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USE OF SOCIAL SUPPORT TO DECREASE DEPRESSION AND ANXIETY SYMPTOMS
IN COLLEGIATE ATHLETES WITH TIME-LOSS INJURIES

A MASTER'S CAPSTONE PROJECT
SUBMITTED TO THE GRADUATE FACULTY
OF THE GRADUATE SCHOOL
BETHEL UNIVERSITY

BY

JESSIE JUENEMANN AND KAYLEE HERMANSEN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE IN ATHLETIC TRAINING

MAY 2022

BETHEL UNIVERSITY

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IN COLLEGIATE ATHLETES WITH TIME-LOSS INJURIES

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MAY 2022

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Abstract for Critical Review of Literature

Background: The mental aspects of an injury are what typically go unseen. Injuries often cause psychological distress among injured athletes such as depression and anxiety. Social support can assist in combating mental health distress associated with athletic injury.

Purpose: To determine if social support will decrease depression and anxiety symptoms in collegiate athletes suffering time loss injuries compared to athletes with minimal perceived social support from their ATs.

Method: Eighteen scholarly articles were found using EBSCOHost, PubMed, and Google Scholar. Of the 18 articles, there were 6 cross-sectional studies, 4 cohort studies, 3 systematic reviews, 3 non-randomized controlled trials, 1 randomized controlled trial, and 1 qualitative study. The articles were analyzed using a matrix format and were evaluated with the CASP tool.

Results: Ten of the eighteen articles supported the positive effect social support has on athletes with anxiety and/or depression symptoms from time-loss injuries. Eight of the eighteen articles were labeled inconclusive because the study found no statistical significance or the sample size was not large enough to deem the information significant.

Conclusion: Social support can be supported in the idea it helps decrease depression and anxiety in time-loss injuries.

Implications for Athletic Training: A need for more collaboration between athletic training staff and the athlete health network with behavioral health services for the holistic well-being of each patient. Repeated assessments of athlete mental health are beneficial to see mental health changes, especially post-injury and through recovery.

Keywords: Social support, depression, anxiety, time-loss injury, ATs

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Chapter 1: Introduction

Collegiate athletes are the face of grit and perseverance in the eyes of all who witness their athletic abilities. These competitors are seen as limitless until they become afflicted with an injury. The physical aspect of the injury is seen to all those who have watched the scene unfold, but what goes unseen are the mental aspects which may occur immediately after the injury and during the recovery process. Since the athletic image is viewed as tenacious, relentless, and passionate for their sport, the psychological distress of an injury may go unnoticed or unheard (Cormier & Zizzi, 2015). Previous research has shown 40% of university students, including both athletes and nonathletes, reported high levels of depression and over 60% reported high levels of anxiety (McLauren et al., 2018; ACHA, 2017). It has also been noted 40-50% of collegiate athletes sustain at least one injury which requires medical attention or restricts their participation for one day or more during their athletic careers (Yang et al., 2014). Time-loss injuries often cause psychological distress among injured athletes such as depression and anxiety, which can play a role in their injury recovery (Yang et al., 2014; Cormier & Zizzi, 2015).

In a retrospective study of Division I football players, 33% of the injured athletes reported high levels of depressive symptoms, using the Center for Epidemiological Studies Depression scale (Putukian, 2016). This is compared to 27% of non-injured athletes who reported levels of depressive symptoms. Although the study did not state these percentages were statistically significant, it is relevant data which warrants further investigation. The research showed after significant time loss injuries, athletes can suffer physically and emotionally with a decrease in their quality-of-life measures (Putukian, 2016). Sports medicine professionals, such as athletic trainers (AT), can use the act of giving social support as an intentional mental health intervention. ATs can implement empathetic listening and focus on the athlete as a person, not

only on their athletic ability (Neal et al., 2013). For example, asking how their classes and personal life are going instead of simply how their practice went can be an effective strategy.

Statement of Purpose

There is a growing need for the examination of athlete mental health and the role an athletic trainer plays in the rehabilitation of the physical and mental aspects of athletic injury. The purpose of this paper is to determine if social support will decrease depression and anxiety symptoms in collegiate athletes who are suffering time loss injuries compared to athletes with minimal perceived social support from their ATs.

Need for Clinical Review

It is important to investigate exactly how much counseling and care is provided by ATs. Yang et al. (2014) found social support was provided by the athletic training staff where the AT's role was described as a buffering effect for their social support. The emotional aspect of social support was the main type of support provided by ATs. This includes expressions of empathy, love, caring, and trust. The results from the study reported 84.3% of collegiate student athletes received social support from their ATs with 53.1% being very satisfied with the care they received. Those who were more satisfied with their ATs were less likely to report symptoms of depression and anxiety at return to play. The ATs who participated provided constant check-ins with their student athletes, providing them with the support they needed as a coping resource. Yang et al. (2014) concluded there is support for the buffering effect provided by ATs. In research by Cormier and Zizzi (2015), it was discussed that ATs play a primary role in the facilitation of an athlete's rehabilitation after a sport-related injury. Because of this, it is important for ATs to know the signs of distress and understand they might not all be obvious.

Additionally, athletes might be at a greater risk for mental health issues due to a variety of social norms placed upon the athletic image. For instance, athletes may be afraid to talk about their emotions, have become accustomed to working through the pain, view seeking counseling as a sign of weakness, and/or may not have developed healthy coping mechanisms to deal with perceived failures (Putukian, 2016). Because of these fears, it is important ATs understand what affects they personally have on their athlete's psychological well-being. In a study by Covassin et al. (2014), the researchers reported the most common and useful types of social support given by ATs to an injured athlete are emotional support (empathy), tangible support (practical assistance), and informational support (problem solving).

Significance to Athletic Training

Athletic trainers have the ability to provide support for their athletes in a variety of settings and circumstances. As a result, the AT and other members of the athletic care network are uniquely positioned to detect mental health (MH) disruptions and intervene in an appropriate manner (Chang et al., 2020). Previous literature showed athletes turn to coaches and ATs for emotional support and may view ATs as their main source of emotional support given the amount of time injured athletes spend rehabilitating their injuries in the athletic training room (Covassin et al., 2014). It is important to note very few psychologists and/or therapists are specifically trained in athletics and may not completely fulfill the injured student athletes' needs (Yang et al., 2014). Sports medicine professionals are in regular contact with athletes and are in a perfect position to inform, educate, and assist with the psychological aspects of injuries. An AT is generally the first person of contact when an athlete is injured, which in turn means they usually witness the emotions and struggles of the athlete which could be heightened by the injury they sustained (Arvinen-Barrow et al., 2014). It should also be noted ATs are not all specifically

trained in counseling; therefore, a “team approach” to treating an athlete is most beneficial. ATs assist with the day-to-day tasks of prevention, recognition, management, and rehabilitation of injuries among athletes and therefore become an important source of emotional social support for injured athletes (Yang et al., 2014).

ATs work closely with their athletes, regardless of their injury. The relationship is fulfilled from the initial injury to the athlete’s return to full, unrestricted activity. Because of this relationship, ATs are oftentimes more available to contribute valuable social support to their student athletes than coaches and teammates (Yang et al., 2014). The role of being a source of emotional social support is acknowledged in the National Athletic Training Association (NATA), training educational competencies with a set specifically for psychosocial strategies and referrals (Yang et al., 2014). With the acknowledgement from the NATA stating ATs provide emotional social support, it is essential to understand what impact this has on the athletes who are provided care as well as the athletic training profession as a whole.

Chapter II: Methods

This chapter describes the methods and processes used to review and examine the articles on social support and mental health interventions on athletic populations. Discussed below are the search strategies, inclusion and exclusion criteria, number and types of studies selected, and the criteria used for evaluating studies.

Search Strategies

The majority of the studies included in the Critical Review of Literature were found through EBSCOHost and PubMed databases. Google Scholar was utilized only when an article was unavailable due to cost on EBSCOHost or PubMed. Keywords used during the searches included: mental health, athletic injury, social support, mental health intervention, time-loss injury, depression, anxiety, injury, athletic trainer, sports medicine, and athlete. Initial results with the search terms of “athletic injuries”, “anxiety”, and “depression” yielded 80 results on EBSCOHost and 100 results on PubMed. The search terms with the most results were “time loss injury” and “mental health”, which yielded 748 results. The noted search terms were used interchangeably to find different articles pertaining to the topic in question. The 748 results were then condensed down to 18 articles with the use of inclusion and exclusion material. All articles included were published between the years of 2009 and 2021.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were established during the search process in order to accumulate articles relevant to the topic and produce valuable data. In order for the study to be included, the research had to revolve around injuries in athletes, mental health (specifically depression and anxiety), social support intervention, and whether the AT or sports medicine staff played an intervention role in the athlete’s mental health. The research had to have a clear study

design and outcome measures; however, there was no restriction on the type of study conducted. The article had to be published by a peer-reviewed journal to ensure there was no bias involved as well as if the study was legitimate. The population included athletes over the age of eighteen who were currently participating in a sport at any level. This included collegiate athletes, recreational athletes, semi-professional, and professional athletes. There were no restrictions on the type of sport played, nor what type of injury was sustained. There was also no restriction on whether “athletic trainer” had to be used because “sports medicine staff” could be interchangeable in the setting being researched.

