/>

<https://www.nami.org/Support-Education/Video-Resource-Library/Tackling-Mental-Health-Stigma>

Coaches and Team Personnel

1. Coaches and Team Personnel Recognizing Challenges of Disclosure

The perception that athletes should be mentally tough and not show signs of weakness are still dominant in sport environments (Gulliver et al., 2012). This may guide many athletes to deny or hide suffering from mental health issues because of the possible consequences on their careers (Lebrun et al, 2018). Coaches, athletic trainers, and other team personnel need to recognize the challenges for athletes to reveal the symptoms of depression they are facing. Coaches/team personnel play a crucial role and can reduce mental health stigma, and create an atmosphere in which athletes feel comfortable seeking help when needed. As coaches recognize the demands that athletes are under, including the heavy training and effort to better their performance, they can better identify the depressive concerns that emerge during stressful times, such as when an injury is sustained. Educating coaches on the effects of attitudes and behaviors that equate an injury with worthlessness is also imperative (Herring et al., 2016).

2. Coaches and Team Personnel Creating a Safe Culture

Coaches can promote a culture in which they prioritize the mental health, in addition to physical well-being, of athletes. Because athletes may not always be forthcoming about their

emotional experiences due to, for example, fear of losing playing time, appearing weak, or privacy concerns, coaches can initiate and/or normalize conversations with their athletes. By encouraging the sharing of emotional difficulties related to depression and challenges athletes may be experiencing in their personal lives or athletic careers, these conversations can become part of the regular dynamic of an athletic environment. Therefore, realizing the role that coaches and team personnel can play in helping to reduce mental health stigma can help influence the climate created.

3. Education on Depression

Team personnel can benefit from educational programs, introducing preventative strategies, and creating intervention methods. Coaches can benefit from training that allows them to better recognize the emotional and behavioral changes that arise in athletes, particularly when injured. Knowing the warning signs and observing even the subtle cues can help them to address such concerns. However, it is essential to highlight that it is about both increasing coaches' knowledge of athlete mental health experiences and developing inclusive attitudes regarding mental health. Having adequate knowledge can help coaches increase their awareness of athlete psychological distress. Still, they also ought to promote an atmosphere where addressing these signs aren't a weakness but rather valued. Emphasis on continuing education for coaches regarding mental health symptoms of athletes will ensure early recognition and making of referrals.

Coaches may sometimes feel the dilemma between the demands they are placing on the athletes while also understanding the stressful times that the athlete can experience when an injury is sustained. Therefore, coaches can advocate for early intervention programs. Dedicating efforts to screening procedures can help raise awareness and identify athletes who may be at risk

for experiencing depression when dealing with an injury. Although some team personnel notice the psychological aftermath of an injured athlete and are willing to help injured athletes cope appropriately with the effects of an injury, they may not feel qualified to adequately respond (Yang, et al., 2014). Coaches are further responsible for identifying when athletes are experiencing emotional and behavioral changes that require further attention. They would benefit from an established plan to better determine athletes with psychological distress and facilitate an appropriate referral system. Team personnel can establish relationships and collaborate with mental health professionals for further evaluation and psychological support (e.g., stress management, psychotherapy; Herring et al., 2016). Shifting the culture from mental health as secondary to physical health can normalize pursuing support and increase help-seeking when issues inevitably arise (See Figure 5 Resources of Coaches and Team Personnel)

Figure 5

Resources for Coaches and Team Personnel

Stress in Sport–Is enough Being Done to Help Athletes?

https://www.sportspromedia.com/opinion/stress_in_sport_is_enough_being_done_to_help_athletes

What is Depression?

<https://www.therapistaid.com/worksheets/depression-info-sheet.pdf>

American Medical Society for Sports Medicine

<https://www.amssm.org>

Mental Health Best Practices: Understanding and Supporting Student–Athlete Mental Wellness*

https://ncaaorg.s3.amazonaws.com/ssi/mental/SSI_MentalHealthBestPractices.pdf

Helping Support Student–Athlete Mental Health*

<https://www.ncaa.org/sites/default/files/Mental%20Health%20Information%20stakeholder%20primer.pdf>

Managing Student–Athletes Mental Health Issues*

<https://sportsconflict.org/wp-content/uploads/2014/05/NCAA-Managing-Student-Athletes-Mental-Health-Issues.pdf>

Mind, Body, and Sport: Understanding and Supporting Student Athlete Mental Wellness*