The exclusion criteria eliminated research not containing any injuries in athletes, mental health concerns, or a specific intervention. Articles not written in English or did not have the ability to be translated to English were excluded from being used. Studies 15 years or older were also excluded from the search, along with articles needing to be purchased to view beyond the abstract. The exclusion criteria were essential to omitting studies which may decrease the legitimacy of this Critical Review of Literature.

Numbers and Types of Articles

With the use of inclusion and exclusion criteria, eighteen articles were selected for the Critical Review of Literature. All articles were evaluated using the Critical Appraisal Skills Programme (CASP) Questions (CASP UK-OAP, 2021; Raab & Craig, 2016). The CASP questionnaire tool is a set of eight critical appraisal tools which has specific checklists designed for use with Systematic Reviews, Randomized Controlled Trials, Cohort Studies, Case Control Studies, Economic Evaluations, Diagnostic Studies, Qualitative Studies, and Clinical Prediction Rule. Due to the variety of studies able to be evaluated, the CASP questionnaire is a beneficial tool used to determine the quality of each article included in this review. All articles included

were deemed good quality by passing the CASP questionnaire and rated more subjectively due to the specific form type. The CASP questionnaires are included in Appendix B for additional review. The CASP consists of questions which allow for longer answers to help the researcher evaluating the article to explain and understand what the original article is stating. The CASP also has “yes” or “no” questions. The more “yes” answers, the higher the quality of the research. If a question could not be answered, the quality of the article would be affected negatively.

Criteria for Evaluating the Studies

Each study included was put into a matrix developed by the Garrard matrix method for health science literature review (Garrard, 2017). All completed matrices can be found in Appendix A. Information inputted into the matrix from each study included the source, purpose, sample, design, measurement, results, quality, comments, and recommendations. High quality articles were determined when they stated all of the information clearly throughout the research whereas low quality articles may have some points missing or information not clearly stated. The matrix method combined with the CASP questionnaire was used to ensure the research is of high quality in two different assessments.

Summary

Studies and articles which included data about injuries in athletes, mental health, and a specific intervention were researched through at least 3 different databases. Eighteen articles were deemed useful based on the above inclusion and exclusion criteria. The quality of each article was then evaluated through a literature matrix and a critical appraisal tool.

Chapter III: Literature Review and Analysis

Synthesis of Matrix

The purpose of chapter three is to review the selected 18 scholarly articles to answer the research question presented in chapter one. The clinical question is if social support will decrease depression and anxiety symptoms in collegiate athletes suffering time loss injuries. The literature was reviewed and analyzed through the matrix developed by the Garrard Matrix Method for Health Science Literature Review (Garrard, 2017). Each article was sorted into specific categories of whether they support, are inconclusive, or did not support the research question. The articles were sorted in each category based on their CASP score of “*excellent*”, “*good*”, or “*fair*”. Of the 18 articles, 10 supported the use of social support and 8 were inconclusive. No articles were selected if they did not include relevant information to support the research question. The label of inconclusive was given if the study had no statistical significance towards the research question or the sample size was not large enough to deem the information significant. Types of articles include systematic reviews, randomized controlled trials, non-randomized controlled trials, cross sectional studies, cohort studies, and qualitative studies. The literature review matrices can be found in Appendix A.

Synthesis of Major Findings

Supporting Evidence

Two systematic reviews, one non-randomized controlled trial, four cross-sectional studies, and three cohort studies are included in this category and are summarized below.

Schwab Reese et al. (2012) conducted a systematic review and investigated the effects of social and psychological interventions in reducing psychological consequences from time-loss injuries and improving coping during the rehabilitation process. Schwab Reese et al. searched for

articles using Academic Search Elite, ERIC, Health Source, PubMed, and PsychINFO. Both competitive and recreational athletes with severe injuries were included in their search requirements. After the evaluation of 29 articles, there were 7 which met all inclusion criteria and were included in the systematic review. Social support interventions such as imagery and relaxation, goal setting, microcounseling, and acceptance and commitment therapy were found in the search. Outcome measures from the Mood Adjective Checklist, Patient's Self-Rating Questionnaire, Acceptance & Action questionnaire-II, Mindfulness Attention Awareness Scale, and Sport Injury Anxiety Scale included reduction in psychological consequences, increase in coping skills, and reduction in re-injury anxiety.

Schwab Reese and colleagues (2012) found 66% of the studies concluded social support increased general enjoyment and life satisfaction in participants who completed the psychological interventions. Additionally, 71% of the studies reported perceived social support increased confidence and general enjoyment in participants. Psychological interventions utilized in four studies included relaxation, deep breathing, goal setting, and microcounseling. Their research suggests a significant need to develop more intervention studies specifically targeting improvement of post-injury psychological outcomes for the most successful recovery. This article was deemed *excellent* because it scored 9 out of 10 on the CASP Systematic Review Checklist. It was used in this review because they found social support increased certain psychological aspects of athletic injury.

Truong et al. (2019) conducted a systematic review and investigated 77 studies in their systematic review to explore psychological and social factors following sport-related time-loss injuries. Truong et al. utilized the Mixed Methods Appraisal Tool to critically assess each article and articles were identified using MEDLINE, PsychINFO, CINAHL, SportDiscus, SCOPUS,

and ProQuest. Studies were included if they identified psychological, social, or contextual factors during the acute, rehabilitation, and return to sport stages of recovery.

Truong et al. found 39% of the articles investigated both psychological and social factors. Of the 77 studies included, 66 studies were performed during rehab or return to sport stages and 12 studies investigated the acute stage. The studies used the Profile of Mood States, Emotional Responses of Athletes to Injury Questionnaire, Acceptance & Action Questionnaire, Depression Anxiety and Stress Scale, Multidimensional Health Locus of Control, and the Return to Sport after Injury Scale outcome measures. Of the 77 studies, 67 studies concluded anxiety (barrier to progress rehabilitation) and 38 concluded depression (reduced coping mechanisms) were two of the most dominant themes in athletes with a time-loss injury. For social themes, 30 studies showed social support was beneficial to the recovery process for time-loss injuries. Engagement in care for the patient and healthcare provider was also found beneficial for the return to sport process. The study scored 10 out of 10 on the CASP Systematic Review Checklist which deemed it *excellent*. The article was important to this review because they found social support was beneficial to the recovery process.

Yang et al. (2014) conducted a cohort study to examine the effect of collegiate athletes' social support received from ATs post injury on reported symptoms of anxiety and depression at return to play. There were a total of 387 collegiate athletes who participated in the study who sustained a total of 594 injuries. The study consisted of a 6-item social support questionnaire, the Center for Epidemiological Studies Depression Scale, and the State Trait Anxiety Inventory.

Yang and colleagues (2014) found 84.3% of injured athletes received support from their ATs during their recovery with 53.1% being very satisfied with the support they received. This support included the ATs helping them feel relaxed, accepted, and cared for post-injury. Results

also showed athletes who were satisfied or very satisfied with the social support received from their ATs were 87% less likely to report symptoms of depression and 78% less likely to report anxiety at return to play. This was compared to athletes who were dissatisfied with the social support received from ATs. It was concluded ATs buffer the effects of anxiety and depression during the injury recovery process. This study was considered *excellent* because it scored 12 out of 12 on the CASP Cohort Study Tool. The article was included in this review because it showed a decrease in anxiety and depression symptoms was directly correlated to the social support received.

Covassin et al. (2014) conducted a cross-sectional study and compared the anxiety and social support of athletes with concussion versus athletes with time-loss orthopedic injuries. There were 63 athletes with concussions and 63 athletes with orthopedic injuries all of which were at the collegiate level of competition. Measures used were the state-trait anxiety inventory (STAI) and the modified 6-item social support questionnaire. The STAI is used to diagnose anxiety and distinguish it from depressive syndromes. It has 20 items for state anxiety and 20 for trait anxiety. State anxiety items include “I am tense; I am worried” and “I feel calm; I feel secure”. Trait anxiety items include “I worry too much over something that really doesn’t matter” and “I am content; I am a steady person”. The modified 6-item social support questionnaire rates the overall level of satisfaction with the support given in each of the 6 areas.

Results from Covassin and colleagues (2014) concluded both concussed and orthopedically injured athletes experienced similar state and trait anxiety rates both being elevated to subclinical to clinical levels (average of 46-47 for trait and 30-31 for state both out of 80 with 80 being more severe anxiety). These athletes also relied on similar sources of social support post-injury from friends, teammates, and family with the difference between them being

statistically insignificant. The concussion group relied on their ATs 48% of the time and the orthopedic group being 57% of the time. There was no statistical difference between groups as the data showed both groups relied on their ATs for social support. This study was deemed *excellent* by scoring 8 out of 10 on the CASP Qualitative Study questionnaire. The article was important to this review because it showed social support utilized by collegiate athletes as well as their mental health status post-injury.

Lu and Hsu (2013) conducted a cross-sectional study and examined how social support and hope individually and combined predict post-injury rehabilitation beliefs, behavior, and subjective well-being. There were a total of 224 injured collegiate athletes who participated in the study. Lu and Hsu used the multiple hope scales as well as the Satisfaction With Life Scale which includes mental health aspects, and the Multidimensional Scale of Perceived Social Support. Each of these questionnaires were given out directly after rehabilitation treatments were completed.

Lu and Hsu (2013) found social support and two different types of hope in injured athletes predicted their rehabilitation beliefs and subjective well-being. For participants with low hope pathways, the perception of more social support was associated with higher levels of subjective well-being, whereas social support had a low association with subjective well-being among participants with high hope pathways with statistical significance ($p\text{-value} = .05$). Lu and Hsu concluded both hope and social support are psychological strengths which may prove beneficial for an injured athlete's rehabilitation and subjective well-being. The study scored 10 out of 12 on the CASP tool and was deemed *excellent*.

Mitchell et al. (2013) conducted a cross-sectional study and examined the relationship between social support and the psychological response to athletic injury. Two studies were

conducted with 319 participants in study one and 302 participants in study two all of which were collegiate athletes. Study 1 used measures of stressors, psychological responses, and perception of social support. Study 2 utilized psychological responses, measures of stressors, and received social support instead of perceived as was collected in Study 1. Both studies collected measures of stressors, social support, and psychological responses to injury during their check-ins.

The results found by Mitchell and colleagues (2013) revealed significant stress-buffering effects for the perception of social support in relation to restlessness, feeling cheated, feeling isolated, and the perception of emotional support ($p\text{-value} = .05$). This article was important to the review because the findings supported the effect social support has on buffering the effect of stress from an athletic injury. This article was considered *excellent* because it scored 9 out of 10 on the CASP questionnaire.

Malinauskas (2010) conducted a cross-sectional study and examined the associations among social support, stress, and life satisfaction as perceived by collegiate athletes with minor or major athletic injuries. The population for this study was 123 collegiate athletes and Malinauskas used multiple measuring tools including the Multidimensional Scale of Perceived Social Support, the Perceived Stress Scale-10, and the Satisfaction With Life Scale.

Malinauskas (2010) found there was no difference between major and minor injury groups for perceived social support, the major injury group had less life satisfaction, and the major injury group also had greater perceived stress than the minor injury group with statistical significance ($p\text{-value} = .001$). With this information, Malinauskas concluded stress-buffering mechanisms of social support can increase life satisfaction based on the findings in this study. The study scored a 9 out of 10 on the CASP questionnaire and was deemed *excellent*.

Yang et al. (2010) conducted a prospective cohort study and examined the pre and post time-loss injury social support patterns among male and female collegiate athletes. From Big Ten Conference universities, a total of 256 National Collegiate Athletic Association Division I male and female athletes participated in the study. The athletes' injury was identified using the Sports Injury Monitoring System (SIMS) while their social support was measured using the 6-item Social Support Questionnaire (SSQ6). Participants were asked about their sources of and satisfaction with social support during the injury recovery period.

Yang and colleagues (2010) reported athletes who were injured reported relying more on coaches, ATs, and physicians for social support after they became injured. Perceived social support from their ATs went from 49% before injury to 83% after injury and was the largest increase of social support found. The 34% increase in social support from ATs after sustaining a time-loss injury concluded the idea in which social support is a vital part of the physical and mental recovery process. This article was deemed *good* through the CASP Cohort Study questionnaire because it scored a 9 out of 12. The article was included in this review because it emphasized the need for social support from an AT but psychosocial impact needs to be further investigated.

Wayment and Huffman (2020) conducted a non-randomized controlled trial and examined where concussed football players seek and receive emotional and social support and whether the support is associated with injury perceptions. The study included 26 National Collegiate Athletics Association (NCAA) Division I football players with concussions. With approval from the head AT, the selected athletes completed short surveys within 4–6 days of diagnosis and then again when cleared to return to play. The survey included questions regarding

depression/anxiety through the 4-item Patient Health Questionnaire, social and emotional support, adverse psychosocial experiences, and sport-injury related growth.

Wayment and Huffman reported the participants received significantly more emotional support than they expected from their ATs with a mean of four out of five receiving this support. It was concluded the benefit of emotional support from ATs was correlated with lower adverse psychological perceptions and experiences (p -value= .05), stronger sport-injury related growth perceptions (p -value= .06), and a willingness to report future concussions (p -value= .05) all showing statistical significance. This study scored 8 out of 11 and was considered *good* through the CASP questionnaire. The article was included in this study because it had data including time-loss injuries and the emotional and social support from ATs. One drawback was it was only conducted on concussion patients.

Carr et al. (2020) conducted a cohort study and examined how a drop in perceived social support (PSS) during the recovery process would negatively impact the outcome of a non-neurologic injury. There were a total of 411 patients included. The study included a screening for depression, post-traumatic stress disorder (PTSD), Medical Outcomes Study Short Form 36 Mental Composite Score (SF- 36 MCS), and the Multidimensional Scale of Perceived Social Support (MSPSS) at the initial hospitalization, then again 1, 2, 4, and 12 months post injury. Those who had a drop in their PSS were labeled as “DROP” and those who did not were labeled as “STABLE”.

Carr and colleagues (2020) found out of the 411 patients included, 67.2% experienced a drop in perceived social support within the first year of follow-up from their non-neurological injury and 69% developed depression. DROP patients were also more likely to have PTSD (p -value= .02). Researchers concluded patients who have a drop in PSS during the first year of

recovery had significantly higher odds of poor psychological outcomes and identified interventions to positively influence the recovery process are needed. This article was considered *good* because it scored a 9 out of 12 on the CASP Cohort Study questionnaire. The article was included in this review because it included social support and mental health aspects of time-loss injuries. It was not conducted on collegiate athletes, however.

Inconclusive Evidence

One systematic review, one randomized controlled trial, two non-randomized controlled trials, two cross-sectional studies, one cohort study, and one qualitative study are included in this category and are summarized below.

Sabol et al. (2021) conducted a systematic review which investigated the mental health responses in collegiate athletes with concussions compared to time-loss musculoskeletal injuries. Sabol and colleagues utilized PubMed and multiple other quality search engines to find articles for critical appraisal. They used the Joanna Briggs Institute Critical Appraisal tool on the six articles included in the study.

The results from this systematic review concluded both concussion and musculoskeletal injuries reported peak depressive symptoms one-week post-injury at their follow up with four of six articles in agreement. Sabol et al. found state and trait anxiety were reported elevated for both groups compared to the baseline and exceeded clinical levels 72-hours post-injury at their check-ins with three of the six articles in consensus. This article was considered *excellent* because it scored 10 out of 10 on the CASP Systematic Review questionnaire. It was included in this review because it included time-loss injuries in collegiate athletes as well as social support and mental health questionnaires.

Donohue et al. (2020) conducted a randomized controlled trial and examined how structured interviews and demographic factors influence collegiate athletes to use psychological interventions. The sample consisted of 289 NCAA Division I collegiate athletes. Each participant went through a mental health screening and was randomly assigned to one of two semi-structured interviews based on the experimental phase. Phase I received standard engagement or a discussion about mental health. Phase II received both options in phase I - either with just those two or the addition of a discussion about the culture of choice. And, phase III received all three of the options in phase II - either alone or with the addition of a discussion of sport culture. After the experimental phase, the participants were offered psychological assessment and intervention. The purpose of the engagement of the interventions was to encourage the collegiate athletes' participation in campus counseling.

Donohue and colleagues (2020) completed an analysis of mental health symptom severity revealed 36% of subjects were at subclinical levels for anxiety and/or depression and 13% were at clinical levels. Social support from athletic trainers and coaches increased participation (53%) in interventions. There was no statistical significance found for the specific programs being beneficial because the subject pool was too small. The study scored 10 out of 11 on the CASP Randomized Controlled Trial questionnaire and is considered *excellent*. It was included in this review because it included time-loss injuries in collegiate athletes, social support interventions, and a mental health analysis.

Shannon et al. (2019) conducted a non-randomized controlled trial and examined the effect of mental health interventions for reducing stress, promoting emotional well-being, and increasing competence in mental health self-management in both healthy and injured collegiate athletes. There were 238 participants who completed an online survey before the intervention

and two weeks following. The mental health intervention used was a mindfulness program. The online survey included the Mindfulness Attention Awareness Scale, Perceived Competence Scale, Perceived Stress Scale, and the 14-item Warwick-Edinburgh Mental Well-being Scale.

The Warwick-Edinburgh Mental Well-Being Scale encompasses positive and negative aspects of mental and social well-being. Results from Shannon et al. found the mindfulness intervention was not directly effective at increasing mindfulness or reducing stress and had no statistical evidence showing the interventions were beneficial. The effects of stress on wellbeing were indirectly recognized as a negative correlation, but again, there was no statistical significance. This study was considered *good* through the case control CASP questionnaire scoring a 9 out of 11. It was included in this research study because it was conducted on time-loss injury collegiate athletes and they used a questionnaire which included mental and social aspects of injury.

Drew and Matthews (2018) conducted a cross-sectional study and investigated the prevalence of depression and anxiety symptoms within collegiate athletes to examine protective factors which may act as a buffer against a decline in mental health. The study included 185 collegiate athletes and utilized the following measures: self-reported symptom prevalence, resilience, and help-seeking behavior; Depression, Anxiety and Stress Scale (DASS-21); Connor-Division Resilience Scale (CD-RISC); and a questionnaire with specific help-seeking behavior questions.