<http://www.ncaapublications.com/productdownloads/MindBodySport.pdf>

National Athletic Trainer's Association*

<https://www.nata.org/practice-patient-care/health-issues/mental-health>

Note: Gathered from Mental Health in Athletes: 45 Resources to Help you Cope. Coaches and Trainers. <https://www.onlinemswprograms.com/resources/mental-health-resources-for-athletes/#coaches>

Mental Health Professionals

1. Understand Athletic Culture

Mental health professionals can benefit from gaining an understanding of athletic culture and the stigmas that exist within this culture. Similar to the general population, stigma can deter athletes from seeking professional help. The stigma that athletes may be viewed as weak and speaking up without having negative consequences can further create a barrier for athletes (Stankovich, 2020). The athletic community can further deem one as vulnerable which is not how an athlete wants to present themselves in the competitive world of sports (Dorantes, 2020).

Michael Phelps said:

For the longest time, I thought asking for help was a sign of weakness because that's kind of what society teaches us. That's especially true from an athlete's perspective. If we ask for help, then we're not this big macho athlete that people can look up to. Well, you know what? If someone wants to call me weak for asking for help, that's their problem.

Because I'm saving my own life. (Gleeson & Brady, 2017, para 13)

Overall, normalizing mental health treatment, providing psychoeducation regarding the benefits of psychological support, and establishing connections between therapy and improved performance can allow athletes to more readily seek help.

2. Impact of Injury on Athletes

Stress influences an athlete's ability to rehabilitate from an injury and return to their sport (Wiese-Bjornstal, 2010). One form of stress can be the influence of an injury on an athlete's identity. Understanding the influential role of athletic identity can also assist mental health professionals in assessing symptomology and individualizing interventions appropriately. Noting the complexity of identity and what occurs when one's identity is negatively affected by an injury is crucial in best working with athletes. This can deepen the professional's understanding of what it means to be injured for an athlete. Athletes also find one part of their identity in their routine which includes training, practice, diet, nutrition and competition in their sport (Cross & Fouke, 2019). Mental health professionals can also help athletes consider their athletic ability as only one component of multiple dynamic dimensions of their identity (Cross & Fouke, 2019).

3. Screening Measures

There is a wide range of measures and screening tools that are critical in detecting the presence of depression. It is crucial to note that screening tools merely identify specific symptoms and areas of distress and do not suffice to reach a diagnosis. Diagnosing an individual with a depression requires a comprehensive clinical evaluation that involves assessing various factors. Screening measures further guide professionals with treatment and intervention planning that is unique to the individual. Administering brief screeners within the athletic environment can allow for integrative care of athletes. Establishing early screenings can enable athletes to establish relationships and care with mental health professionals. Early recognition and

management of depression in athletes also leads to better clinical and performance outcomes (Wolanin et al., 2015). Currently, the literature demonstrates inconsistencies in optimally assessing athlete depression. Future research can focus on the control of the measurement of athlete depression while utilizing screeners that are reliable, valid, and sensitive to accurately identifying the problem. Several different screeners were used in the studies referenced in this systematic review, which could directly affect the results.

4. Differential Diagnosis

A mental health professional considers differential diagnoses when working towards better understanding the individual they are working with. It is critical to remember that athletes have unique risk factors for depression compared with non-athletes (Wolanin et al., 2015). As previously discussed, there are specific criteria required to fulfill a diagnosis of major depressive disorder. However, because there is inconsistency in terminology and/or screening measures in the literature, a differential diagnosis can be considered. MDD can be differentiated from adjustment disorder with depressed mood. According to the *DSM5* (American Psychiatric Association, 2013), the latter is characterized as emotional and behavioral symptoms within three months of an identifiable stressor that includes distress that is out of proportion to the stressor and causes significant impairment in psychosocial functioning. It can further include low mood, tearfulness, or feelings of hopelessness. Therefore, an adjustment disorder with depressed mood is characterized by depressive symptoms in response to a stressor and does not meet the full criteria for a major depressive episode.

5. Evidence-Based Practice and Interventions for Consideration

Athletes have various emotional responses to an injury, including symptoms of depression. Normalizing the importance of mental health care can allow athletes in

acknowledging their need for help and engaging in services. Microcounseling skills provided by mental health professionals such as attending, active listening, empathy, and reflection are empirically supported factors in the therapeutic process (Rock & Jones, 2002). These skills enhance improve athletes psychological well-being during the rehabilitation process (Rock & Jones, 2002). Interventions for athletes to target their psychological distress can focus on promoting feelings of autonomy, connectedness, and competence during the rehabilitation process (Podlog & Dionigi, 2010). Building upon protective factors previously discussed is essential for athletes to cope appropriately with their stressors as their emotions may fluctuate with the changes brought upon by an injury.