Drew and Matthews found there were no significant differences between men and women other than male student-athletes reported higher levels of resilience. 45% of participants reported symptoms of anxiety and/or depression outside the normal range. Results showed student athletes who did not speak about their personal problems or show social support reported

elevated symptoms of depression ($p\text{-value} = .02$). The study showed the need for increasing student-athletes' knowledge of help seeking behavior and the importance of mental health and social support. This study was deemed a *good* article through the CASP questionnaire scoring an 8 out of 10. It was included in this study because it included time-loss injury collegiate athletes and examined mental health. A potential drawback is the study did not include much data on social support interventions.

Appaneal et al. (2009) conducted a non-randomized controlled trial and examined athletes' post injury depression symptoms through the initial injury as well as 1-week, 1-month, and 3-month follow-up. The study included 164 student athletes at the collegiate level. Two forms of measurement were used: The Center for Epidemiologic Studies Depression Scale (CES-D) and the semi structured interview guide for the Hamilton Rating Scale for Depression (SIGH-D). The CES-D is a self-rated paper-and-pencil checklist and the SIGH-D is a clinician rated semi structured interview.

Results from Appaneal et al. showed the participation restriction at 1-month post injury was significantly related to higher scores on both the CES-D and SIGH-D compared to 1 week post injury. The injured group at the one-month check-in had higher depression and anxiety scores than healthy with 61 of the 77 athletes showing elevation. Social support was only seen in the overall "check-in" and mental health was collected in this study. This study was considered *good* through the case control CASP questionnaire scoring an 8 out of 11. It was included in this review because it included collegiate athletes with time-loss injuries, social support, and measurements of mental health.

Goutteborge et al. (2015) conducted a cross-sectional study and investigated the association of time-loss musculoskeletal injuries with symptoms of common mental health

disorders such as anxiety, depression, sleep disturbances, alcohol behavior, and smoking behavior. The study was conducted on 540 professional European soccer players. Measurements of mental health disorder symptoms were collected with the use of the Four-Dimensional Symptom Questionnaire, the 12-item General Health Questionnaire, PROMIS, and the 3-item AUDIT-C.

Gouttebarga and colleagues (2015) found 68% of participants were previously afflicted with one or more severe joint injuries and 60% had one or more severe muscle injuries. Of those with severe injuries both joint and muscular, 37% showed symptoms for anxiety and/or depression. Severe musculoskeletal injuries were positively correlated with anxiety, distress, and sleep disturbances. The PROMIS questionnaire includes social support questions, but there was no statistically significant data on this information. The study was cross-sectional so it cannot prove any direct causal relationship, but does give cause for further exploration of their correlation. The CASP questionnaire considered this article *good* because it scored an 8 out of 10. It was included in this review because it contained beneficial information to the research question in this paper, but it was conducted on professional athletes instead of collegiate.

Kilic et al. (2017) conducted a prospective cohort study and examined the interaction between common mental health disorders and severe musculoskeletal time-loss injuries in professional European soccer players. The study was conducted over a 12-month period with 384 participants with 262 completing the entire study. Mental health and social support check-ins were conducted at baseline, 6 months, and 12 months post-injury. Measures were obtained using the Distress Screener, 12-items General Health Questionnaire, Patient-Reported Outcomes Measurement Information System, and Alcohol Use Disorders Identification Test.

Kilic and colleagues (2017) found 37% of the participants reported symptoms up to the 12-month check-in. There was no statistical relationship found between the symptoms of mental health disorders creating an onset of severe time-loss injury. The article found professional soccer players who suffered a severe time-loss injury were more likely to develop subsequent symptoms of a common mental health disorder. Kilic and colleagues concluded early identification of players at risk creates the opportunity for medical staff to treat and give a mental health/social support check-in for the patient accordingly and in a timely manner. This article was considered *good* through the CASP questionnaire and scored a 9 out of 12.

Bejar et al. (2019) conducted a qualitative study and examined athletes' perception of an AT's influence on their basic psychological needs and motivation efforts during sport injury rehabilitation through conducting a series of interviews. The study included 10 time-loss injury collegiate athletes at National Collegiate Athletic Association Division 1 universities. The interview data was then analyzed using consensual qualitative research (CQR) procedures. Bejar and colleagues (2019) conducted an analysis of the interviews, 4 domains of information were constructed: athletes' concerns about injury and rehabilitation, ATs feedback and athletes' perception of competence, a person-centered approach from ATs and athletes' perception of autonomy, and a connection between ATs and athletes' perception of relatedness.

Bejar et al. found the ATs who provided a detailed understanding of the injury, presented clear goals, offered choices of rehabilitation exercises, and built supportive rapport, had a positive effect on the motivation of the athletes' sports rehabilitation process. Since it was a qualitative research study, there was no statistical significance found. It was concluded the behaviors enhancing the basic psychological needs of competence, autonomy, and relatedness positively affected athletes' motivation during sport injury rehabilitation. This was deemed *fair*

because it scored a 6 out of 10 on the CASP Qualitative questionnaire. The article unfortunately had a small sample size, but all other information was useful to the research question in this paper.

Critique of Strengths and Weaknesses

There were many strengths and weaknesses throughout the appraisal process of the above 18 articles. Strengths identified included population size, population type, comparison and combination of concussions and musculoskeletal injuries, types of questionnaires used, the purpose being mental health oriented, and quality of articles. Out of the 18 studies, the articles by Wayment and Huffmann (2020) and Bejar et al. (2019) had population sizes not large enough to show statistical significance, but still showed important information. The population type for 70% of the research studies were collegiate athletes with 20% unspecified and 10% being professional athletes. Sixteen of the eighteen research studies included both concussions and musculoskeletal injuries and some of them specifically compared the two. All studies used questionnaires which were specific to mental health and social support were deemed valid by their contents. All of the studies looked at mental health after time loss injuries with 10 of those studies also including social support aspects whereas the other study only included social support after time loss injuries. The quality of articles

Weaknesses in the research articles include the variety of articles, inclusion of social support, age of articles, and use of interventions. One weakness of the articles used is there was a wide variety of the studies. There were four systematic reviews, one randomized controlled trial, one non-randomized controlled trial, six qualitative and quantitative studies, and six cross-sectional studies. This may be due to the subject which was searched for and how data of it can be collected. Mental health and social support can be assessed with questionnaires, but it is a

complex subject which may be the causation for the variety. Another weakness found was only half of the studies included social support. While this is an important aspect of the purpose of the literature review, mental health was the main subject investigated. A weakness three of the articles had was the year they were published. We had exclusion criteria which stated articles needed to be less than 10 years old, but the articles proved of high value because of their content as well as they had accessibility whereas many articles recently published do not have as much access due to certain journal's cost for viewing. Lastly, another weakness of the articles was four of the eighteen articles compared mental health interventions. While this was not the purpose of this critical review of literature, the information these studies provided was still beneficial to the understanding of mental health of athletes following time loss injuries.

Chapter IV: Discussion, Implications, and Conclusions

The purpose of this review was to determine if social support will decrease depression and anxiety symptoms in collegiate athletes suffering time-loss injuries. Chapter 4 will discuss how the review topic was able to be supported with ten of the eighteen articles in favor. In addition, gaps and relevant trends found throughout the research, implications for athletic training practice, and recommendations for further research will be discussed.

Literature Synthesis

The focus of the Critical Review of the Literature was to answer the question, “Does social support decrease depression and anxiety symptoms in collegiate athletes suffering time-loss injuries compared to athletes with minimal perceived social support from their athletic trainers?” After the synthesis of the eighteen articles, it was determined that social support does decrease depression and anxiety symptoms in collegiate athletes suffering time-loss injuries. After the preliminary exclusion process, a total of eighteen articles were reviewed and appraised in order to answer the research question. The following paragraphs will synthesize the eighteen articles into three categories for collegiate athletes suffering time-loss injuries: mental health considerations, social support considerations, and recommended mental health interventions.

Each of the studies investigated mental health after time loss injuries with collegiate athletes in fifteen of them, professional athletes in two of the studies, and one study with both athletes and non-athletes. Each study had mental health components and had many considerations for what to look for and when to refer. An *excellent* article by Appaneal et al. (2009) showed athletes had higher depression scores at one and three months post-injury compared to depression scores at one week post injury with 61 of 77 athletes having elevated depression. The longer the time-loss injury occurred, the higher the depression scores were thus,

indicating the need for mental health considerations in injured athletes. Multiple *excellent* articles compared the mental health issues from concussed athletes versus athletes who had musculoskeletal injuries. Both studies concluded both groups experience similar mental health issues post-injury (Sabol et al. (2021), Covassin et al. (2014)). Concussed athletes and musculoskeletal injury athletes should all be screened at preseason, during season, directly after an injury occurs, as well as through the rehabilitation process. All of the studies showed athletic injuries affect mental health and screenings should be utilized to ensure all athletes are healing both physically and mentally.