Techniques and therapies such as Acceptance Commitment Therapy (ACT) and expressive writing have been found helpful in moderating athletes' post-injury psychological distress (Mahoney & Hanrahan, 2011). More specifically, ACT is an evidence-based practice that is effective in both clinical and sport settings (Mahoney & Hanrahan, 2011; Gardner & Moore, 2004). ACT has six core processes to foster psychological flexibility (Hayes et al., 2012). These processes include acceptance, cognitive defusion, being present, values, self as context and committed action. Initial efforts have been made with the development of the protocol *Return to ACTion* for use with injured student-athletes. “*Return to ACTion* is intended to foster mindfulness and acceptance to increase behavioral engagement in the direction of what is important at that point in one’s sport-related endeavors” (Shortway et al., 2018, p. 9). This protocol was made while being aware of the barriers student-athletes face when seeking psychological services such as stigma, lack of support, and schedule demands (Shortway et al., 2018).

Expressive writing is also effective in disclosing one's emotions that contribute to improving the psychological rehabilitation of injured athletes (Greenberg et al., 1996). Writing allows athletes to construct their narratives while having a sense of increased control over their emotions (Greenberg et al., 1996). Another technique is imagery, or visualizing an experience without engaging in it, which helps teach athletes to connect with their bodies and imagine the healing taking place. Imagery has been shown to improve injured athletes' overall mood (Johnson, 2000; (See Figure 6 Resources for Mental Health Professionals).

Figure 6

Resources for Mental Health Professionals

Association for Applied Sport Psychology

<https://appliedsportpsych.org>

American Psychological Association Division 47: Society for Sport, Exercise & Performance

<https://www.apadivisions.org/division-47>

Acceptance Commitment Therapy (ACT)

Harris, R. (2019). *ACT made simple: An easy-to-read primer on acceptance and commitment therapy* (2nd ed.). New Harbinger Publications.

Protocol

Shortway, K. M., Wolanin, A., Block-Lerner, J., & Marks, D. (2018). Acceptance and commitment therapy for injured athletes: Development and preliminary feasibility of the return to ACTion protocol. *Journal of Clinical Sport Psychology*, 12(1), 4–26. <https://doi.org/10.1123/jcsp.2017-0033>

Strengths and Limitations

This review attempted to clarify the literature's understanding of depression in response to injuries and therefore addresses a gap in a growing body of literature. This review further hoped to advance audience knowledge regarding athletes' experiences of mental health and how injuries can negatively impact athletes' well-being. These findings will inform coaching personnel and improve their understanding of athlete mental health, particularly depression.

Reducing stigma and bias associated with mental health will enhance screening practice and improve athlete help-seeking behaviors. Results will further have implications for clinical interventions, including prevention techniques and treatment methods.

The systematic search used, 19 full texts were identified for the review. Twelve of the 19 articles were published since 2010 and the remaining seven in the decade prior, demonstrating interest in athlete's mental well-being, particularly in response to injuries. Additionally, the search strategy included multiple databases and sources, allowing ample literature to be reviewed across a diversity of study designs.

However, this review also has several limitations. First, a mixed-method approach allows the researcher to appreciate the complex nature of what is being investigated. Although qualitative studies present valuable information, they lack statistical representation and can be subjective. Scientific communities value research that is replicable in order to present results as factual. Therefore, unique perspectives, skills, and biases of researchers may impact results. Second, the included studies did not all sufficiently address the objectives of the review. Although a quality appraisal form was utilized to evaluate the characteristics of each study, those that did not obtain an overall high score were included if they directly addressed the research question. Third, the search terms aimed to capture the general understanding of the term depression in the context of mental health. Given that not all articles included defined or used the same terms, literature examining athletes' responses to injuries may have been overlooked. Yet, the review yielded several themes supported by various research. Fourth, although there are clinical and medical conceptualizations of depression, it is a complex mental health disorder in which various factors play a contributing role. An athlete can present with clinical levels and symptoms of depression, but cannot be diagnosed with depression without further assessment by

a mental health professional. Fifth, given that the systematic review included samples of athletes with a range of playing abilities, engaged in different sports, from various parts of the world, experiences of depression cannot be generalized. Sixth, this dissertation demonstrates the need for conceptualizing injuries. The complexity of an injury is not well defined concerning athletes and requires more discussion. The lack of standardized definition contributes to the challenges of better observing injuries to understand its true impacts. Particularly when exploring diverse injuries that differ in severity and length of time injured. Seventh, while this study intended to demonstrate the influences of an injury on athlete's mood, there is potential for a bidirectional impact. Specifically, the examined variables can mutually influence each other. For instance, an athlete who is injured can develop depressed mood, which can further impact their recovery. However, if an athlete is at greater risk for depression, perhaps they may be more likely to become injured.