A discovery from an *excellent* systematic review by Truong et al. (2019) showed athletes in 67 of the 77 studies had high levels of anxiety which they deemed as barriers to progress through rehab and back into sport. Truong and colleagues also found depression (38 out of 77 studies) was another psychological setback of time-loss injuries. Another highlight from the articles was found in one *excellent* study by Sabol et al. (2021) and one *good* article by Kilic et al. (2017). Both articles stated the athletes in their respective studies were returning to sport before their psychological symptoms were at baseline. This is important to note even though the athlete may be physically ready to play, they may need more or longer mental health interventions to recover mentally, not just physically. Another aspect which should be studied further is Drew et al. (2018) found collegiate athletes who did not speak about their personal problems reported elevated symptoms of depression. This could be more concrete evidence for incorporating more mental health/social support check-ins and resources for collegiate athletes, especially if more studies are done on this topic.

Social support was investigated with diverse questionnaires by each study which creates complications when trying to compare them, but they used similar questions in each. Two studies

identified the themes associated with social aspects of rehabilitation. One study was of *excellent* quality by Truong et al. (2019) and the other was of *good* quality by Lu & Hsu (2013). Themes identified in each were social support and engagement in care. The studies concluded increased social support and increased engagement in care would positively influence the participants' rehabilitation process.

Multiple studies investigated stress-buffering mechanisms of social support were of *excellent* quality (Malinauskas (2010), Mitchell et al. (2013)). Both studies found social support can increase life satisfaction for athletes with time-loss injuries. The perception of decreased social support was additionally found to be related to restlessness, feeling cheated, feeling isolated, and a decreased perception of emotional support. A *good* research article conducted by Carr et al. (2020) also noted decreased perceived social support was associated with increase in depression symptoms compared to stable perceived social support.

Another topic which was seen in one *excellent* article by Yang et al. (2014) and multiple *good* research articles (Yang et al. (2010), Wayment & Huffman (2020)) was injured athletes receiving more emotional and social support from their AT than they anticipated. These studies also showed the need for social support during a time-loss injury is evident in collegiate athletes. Athletes received a lot of social support from ATs (Yang et al. 2014, Yang et al. 2010) and were found less likely to report symptoms of anxiety and depression when receiving social support from their AT with more social support being associated with lower adverse psychological perceptions (Yang et al. 2014).

Mental health and social support interventions were seen very differently in each study. Some studies used short check-ins as a form of an intervention whereas some other studies looked at specific interventions as the main goal of their paper. One study by Schwab Reese et al.

(2012) found guided imagery and relaxation was associated with improved coping and reduced re-injury anxiety. Multiple studies found there is a need for implementation of intervention programs as well as the need to focus on encouraging athletic administrators, coaches, and teammates to make appropriate referrals to mental health services (Donohue et al. (2020), Drew et al. (2018), Kilic et al. (2017)). Referrals made by coaches and teammates is important because it shows the social support they are providing the injured athlete as well as athletes were more likely to participate in the intervention when they were referred by a coach or teammate (Donohue et al. (2020)). Implementing more mental health screenings was seen as beneficial for collegiate athlete populations (Donohue et al. (2020), Kilic et al. (2017)). It would be useful to have not only screenings during preseason, but during season, post-injury, and during recovery as well. There was no statistical evidence showing one form of social support or mental health intervention was more beneficial than another. However, it is worth conducting more research to find which intervention has the best outcomes.

Current Trends and Gaps in Literature

There were many trends and gaps found throughout the eighteen articles reviewed. One trend observed was that many researchers used similar questionnaires in their studies. Patient reported outcome measures in the form of questionnaires in the articles in this review had similar questions with some being more in-depth. For example, one of the questionnaires for social support called the Multidimensional Scale of Perceived Social Support does not include ATs, so some studies expanded their questionnaire to ask more in-depth questions. Another trend was most of the studies had large population sizes. This was mainly because the majority of studies were cohort or cross sectional which made it easier to have larger populations because they did not require as many resources. A trend seen in the literature was the mean of the research found

was 2015. The range was from 2009 to 2021 which shows this has been a researched topic for a while and is still being studied currently.

A gap in the literature showed many of the newer articles were challenging to access. There were many studies done within the past five years, but due to viewing fees and lack of access through the Bethel library database, they were not able to be used in this review of literature. The newer articles would have increased the mean of the research found, but a mean of 2015 is still useful as well as all of the studies found were within the past fifteen years. Another gap in the literature was there are not many randomized controlled trials being conducted on this subject nor are there many systematic reviews. This may be because mental health is only a recent topic being discussed in the athletic community and the research question is very specific and in-depth compared to the general questions about mental health post-injury and how social support is beneficial to recovery. This research question is very intricate which makes it more challenging to find systematic reviews for it. A final gap in the literature was there were many differences in the interventions studied. Mental health interventions included a mindfulness program, traditional counseling, relaxation, deep breathing, goal setting, and microcounseling. There was a wide range of interventions which were overall inconclusive. Social support interventions were more prominent in the literature than the other mental health interventions. However, since social support varies from person to person, it is hard to collect completely objective data.

Implications for Athletic Training

There are many takeaways from the literature found in this critical review which pertain to athletic training. One takeaway is there needs to be more collaboration between athletic training and the athlete health network with behavioral health services. These services may be on

or off campus and referrals can be done by the sports medicine staff or by coaches. Knowing when to refer an athlete for mental health issues is crucial to the well-being of all patients.

An outcome from this critical review is the need for more implementation of mental health screening at preseason, multiple times throughout the season, post-injury, and throughout the rehabilitation process. Having repeated assessments is beneficial to see how athletes are doing throughout the season as well as see how they are mentally recovering from their injury instead of simply seeing the physical recovery and growth. It can be a helpful tool to use to refer athletes to psychological services which are necessary in those situations.

Another note for ATs from this review is the need for more mental health training for ATs. There is some training on mental health issues in athletic training education, but there is not enough for topics such as post-injury mental health issues. The curriculum to become a Certified Athletic Trainer goes through basic psychological issues which is beneficial, but there is much more to be learned on the topic. Increasing continuing education units for mental health or increasing the curriculum would be beneficial to learn how to talk to athletes who are going through psychological consequences of time-loss injuries and know when to refer them to more professional support.

In a study done by Drew & Matthews (2018), 62% of the athletes in their study who required professional help did not seek the professional support they needed. Building social connections and giving the athletes' more social support may help them to open up to their AT and support them through their injury. This social connection or mutual trust with the AT may help in the referral process to a mental health professional when needed. It may also increase the athletes' knowledge of how to seek help and spread the knowledge of how mental health can be affected by time-loss injuries.

Recommendations for Future Research

The literature found for this critical review was very beneficial in finding more about the purpose of this paper, but there are areas where future research could further expand the findings. One recommendation would be future research includes more intervention studies which specifically target improvement of psychological outcomes of time-loss injuries. There needs to be more research behind the many diverse interventions commonly used to see if they are statistically beneficial or if they have just worked in some cases. Another recommendation would be to have studies continuously use common or well-known health questionnaires to ensure the information gathered is of the same value and high quality. The most well-known questionnaires are beneficial, but they do not cover everything the articles in this review wanted, so they expanded the questions to be more specific. While this is good information, there should be more consensus between the studies on which questions are asked to ensure the data gathered is of the same quality. Another recommendation would be to conduct more randomized controlled trials (RCT) and more systematic reviews on this topic. Both RCTs and systematic reviews are top tier, high quality types of research which helps increase the validity of the research question and help to prove or disprove it as well. A final recommendation would be to focus the research on specific age or skill level when conducting studies. This critical review focuses on college-aged athletes, but athletes at all levels have mental health struggles and the appropriate intervention strategies should be researched for each.

Conclusion

The purpose of this paper was to determine if social support would decrease depression and anxiety symptoms in collegiate athletes suffering time-loss injuries. After thoroughly analyzing eighteen articles using the Garrard Matrix Method for Health Science Literature

Review (Garrard, 2017) and the Critical Appraisal Skills Programme Questions (CASP UK-OAP, 2021; Raab & Craig, 2016), it was found that social support does decrease depression and anxiety in collegiate athletes suffering time-loss injuries. Although the purpose of this study is supported, it is important to note that it is challenging to obtain statistical significance for mental health and social support measures because of the diversity of contributing factors in each and how they interact. Overall, this paper is important in the understanding of social support for time-loss injuries as it shows while there is research being conducted, much more needs to be done.