Conclusion

The purpose of this systematic review was to highlight the emotional experiences of athletes after sustaining an injury. Despite efforts to reduce mental health stigma within an athlete population, there continues to be a barrier. Future research should seek to address issues with defining an injury. Greater clarity is required in research to conceptualize an injury and its limitations brought upon athletes. The literature could also benefit from utilizing consistent terminology related to depression. In synthesizing the existing literature, this review may allow coaches and sport team personnel to be more sensitive to the mental health needs of athletes. This dissertation will continue the conversation of athlete well-being in hopes of generating standardized mental health screening measures for athletes.

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APPENDIX A

Summary of Studies

Author(s)	Title	Study Type & Size	Level & Type of Sport	Country	Injury Types
Herring et al. (2017)	Psychological Issues Related to Illness and Injury in Athletes and the Team Physician: A Consensus Statement—2016 Update	N/A	N/A	U.S.A	N/A
Putukian (2016)	The Psychological Response to Injury in Student Athletes: A Narrative Review with a Focus on Mental Health	Narrative Review	Elite & Unknown	U.S.A	N/A
San-Antolín et al. (2020)	Depression Levels and Symptoms in Athletes with Chronic Gastrocnemius Myofascial Pain: A Case–Control Study	Quantitative (N = 50)	Unknown Level & Various Sports	Spain	Chronic gastrocnemius myofascial pain
Losty et al. (2018)	Mental Health and Wellbeing of Jockeys	Quantitative (N = 116)	Various & Various	Ireland	Not Specified
Yang et al. (2007)	Prevalence of and Risk Factors Associated With Symptoms of Depression in Competitive Collegiate Student Athletes	Quantitative (N = 257)	College & Various	U.S.A	Not Specified
Adam et al. (2004)	Psychological Factors Associated With Performance–Limiting Injuries in Professional Ballet Dancers	Mixed Methods (N = 54)	Elite & Dance/Ballet	Germany	Not Specified
McArdle (2010)	Psychological Rehabilitation From Anterior Cruciate Ligament–Medial Collateral Ligament Reconstructive Surgery: A Case Study	Qualitative (N = 1)	College & Unknown	Ireland	MCL–ACL tear
Tracey (2003)	The Emotional Response to the Injury and Rehabilitation Process	Qualitative (N = 10)	College & & Various	U.S.A	severe contusion of the foot, torn ACL, sprained ankles, torn meniscus, separated shoulder, strained back, fractured fifth metatarsal, stress fracture to the fifth metatarsal
Wolanin et al. (2015)	Depression in Athletes: Prevalence and Risk Factors	N/A	Various & Various	U.S.A	Not Specified

Author(s)	Title	Study Type & Size	Level & Type of Sport	Country	Injury Types
Gouttebarga et al. (2016)	Prevalence and Determinants of Symptoms Related to Mental Disorders in Retired Male Professional Footballers	Quantitative (N = 219)	Various & Soccer	Netherlands	Not Specified
Mainwaring et al. (2010)	Emotional Response to Sport Concussion compared to ACL Injury	Quantitative (N = 51)	College & Various	Canada	Concussion and ACL
Appaneal et al. (2009)	Measuring Postinjury Depression Among Male and Female Competitive Athletes	Mixed (N = 164)	College & Various	U.S.A	Joints, muscle, bone, head, neck, and/or lower back, knee, MCL & ACL tears
Carson & Polman (2008)	ACL Injury Rehabilitation: A Psychological Case Study of a Professional Rugby Union Player	Mixed (N = 1)	Professional & Rugby	U.K.	ACL
Sanders & Stevinson (2017)	Associations Between Retirement Reasons, Chronic Pain, Athletic Identity, and Depressive Symptoms Among Former Professional Footballers	Quantitative (N = 307)	Professional & Soccer	U.K.	Knee, Leg, Groin, Hip, Back, Ankle, Other
Kaul (2017)	Involuntary Retirement due to Injury in Elite Athletes from Competitive Sport: A Qualitative Approach	Qualitative (N = 8)	Elite & Various	India	PCL, ACL, tendonitis, disc prolapse, wrist injury, a grade three ligament tear, hamstring tear, tennis elbow
Lebrun et al. (2018)	Learning From Elite Athletes' Experience of Depression	Qualitative (N = 4)	Elite & Unknown	U.K.	N/A
Yang et al. (2014)	Social Support From the Athletic Trainer and Symptoms of Depression and Anxiety at Return to Play	Quantitative (N = 594)	College & Various	U.S.A	Knee, Head/Neck, Ankle, Shoulder, Pelvis, hips, groin, Leg, Foot/toe, Back, Elbow/arm, Face, Wrist/hand/thumb/finger, Other
Gulliver et al. (2015)	The Mental Health of Australian Elite Athletes (2014)	Quantitative (N = 224)	Elite & N/A	Australia	N/A
Abbott et al. (2019)	A Season Long Investigation Into the Effects of Injury, Match Selection and Training Load on Mental Wellbeing in Professional Under 23 Soccer Players: A Team Case Study	Quantitative (N = 25)	Professional & Soccer	U.K.	N/A

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Depression levels and symptoms in athletes with chronic gastrocnemius myofascial pain:

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doi:10.1249/JSR.0000000000000123

Yang, J., Peek–Asa, C., Corlette, J. D., Cheng, G., Foster, D. T., & Albright, J. (2007).

Prevalence of and risk factors associated with symptoms of depression in competitive collegiate student athletes. *Clinical Journal of Sport Medicine*, 17(6), 481–487.

Yang, J., Schaefer, J. T., Zhang, N., Covassin, T., Ding, K., & Heiden, E. (2014). Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *Journal of Athletic Training*, 49(6), 773–779.

doi:10.4085/1062–6050–49.3.65

APPENDIX B

IRB Documentation

September 11, 2020

Protocol #: **91120**

Project Title: A Systematic Review of Athlete Mental Health and the Impact of Injury on Well-Being.

Dear Nergis:

Thank you for submitting a “GPS IRB Non-Human Subjects Notification Form” for *A Systematic Review of Athlete Mental Health and the Impact of Injury on Well-Being* project to Pepperdine University’s Institutional Review Board (IRB) for review. The IRB has reviewed your submitted form and all ancillary materials. Upon review, the IRB has determined that the above titled project meets the requirements for *non-human subject research* under the federal regulations 45 CFR 46.101 that govern the protection of human subjects.

Your research must be conducted according to the form that was submitted to the IRB. If changes to the approved project occur, you will be required to submit *either* a new “GPS IRB Non-Human Subjects Notification Form” or an IRB application via the eProtocol system (<http://irb.pepperdine.edu>) to the Institutional Review Board.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at <https://community.pepperdine.edu/irb/policies/>.

Please refer to the protocol number denoted above in all further communication or correspondence related to this approval.

On behalf of the IRB, we wish you success in this scholarly pursuit.

Sincerely,

Institutional Review Board (IRB)
Pepperdine University

cc: Mrs. Katy Carr, Assistant Provost for Research
Dr. Judy Ho, Graduate School of Education and Psychology IRB Chair

APPENDIX C

Search Documentation Record

List of Search Terms

<u>Search Term ID#</u>	<u>Primary Term</u>	<u>Synonyms-Alternate Forms</u>	<u>Notes</u>
01	Mental health	Mental Health, Mental Illness, Mental Disorder, Psychiatric Health, Psychiatric Illness, Psychiatric Disorder, Well-Being	
02	Depression	Mood Disorder, Depressive Disorder, Depressive Symptoms, Major Depressive Disorder, Clinical Depression, Depressive Mood	
03	Sources of Stress	Stress, stressful, athlete stressors, athlete stress	
04	Social Support	social aid, social assistance, assistance	
05	Athlete	College athlete, elite athlete, professional athlete, athletics	NO "physical activity" of "fitness"
06	Injury		

Final Search Documentation Record

<u>Final Search Date</u>	<u>Search Type</u>	<u>Database-Source</u>	<u>Search Terms</u>	<u>Fields to Search</u>
06/21/20	Electronic Database	PsycArticles APA PsychInfo SPORTDiscus	(athlete* OR athletic OR sport OR sports) AND (injury OR injuries OR sport* injury OR accident OR trauma OR pain) AND (depression OR depressed OR depressive disorder OR depressive symptoms OR major depressive disorder OR major depression) NOT concus*	Title, Keywords, Abstract