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Appendix A: Literature Review Matrix

Confirming Evidence

<p>Source: Schwab Reese, L., Pittsinger, R., & Yang, J. (2012). Effectiveness of Psychological Intervention Following Sport Injury. <i>Journal of Sport and Health Science</i> 1, 71-79. https://doi.org/10.1016/j.jshs.2012.06.003</p>			
<p>Purpose To summarize the empirical findings of the effects of psychological interventions in reducing post-injury psychological consequences and improving psychological coping during the injury rehabilitation process among competitive and recreational athletes.</p> <p>Design Systematic review.</p>	<p>Sample Of 29 articles, only 7 met study criteria (study population of interest, outcome of interest). Included RCTs and nonRCTs. Participants: studies with time-loss injuries in competitive and recreational athletes.</p>	<p>Measurements Interventions: effectiveness of psych interventions with aims of reducing post-injury mental health issues. Outcome measures included in the studies were a Mood Adjective Checklist, Patient's Self-Rating Questionnaire, Acceptance & Action questionnaire-II, Mindfulness Attention Awareness Scale, and Sport Injury Anxiety Scale concluded a reduction in mental health consequences and increase in coping through perceived social support.</p>	<p>Results Social support increased in 66% of participants in studies where psychological intervention was completed. 71% of the studies reported perceived social support increased confidence and general enjoyment in participants.</p>
<p>Quality Excellent</p>			
<p>Comments/ Recommendations The findings support the idea in which social support can be effective in reducing post-injury psychological consequences (anxiety and depression) and improves psychological coping during rehabilitation.</p>			

<p>Source: Truong, L., Mosewich, A., Holt, C., Le, C., Miciak, M., & Whittaker, J. (2019). Psychological, social, and contextual factors across recovery stages following a sport-related knee injury: a scoping review. <i>British Journal of Sports Medicine</i> 54:1149-1156. https://doi.org/10.1136/bjsports-2019-101206</p>			
<p>Purpose To explore the role of psychological, social and contextual factors across the recovery stages following a traumatic time-loss sport-related injury.</p> <p>Design Systematic Review</p>	<p>Sample 77 studies representing 5540 participants.</p> <p>Studies were included if they identified, described, or assessed a psychological, social, or contextual factor during the acute, rehabilitation, or RTS stages of recovery following a time-loss knee injury.</p>	<p>Measurements Collected data from each study with psychological, social, and contextual factors identified in each. Each study was assessed for quality with two independent raters. 39% of the studies investigated both psychological and social factors.</p>	<p>Results Psychological themes: Outcome measures included Profile of Mood States, Emotional Responses of Athletes to Injury, Acceptance & Action Questionnaire, Depression Anxiety and Stress Scale, Multidimensional Health Locus of Control, Return to Sport after Injury Scale. 67 studies concluded anxiety (barrier to progress rehabilitation) and 38 studies concluded depression (reduced coping mechanisms) was the dominant theme in time-loss injury. Social themes: 30 studies concluded social support (family friends, teammates, coaches, medical staff) was beneficial.</p>
<p>Quality Excellent</p> <p>Comments/ Recommendations The social support provided by an AT was proven beneficial in decreasing psychological implications (anxiety and depression) of a time-loss injury.</p>			

<p>Source: Yang, J., Schaefer, J., 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. <i>Journal of Athletic Training</i> 49(6):773-9. https://doi.org/10.4085/1062-6050-49.3.65</p>			
<p>Purpose To examine the effect of social support received from ATs during injury recovery on reported symptoms of depression and anxiety at return to play among a cohort of collegiate athletes.</p> <p>Design A cohort study</p>	<p>Sample A total of 594 injuries sustained by 387 collegiate athletes. Sampled 2 Big 10 conference universities on 9 sports teams.</p>	<p>Measurements A 6-item social support questionnaire. Center for epidemiological studies depression scale. State trait anxiety inventory.</p>	<p>Results In 84.3% of injury events, injured athletes received social support from ATs during their recovery. 53.1% reported being very satisfied with the social support they received. Found ATs buffer the effects of anxiety and depression during the injury recovery process.</p>
<p>Quality Excellent</p> <p>Comments/Recommendations ATs would benefit from recognizing these situations and being able to provide the appropriate type of support. Whether or not injured athletes received social support from ATs during their injury recovery did not correlate with psychological outcomes at return to play.</p>			

<p>Source: Covassin, T., Crutcher, B., Bleecker, A., Heiden, E., Dailey, A., & Yang, J. (2014). Postinjury Anxiety and Social Support Among Collegiate Athletes: A Comparison Between Orthopaedic Injuries and Concussions. <i>Journal of Athletic Training</i> 49(4):462-468. https://doi.org/10.4085/1062-6059-49.2.03</p>			
<p>Purpose To compare the anxiety and social support of athletes with concussions and a matched group of athletes with musculoskeletal injuries.</p> <p>Design Cross-sectional Study.</p>	<p>Sample 525 injuries among 2 Big Ten Universities. Of these, 63 time-loss musculoskeletal injuries were matched with 63 concussion injuries.</p>	<p>Measurements State-Trait Anxiety Inventory. Modified 6-item Social Support Questionnaire</p>	<p>Results Concussion group: ATs (48%) Orthopedic Group: ATs (57%) Both concussed and those with musculoskeletal injuries experienced similar anxiety rates and relied on similar sources of social support post-injury (Trait= 47 C, 46 M; State= 31 C, 30 M; scale from 20-80, 80 being more severe anxiety).</p>
<p>Quality Excellent</p> <p>Comments/Recommendations Athletes with concussions and orthopedic injuries showed similar levels of state and trait anxiety. Athletes with orthopedic injuries reported more satisfaction with social support from all sources.</p>			

<p>Source: Lu, F. J. H., & Hsu, Y. (2013). Injured Athletes' Rehabilitation Beliefs and Subjective Well-Being: The Contribution of Hope and Social Support. <i>Journal of Athletic Training</i>, 48(1), 92–98. https://doi-org.ezproxy.bethel.edu/10.4085/1062-6050-48.1.03</p>			
<p>Purpose To examine how hope and social support uniquely and jointly predict post injury rehabilitation beliefs, rehabilitation behavior, and subjective well-being</p> <p>Design Cross-sectional study.</p>	<p>Sample 224 collegiate athletes with time-loss injuries.</p>	<p>Measurements Trait hope scale, sport injury rehabilitation beliefs survey, satisfaction with life scale, positive affectivity and negative affective scale, and multidimensional scale of perceived social support. Done after rehab treatment</p>	<p>Results Hope and social support predicted injured athletes' subjective well-being and rehabilitation beliefs. High social support was positively associated with subjective well-being ($p < .05$)</p>
<p>Quality Excellent</p> <p>Comments/ Recommendations Their findings support the notion human psychological strengths, including hope and perceived social support, are critical for helping injured athletes. Social support is an effective buffer between adverse life events and negative responses.</p>			

<p>Source: Mitchell, I., Evans, L., Rees, T., & Hardy, L. (2013). Stressors, social support, and tests of the buffering hypothesis: Effects on psychological responses of injured athletes. <i>British Journal of Health Psychology</i>, 19(3), 486–508. https://doi.org/10.1111/bjhp.12046</p>			
<p>Purpose To examine the relationship between social support and the psychological response to injury using the stress buffering effect.</p> <p>Design Cross-sectional study</p>	<p>Sample 2 studies done to measure the buffering effects social support has regarding the psychological response to time-loss injury. (Study 1= 319 participants. Study 2= 302 participants)</p>	<p>Measurements Utilized Social Support Inventory for Injured Athletes (SSIIA) and the Psychological Responses to Sport Injury Inventory (PRSII)</p>	<p>Results Moderated hierarchical regression analyses in Study 1 revealed significant ($p < .05$) stress-buffering effects for the perception of social support in relation to restlessness, isolation, and feeling cheated, and the perception of emotional support in relation to isolation.</p>
<p>Quality Excellent</p>			
<p>Comments/ Recommendations Understanding of the stress-buffering effects of social support in relation to injury stressors and psychological responses is an important factor in the physical and mental recovery of an athlete.</p>			

<p>Source: Malinauskas, R. (2010). The Associations among Social Support, Stress, and Life Satisfaction as Perceived by Injured College Athletes. <i>Social Behavior & Personality: An International Journal</i>, 38(6), 741–752. https://doi-org.ezproxy.bethel.edu/10.2224/sbp.2010.38.6.741</p>			
<p>Purpose Investigate the associations among social support, stress, and life satisfaction as perceived by college athletes with a minor or major injury.</p> <p>Design Cross-sectional design.</p>	<p>Sample 123 collegiate athletes with minor to severe time-loss athletic injuries.</p>	<p>Measurements Multidimensional scale of perceived social support (MSPSS), Perceived stress scale-10 (PSS-10), Satisfaction with life scale (SWLS).</p>	<p>Results Major injury group had less life satisfaction (Major 16.5 which is slightly dissatisfied, minor 22 which is slightly satisfied. $p = .001$). No difference in PSS between major and minor injury groups (MSPSS does not include AT). High perceived stress and total social support was correlated ($p = .01$) for major injuries.</p>
<p>Quality Excellent</p> <p>Comments/ Recommendations Stress-buffering mechanisms of social support increase life satisfaction.</p>			

<p>Source: Yang, J., Peek-Asa, C., Lowe, J. B., Heiden, E., & Foster, D. T. (2010). Social Support Patterns of Collegiate Athletes Before and After Injury. <i>Journal of Athletic Training</i>, 45(4), 372–379. https://doi.org/10.4085/1062-6050-45.4.372</p>			
<p>Purpose To examine the preinjury and postinjury social support patterns among male and female collegiate athletes.</p> <p>Design Prospective cohort study.</p>	<p>Sample A total of 256 National Collegiate Athletic Association Division I male and female collegiate athletes</p>	<p>Measurements Injury incidence was identified using the Sports Injury Monitoring System. Social support was measured using the 6-item Social Support Questionnaire</p>	<p>Results Social support from AT went from 49% before to 83% after injury and was the largest increase. Injured athletes reported relying more on coaches, ATs, and physicians for social support after they became injured.</p>
<p>Quality Good</p>			
<p>Comments/ Recommendations ATs need not only knowledge but also skills and strategies to provide positive psychological support to assist athletes in rehabilitation. Specific training is required to better equip ATs with the knowledge and skills for providing services beyond the prevention and care of athletic injuries.</p>			

<p>Source: Wayment, H. A., & Huffman, A. H. (2020). Psychosocial experiences of concussed collegiate athletes: The role of emotional support in the recovery process. <i>Journal of American College Health</i>, 68(4), 438–443. https://doi-org.ezproxy.bethel.edu/10.1080/07448481.2019.1577863</p>			
<p>Purpose To understand where concussed football players seek and receive emotional support and whether the support is associated with injury perceptions.</p> <p>Design Non-randomized controlled trial</p>	<p>Sample 26 NCAA Division I football players with diagnosed concussions.</p>	<p>Measurements Perceived seriousness and impact of concussion, depression/anxiety, attribution about concussion cause, emotional/social support, adverse psychosocial experiences, sport-injury related growth, and future reporting behavior.</p>	<p>Results Participants indicated they were more likely to report future concussions. Received more emotional support from AT than expected. Received a mean of 4 out of 5 for support received by AT which was significantly and positively correlated with future reporting intentions (Spearman rho= .395, p<.05) and had higher sport-injury related growth and lower adverse psychological perceptions (Spearman= .364, p<.06)</p>
<p>Quality Good</p> <p>Comments/ Recommendations The athletes in this study did not believe their concussions were very serious, but a normal consequence of playing football. Enhance athletes' knowledge of the injury recovery process. Investigate how to increase teammate support of concussed players. Emotional support for the psychological health and well-being of concussed collegiate athletes is essential.</p>			

<p>Source: Carr, B., Severance, S., Bell, T., & Zarzaur, B. (2020). Perceived Loss of Social Support After Non-neurologic Injury Negatively Impacts Recovery. <i>Journal of Trauma Acute Care Surgery</i> 88(1):113-120. https://doi.org/10.1097/ta.0000000000002515</p>			
<p>Purpose To determine if changes in perceived social support (PSS) influence long-term outcomes following non-neurologic injury.</p> <p>Design Cohort study</p>	<p>Sample 411 patients included. 287 completed the 4 month F/U, 249 completed 1 year F/U. Patients 18 years of age or older admitted to a Level 1 trauma center with injury severity score of at or more than 10 with no traumatic brain or spinal cord injury.</p>	<p>Measurements Screened for depression, PTSD(Mental Composite Score) and PSS(Multidimensional Scale of Perceived Social Support. All were obtained at initial hospitalization, 1, 2, 4, and 12 months post-injury. Considered a drop in PSS as DROP and those who did not as STABLE.</p>	<p>Results 67.2% (276) experienced a drop in PSS within the year to be considered “DROP”. DROP patients had higher depression and PTSD scores (p=.02).</p>
<p>Quality Good</p> <p>Comments/ Recommendations Perceived social support should be consistently high throughout the patient’s recovery process in order to provide maximal benefit. Patients who have a drop in PSS during the first year of recovery have significantly higher odds of poor psychological outcomes.</p>			

Inconclusive Evidence

<p>Source: Sabol, J., Kane, C., Wilhelm, M, Reneker, J., & Donaldson, M. (2021). The Comparative Mental Health Responses Between Post-Musculoskeletal Injury and Post-Concussive Injury Among Collegiate Athletes: A Systematic Review. <i>International Journal of Sports Physical Therapy</i> 16(1):1-11. https://doi.org/10.26603/001c.18682</p>			
<p>Purpose To summarize existing literature describing mental health responses in collegiate athletes with a concussion compared to those with a musculoskeletal injury.</p> <p>Design Systematic Review</p>	<p>Sample 6 articles included from PubMed, CINAHL, Scopus, ProQuest, and SportDiscus.</p>	<p>Measurements Joanna Briggs Institute(JBI) Critical Appraisal Tool. Extracted mental health responses of collegiate athletes (depression and anxiety), diagnosis of time-loss musculoskeletal injury or concussion, age, and time to return to play. Outcome tools for mental health responses included: State-Trait Anxiety Inventory, Centers for Epidemiological Studies Depression Scale, Profile of Mood States.</p>	<p>Results Both concussion and musculoskeletal injuries reported peak depressive symptoms 1-week post-injury (4 of 6 articles in agreement). State and trait anxiety reported elevated for both concussion and musculoskeletal compared to baseline and exceeded clinical levels 72-hours post-injury (3 of 6 articles).</p>
<p>Quality Excellent</p>			
<p>Comments/ Recommendations Peak depressive symptoms in athletes who sustain a concussion or musculoskeletal injury occur within one-week post-injury. This study identified athletes returning to play before their psychological symptoms had returned to their baseline.</p>			

<p>Source: Donohue, B., Gavrilova, E., Danlag, A., Perry, J., Kuhn, C., Allen, D. N., & Benning, S. D. (2020). A comprehensive examination of factors impacting collegiate athletes' utilization of Psychological Assessment and Intervention Services. <i>Psychology in the Schools</i>, 58(3), 458–474. https://doi.org/10.1002/pits.22458</p>			
<p>Purpose The purpose was to examine how structured interviews and demographic factors influence collegiate athletes to use psychological programming and interventions.</p> <p>Design Longitudinal randomized controlled trial</p>	<p>Sample 289 collegiate athletes from a D1 NCAA university in the United States were referred to participate in the study. They were screened for mental health and randomly assigned to one of two semi-structured interviews based on the experimental phase.</p>	<p>Measurements After completing a demographic questionnaire and symptom checklist 90-revised (SCL90-R) participants were randomly assigned to one of two engagement interventions which were designed to encourage their participation in TOPPS or traditional campus counseling.</p>	<p>Results Mental health: 36% subclinical levels of anxiety/depression, 13% clinical levels. 53% participated in intervention when referred by coach or teammate (social support from them). No statistical significance for the programs being beneficial because the subject pool was too small.</p>
<p>Quality Excellent</p> <p>Comments/ Recommendations The results support implementation of intervention programs focused on encouraging athletic administrators, coaches and teammates to make appropriate referrals to mental health services and implementation of mental health screens in collegiate athlete populations.</p>			

<p>Source: Shannon, S., Hanna, D., Haughey, T., Leavey, G., McGeown, C., & Breslin, G. (2019). Effects of a mental health intervention in athletes: Applying self-determination theory. <i>Frontiers in Psychology, 10</i>. https://doi.org/10.3389/fpsyg.2019.01875</p>			
<p>Purpose To determine the effect of mental health interventions (mindfulness program) for promoting emotional well-being, reducing stress, and increasing competence in mental health self-management.</p> <p>Design Non-randomized control trial</p>	<p>Sample 238 participants who were collegiate athletes. 108 were in the intervention group and 130 were in the control group.</p>	<p>Measurements Data collection through an online survey before and two-weeks following the intervention. Mindfulness Attention Awareness Scale (MAAS), Perceived Competence Scale (PCS), 10-item Perceived Stress Scale (PSS), and 14-item Warwick-Edinburgh Mental Well-being Scale (WEMWBS) were all used.</p>	<p>Results This intervention was not directly effective at increasing mindfulness itself. The effects on stress and wellbeing were indirectly recognized. No statistical evidence showing the interventions were beneficial.</p>
<p>Quality Good</p> <p>Comments/ Recommendations Student athletes frequently report the presence of sporting, academic and social stressors, the present study sought to examine the efficacy of a mental health intervention for reducing stress and promoting well-being while also contributing to theoretical understanding of the mechanisms of change in mindfulness interventions.</p>			

<p>Source: Drew, B., & Matthews, J. (2018). The Prevalence of Depressive and Anxiety Symptoms in Student-Athletes and the Relationship with Resilience and Help-Seeking Behavior. <i>Journal of Clinical Sport Psychology</i>. https://doi.org/10.1123/jcsp.2017-0043</p>			
<p>Purpose To investigate the prevalence of depressive and anxiety symptoms within student-athletes and to examine protective factors which may act as a buffer against mental ill-health.</p> <p>Design Cross-sectional design</p>	<p>Sample 185 student-athletes at a university in Ireland. 18 years of age or older.</p>	<p>Measurements Used the Depression, anxiety and stress scale (DASS-21), Connor-Division Resilience Scale (CD-RISC) which has social support questions as well as self-resiliency and help seeking.</p>	<p>Results 45% reported symptoms of anxiety and/or depression outside the normal range. No significant difference between men and women. Student-athletes who refrained from speaking about personal problems reported significant elevated symptoms of depression ($P = .02$).</p>
<p>Quality Good</p> <p>Comments/ Recommendations Need for university sport departments and student counseling services to increase the focus on mental health promotion for student athletes. Mental health check-ups. Build student-athletes' knowledge of how to seek help and the practical aspects of this behavior. 62% (24) who required professional help did not seek professional support.</p>			