Sample Search Records

<u>SEARCH SYNTAX OR OTHER GUIDELINES FOR THE SEARCH</u>	<u>FIELDS SEARCHED</u>	<u># of Records</u>
Mental Health OR Mental Illness OR Mental Disorder OR Psychiatric Health OR Psychiatric Illness OR Psychiatric Disorder OR Well-Being	Title, Keywords, Abstract	778.093
Mental Health OR Mental Illness OR Mental Disorder OR Psychiatric Health OR Psychiatric Illness OR Psychiatric Disorder OR Well-Being	Title, Keywords, Abstract	32.427
Mood Disorder OR Depressive Disorder OR Depressive Symptoms OR Major Depressive Disorder OR Clinical Depression OR Depressive Mood	Title, Keywords, Abstract	200.321
Athlete* AND Injury * AND Depression	Title, Keywords, Abstract	372
(College athlete OR elite athlete OR professional athlete OR athlete) AND (Injury)	Author, References	24.308
(College athlete OR elite athlete OR professional athlete OR athlete) AND (Injury) AND (Mood Disorder OR Depressive Disorder OR Depressive Symptoms OR Major Depressive Disorder OR Clinical Depression OR Depressive Mood)	Article Titles	313

APPENDIX D

Screening and Selection Record

Phase I

<u>Author</u>	<u>YEAR</u>	<u>ABBREVIATED TITLE</u>	<u>DATABASES/ SOURCES</u>	<u>TITLE AND/OR KEYWORD SCREEN: DECISION – DATE</u>	<u>ABSTRACT SCREEN: DECISION – DATE</u>

Phase II

<u>FULL- TEXT SCREEN?</u>	<u>INCL (SO): <i>Published Study</i></u>	<u>INCL (SO): <i>SOURCE 2</i></u>	<u>INCL(RV): <i>Athlete Depression</i></u>	<u>INCL (RV): Risk Factors for Depression</u>	<u>INCL (RV): Injuries</u>	<u>INCL(PAR): Age</u>

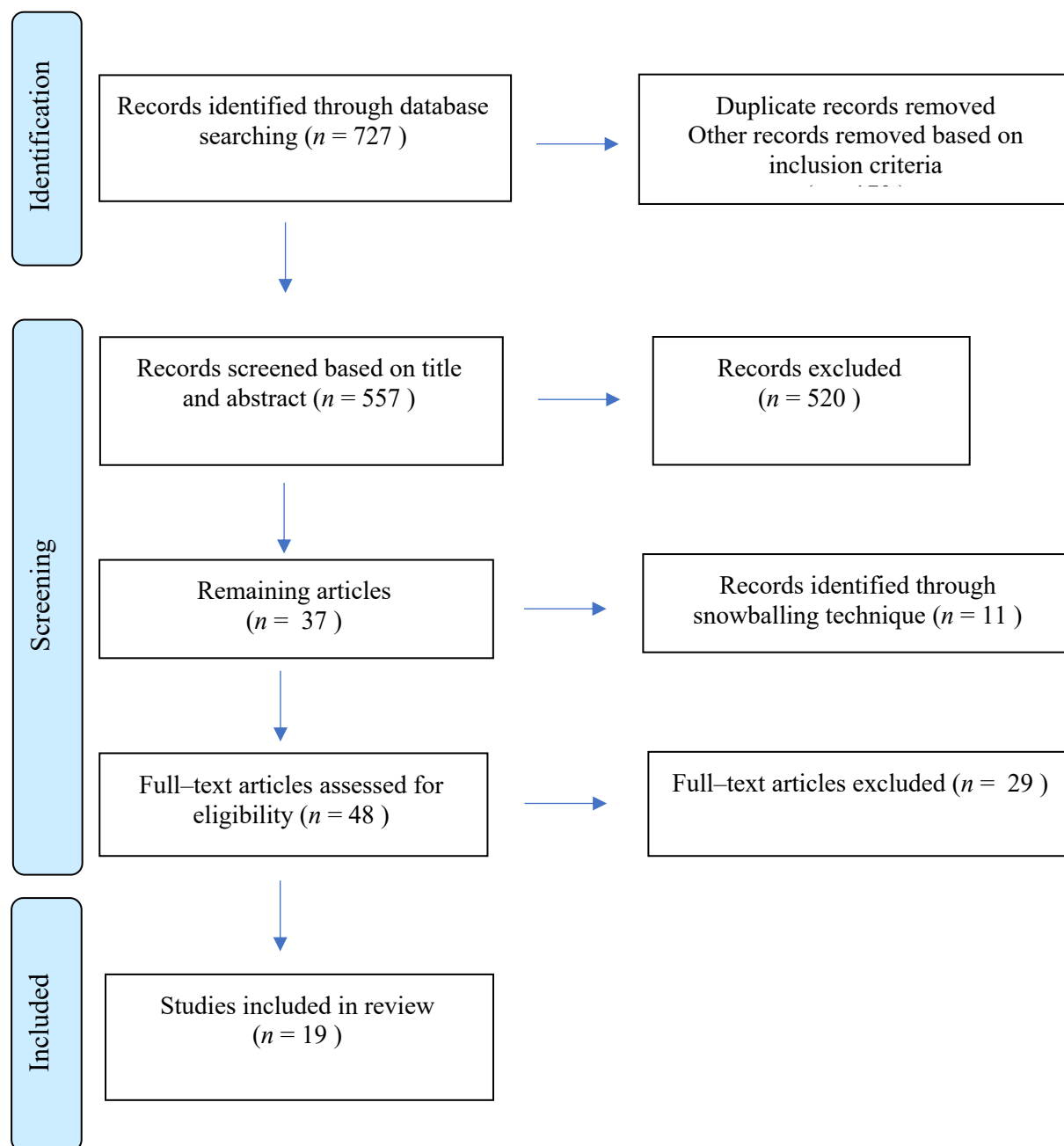
<u>INCL(PAR): Gender</u>	<u>INCL(PAR): Sport</u>	<u>INCL (M): <i>Quantitative</i></u>	<u>INCL (M): Qualitative</u>	<u>EXCL: None Currently Identified</u>	<u>REVIEWER DECISION – DATE</u>