<p>Source: Appaneal, R., Levine, B., Perna, F., & Roh, J. (2009). Measuring postinjury depression among male and female competitive athletes. <i>Journal of Sport and Exercise Psychology</i>, 31(1), 60–76. https://doi.org/10.1123/jsep.31.1.60</p>			
<p>Purpose To examine athletes' post injury depression symptoms using two different measurement strategies. Additionally, to provide a look at the effectiveness of a user-rated depression symptom checklist in identifying severely depressed athletes postinjury.</p> <p>Design Non-Randomized Trial</p>	<p>Sample Collegiate athletes were included in this study. The follow-ups had 134 participants at 1 week, 1 month, 3 months. Time-loss injury participants were compared to healthy participants (134 total= 77 injured, 77 healthy).</p>	<p>Measurements Graded type of time-loss injury. The 2 depression measurements were a CES-D Scale (Center for Epidemiologic Studies Depression Scale) and the Hamilton Rating Scale for Depression (used for anxiety in addition to depression) and given out when a time-loss injury occurred. Baseline mood states were collected before the study began.</p>	<p>Results Clinician-based depression ratings for athletes with injuries exceeded those of healthy athletes and remained elevated 1 week to 1 month post injury. Injured group had higher depression and anxiety scores than healthy ($d= 0.46$, 61 of 77 showed elevated)</p>
<p>Quality Good</p> <p>Comments/ Recommendations The findings of the study further prove the importance of having multiple approaches and clinical judgment when evaluating athletes' post injury depression symptoms.</p>			

<p>Source: Gouttebarga, V., Aoki, H., Ekstrand, J., Verhagen, E. A., & Kerkhoffs, G. M. (2015). Are severe musculoskeletal injuries associated with symptoms of common mental disorders among male European Professional Footballers? <i>Knee Surgery, Sports Traumatology, Arthroscopy</i>, 24(12), 3934–3942. https://doi.org/10.1007/s00167-015-3729-y</p>			
<p>Purpose To explore the association of severe musculoskeletal injuries/surgeries with symptoms of common mental health disorders in male professional footballers (soccer). The symptoms include distress, anxiety/depression, sleep disturbance, alcohol behavior, and smoking.</p> <p>Design Cross-sectional analysis</p>	<p>Sample 540 European professional footballers (mean age of 27 y/o) with time-loss injuries participated in the study.</p>	<p>Measurements Questionnaires used to measure mental health symptoms include the Four-Dimensional Symptom Questionnaire, the 12-item General Health Questionnaire, PROMIS, and the 3-item AUDIT-C. Only questionnaires sufficiently completed were eligible for analysis.</p>	<p>Results 68% of the participants had already incurred one or more severe joint injuries and 60 % incurred one or more severe muscle injuries. 37 % had higher anxiety/depression after injury. The number of severe musculoskeletal injuries was positively correlated with distress and anxiety.</p>
<p>Quality Good</p>			
<p>Comments/ Recommendations Due to the study being a cross-sectional analysis, it does not prove a direct causal relationship between independent (severe musculoskeletal injuries and surgeries) and dependent (symptoms of common MH disorders) variables. However, it does enable research to explore their potential associations.</p>			

<p>Source: Kilic, O., Aoki, H., Goedhart, E., Hagglund, M., Kerkhoffs, G., Kuijer, P., ... & Gouttebauge, V. (2017). Severe musculoskeletal time-loss injuries and symptoms of common mental disorders in professional soccer: A longitudinal analysis of 12-month follow-up data. <i>Knee Surgery, Sports Traumatology, Arthroscopy</i>, 26(3), 946–954. https://doi.org/10.1007/s00167-017-4644-1</p>			
<p>Purpose Exploring the interaction between symptoms of common mental health disorders (CMD) and severe musculoskeletal time-loss injuries in professional football players over a 12 month period.</p> <p>Design Prospective cohort study: Longitudinal analysis of 12-month follow up data</p>	<p>Sample 384 professional football players were enrolled in the study and 262 completed the 12-month follow up period. They were recruited by their national players union in five European countries. The mean age of participants was 27, and had played on average 8 years of professional football.</p>	<p>Measurements Symptoms of common mental health disorders included in the study were distress, anxiety, depression, sleep disturbance, and alcohol abuse.</p>	<p>Results From 193 who reported no mental health symptoms initially, 37% reported symptoms in the 12-month check-in. No relationship was found between the symptoms of mental health disorders creating an onset of severe time-loss injury.</p>
<p>Quality Good</p> <p>Comments/ Recommendations The hypothesis used: 1: professional football players reporting symptoms of CMD at baseline had an increased risk of severe musculoskeletal time-loss injury 2: professional football players suffering from severe musculoskeletal time-loss injuries at baseline were more likely to develop symptoms of CMD. Professional football players who suffer from severe time-loss injury are likely to develop subsequent symptoms of CMD. An early identification of players at risk creates the opportunity for an interdisciplinary medical team to treat accordingly</p>			

<p>Source: Bejar, M., Raabe, J., Zakrajsek, R., Fisher, L., & Clement, D. (2019). Athletic Trainers' Influence on National Collegiate Athletic Association Division I Athletes' Basic Psychological Needs During Sport Injury Rehabilitation. <i>Journal of Athletic Training</i> 54(3):245-254. https://doi.org/10.4085/1062-6050-112-18</p>			
<p>Purpose To explore athletes' perceptions of ATs' influence on their basic psychological needs as well as their motivation during sport injury rehabilitation</p> <p>Design Qualitative study</p>	<p>Sample 10 injured and previously injured athletes. 7 women and 3 men from various sports.</p>	<p>Measurements Semi-structured interviews were conducted and analyzed with consensual qualitative research methods. 4 domains: athletes' concerns about injury and rehabilitation; ATs' feedback and athletes' perceptions of competence; a person-centered approach from ATs and athletes' perceptions of autonomy; and a connection between ATs' and athletes' perceptions of relatedness.</p>	<p>Results Athletes' experiences were largely influenced by the degree to which they perceived ATs satisfied their 3 basic psychological needs. This was determined by the presence or absence of particular AT behaviors (providing encouragement, soliciting input, and building rapport). The degree of which these basic psychological needs were fulfilled affected their overall motivation during sport injury rehabilitation.</p>
<p>Quality Fair</p> <p>Comments/ Recommendations Suggest strategies for ATs to consider for promoting self-determined forms of motivation to facilitate positive physical and psychological recoveries.</p>			

Appendix B: Critical Appraisal Skills Programme (CASP) Tools

CASP: Randomized Controlled Trial

1. Did the study address a clearly focused research question?
2. Was the assignment of participants to interventions randomized?
3. Were all participants who entered the study accounted for at its conclusion?
4. Multiple:
 - a. Were the participants “blind” to the intervention they were given?
 - b. Were the investigators “blind” to the intervention they were giving to participants?
 - c. Were the people assessing/analyzing outcome/s “blinded”?
5. Were the study groups similar at the start of the randomized controlled trial?
6. Apart from the experimental intervention, did each study group receive the same level of care (were they treated equally)?
7. Were the effects of intervention reported comprehensively?
8. Was the precision of the estimate of the intervention or treatment effect reported?
9. Do the benefits of the experimental intervention outweigh the harms and costs?
10. Can the results be applied to your local population/in your context?
11. Would the experimental intervention provide greater value to the people in your care than any of the existing interventions?

* Each question was answered “yes”, “no”, or “can’t tell”.

CASP: Systematic review

1. Did the review address a clearly focused question?
2. Did the authors look for the right type of papers?
3. Do you think all the important, relevant studies were included?
4. Did the review's authors do enough to assess the quality of the included studies?
5. If the results of the review have been combined, was it reasonable to do so?
6. What are the overall results of the review?
7. How precise are the results?
8. Can the results be applied to the local population?
9. Were all important outcomes considered?
10. Are the benefits worth the harms and costs?

* Each question was answered "yes", "no", or "can't tell".

CASP: Qualitative Research

1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate?
3. Was the research design appropriate to address the aims of the research?
4. Was the recruitment strategy appropriate to the aims of the research?
5. Was the data collected in a way which addressed the research issue?
6. Has the relationship between researcher and participants been adequately considered?
7. Have ethical issues been taken into consideration?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of findings?
10. How valuable is the research?

* Each question was answered “yes”, “no”, or “can’t tell” except for Question 10.

CASP: Cohort Study

1. Did the study address a clearly focused issue?
2. Was the cohort recruited in an acceptable way?
3. Was the exposure accurately measured to minimize bias?
4. Was the outcome accurately measured to minimize bias?
5. Multiple:
 - a. Have the authors identified all important confounding factors?
 - b. Have they taken account of the confounding factors in the design and/or analysis?
6. Multiple:
 - a. Was the follow up of subjects complete enough?
 - b. Was the follow up of subjects long enough?
7. What are the results of this study?
8. How precise are the results?
9. Do you believe the results?
10. Can the results be applied to the local population?
11. Do the results of this study fit with other available evidence?
12. What are the implications of this study for practice?

* Each question was answered “yes”, “no”, or “can’t tell”.

CASP: Case Control Study

1. Did the study address a clearly focused issue?
2. Did the authors use an appropriate method to answer their question?
3. Were the cases recruited in an acceptable way?
4. Were the controls selected in an acceptable way?
5. Was the exposure accurately measured to minimize bias?
6. Multiple:
 - a. Aside from the experimental intervention, were the groups treated equally?
 - b. Have the authors taken account of the potential confounding factors in the design and/or in their analysis?
7. How large was the treatment effect?
8. How precise was the estimate of the treatment effect?
9. Do you believe the results?
10. Can the results be applied to the local population?
11. Do the results of this study fit with other available evidence?

* Each question was answered “yes”, “no”, or “can’t tell” except for questions 7 and 8.