Phase III

<u>SECONDARY/ CONFIRMATORY DECISION (chair)</u>	<u>FINAL DECISION</u>	<u>FINAL DECISION DATE</u>	<u>DECISION NOTES</u>

APPENDIX E

PRISMA Flow Diagram



APPENDIX F

Data Collection and Extraction Form

<u>Reviewer</u>	<u>ID</u>	<u>Author</u>	<u>Full Document Title</u>	<u>Year</u>	<u>Research Variables</u>	<u>FINAL DECISION DATE</u>	<u>DATA EXTRACTION DATE</u>

<u>GENERAL: Source</u>	<u>GENERAL: Source Title</u>	<u>GENERAL: Type of Study</u>	<u>STUDY CHARACTERISTICS: Design/Approach</u>
1=Peer-Review Journal 2=Other Journal 3=Book or Chapter 4=Report, White Paper, etc. 5=Conference Presentation 6=Dissertation 7=Other	Name of Journal, Book, Organization, Conference, etc.	1=Quantitative 2=Qualitative 3=Mixed Methods	*Coding categories based on type of study (e.g., 1=RCT, 2=Case Control, 3=Cross-Sectional, etc.) *Specify design used using quote of how author describes it

<u>STUDY CHARACTERISTICS: Sample Size</u>	<u>SETTING CHARACTERISTICS: Study Location (geographic)</u>	<u>SETTING CHARACTERISTICS: Data Collection Setting</u>	<u>PARTICIPANT CHARACTERISTICS: CS: Gender</u>
			N and % Male, N and % Female Other

<u>PARTICIPANT CHARACTERISTICS: Age</u>	<u>PARTICIPANT CHARACTERISTIC S: Race/Ethnicity</u>	<u>PARTICIPANT CHARACTERISTIC S: Level of Sport</u>	<u>PARTICIPANT CHARACTERISTIC S: Status</u>
Mean (SD) and Age Range	1=African Am/Black 2=Asian 3=Latinx 4=Native/Indigenous 5=White/European Am 6=Other (specify)	1=Professional/Elite 2= College 3=Other	1=Active 2=Retired

<u>PARTICIPANT CHARACTERISTICS:</u> <u>Sport</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Team/Individual</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Injury</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Depression</u>
1=Football 2=Basketball 3=Soccer 4=Ice Hockey 5=Handball 6=Other (specify) 7=Unknown	1=Team 2=Individual 3=Both		1=Active 2=Retired

<u>PARTICIPANT CHARACTERISTICS:</u> <u>Age</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Race/Ethnicity</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Level of Sport</u>	<u>PARTICIPANT CHARACTERISTIC</u> <u>S:</u> <u>Status</u>
Mean (SD) and Age Range	1=African Am/Black 2=Asian 3=Latinx 4=Native/Indigenous 5=White/European Am 6=Other (specify)	1=Professional/Elite 2= College 3=Other	1=Active 2=Retired

<u>ASSESSMENT OF RESEARCH VARIABLES:</u>	<u>ASSESSMENT OF RESEARCH VARIABLES:</u> <u>Athlete Depression</u>	<u>ANALYSES CONDUCTED</u>	<u>RESULTS</u>	<u>CONCLUSIONS AND FOLLOW-UP:</u> <u>Key Conclusions</u>
How Assessed (Measure, Observation, Interview Question, Archival, etc.) Reliability/Validity/Utility	How Assessed (Measure, Observation, Interview Question, Archival, etc.) Reliability/Validity/Utility	1=Descriptive Statistics 2=Inferential Statistics 3=Qualitative Analyses 4=Other		

<u>CONCLUSION S AND FOLLOW-UP:</u> General Takeaways	<u>CONCLUSION S AND FOLLOW-UP:</u> Study Limitations	<u>CONCLUSION S AND FOLLOW-UP:</u> Directly Address RQ #1?	<u>CONCLUSION S AND FOLLOW-UP:</u> Directly Address RQ #2?	<u>CONCLUSION S AND FOLLOW-UP:</u> References to other studies	<u>Notes</u>

APPENDIX G

Quality Appraisal

INDIVIDUAL STUDY QUALITY ASSESSMENT

Author(s) and Year: _____ **Study**
ID# _____

- 1. Methodology:** Quantitative Qualitative Mixed Methods
2. Specific Design/Inquiry
Approach: _____

RATING SCALE: Strong=3 Good/Adequate=2 Weak=1 Missing=0 N/A

- 3. Strength of Literature Foundation and Rationale for Study:** _____
 (POSSIBLE CONSIDERATIONS: current and relevant references, background literature sufficiently comprehensive, Need/Rationale for study clearly stated, etc.)
- 4. Clarity and specificity of Research Aims/Objectives/Questions:** _____
- 5. Quality of research design or methodological approach:** _____
 (POSSIBLE CONSIDERATIONS: provides rationale for design chosen, appropriateness for research questions, clear description of design and methodological approach, strength of design characteristics utilized (e.g., randomization, blinding, triangulation, etc.), potential confounds identified and addressed in some way, consideration of internal and external validity in design, specific design-based “risk of bias” criteria)
- 6. Sample Selection and Characteristics:** _____
 (POSSIBLE CONSIDERATIONS: adequacy of sample size in context of design, detailed description of sample characteristics, representativeness of sample, adequacy of sample characteristics in the context of research aims, detailed description of recruitment and selection of participants, extent of selection or sample bias,)
- 7. Measures / Data Collection Tools:** _____
 (POSSIBLE CONSIDERATIONS: rationale for selection, appropriateness for assessing variables, development of new tool clearly described, psychometric properties (reliability, validity, utility) described, adequacy of psychometric properties, sufficiently comprehensive, etc.)
- 8. Data Collection:** _____
 (POSSIBLE CONSIDERATIONS: data collection procedures clearly described, intervention strategies and implementation described in detail, quality of data collected, attrition, etc.)

9. Analysis of Data: _____

(POSSIBLE CONSIDERATIONS: appropriateness of analysis for research questions and type of data, power and effect size presented, results presented clearly and comprehensively, etc.)

10. Discussion of Study Limitations: _____

(POSSIBLE CONSIDERATIONS: identifies and discusses limitations in the context of design/strategy utilized (e.g., various forms of bias, internal validity, external validity (generalizability), ecological validity, transferability, credibility, transparency, etc.), comprehensiveness of limitations identified)

11. Consideration of culture and diversity: _____

(POSSIBLE CONSIDERATIONS: attention to diversity within sample, includes culturally appropriate methods and tools, avoids biased language, uses appropriate terminology, etc.)

12. OVERALL RATING:	EXEMPLARY	STRONG
GOOD/ADEQUATE	WEAK	
	(all “3”s)	(mostly “3”s)
(mostly “1”s)		(mostly “2”s)

APPENDIX H

Evidence Table

Authors	Year	Nation	Focus of Study	Research Methodology and Design	Sample Characteristics (size, gender, ethnicity, etc.)	Depression

Assessment Measures for Depression	Type of Injury	Type of Sport	Level of Play	Results / Main Findings