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## Confidence Level Of Primary Care Providers In Authorizing Athletic Return-To-Play

Cassie L. Austin

Laura H. Flippin

Cody R. Gullick

William J. Hodentott

Camille W. Lott

*See next page for additional authors*

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**Author**

Cassie L. Austin, Laura H. Flippin, Cody R. Gullick, William J. Hodentott, Camille W. Lott, and Hillary B. Lott

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AUTHORIZING ATHLETIC RETURN-TO-PLAY

By

Cassie L. Austin

Laura H. Flippin

Cody R. Gullick

William J. Hodnett

Camille W. Lott

Hilary B. Lott

A Clinical Research Project  
Submitted in Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Nursing, College of Nursing  
and Speech Language Pathology  
Mississippi University for Women

COLUMBUS, MISSISSIPPI

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Graduate Committee Approval

The Graduate Committee of

Cassie L. Austin, Laura H. Flippin, Cody R. Gullick,  
William J. Hodnett, Camille W. Lott, and Hilary B. Lott

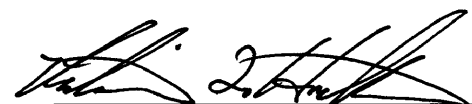
hereby approves their research project as meeting  
partial fulfillment of the requirements for the Degree of  
Master of Science in Nursing

Approved:   
Committee Chair

Approved:   
Committee Member

Approved: \_\_\_\_\_  
Committee Member

Approved:

  
Director of Graduate Studies

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Cassie L. Austin, BSN, RN

Laura H. Flippin, BSN, RN

Cody R. Gullick, BSN, RN

William J. Hodnett, BSN, RN

Camille W. Lott, BSN, RN

Hilary B. Lott, BSN, RN

Mississippi University for Women, 2018

Supervising Faculty: Alena Lester, DNP, APRN, FNP-C, ONP-C

**Abstract**

The purpose of this study was to identify the level of confidence for primary care providers in authorizing athletic return-to-play following sports-related injury. The Centers for Disease Control and Prevention (CDC) (as cited in Patel, Yamasaki, & Brown, 2017) reported that 2.6 million children and teens ages 0-19 years are treated annually for sports-related injuries, and 7.2 million high school students participate in sports and suffer an estimated 2 million injuries that require 500,000 doctor visits and 30,000 hospitalizations annually. Although primary care providers are providing care for musculoskeletal and concussive injuries, Benham and Geier (2016) reported that they may not have the confidence, knowledge, or skill to manage common musculoskeletal conditions in their primary care practice. Excellent provisions of such care will require providers who are safe and confident in the management and treatment of sports-related injuries to ensure high-quality patient care (Benham & Geier, 2016).



Researchers distributed written surveys, and links to a survey were distributed via social media postings, email, and SurveyMonkey to qualifying participants including Doctors of Medicine (MD), Doctors of Osteopathic Medicine (DO), nurse practitioners (NP), and physician assistants (PA). Data collected indicated that only 47.6% primary care providers were confident with returning youth athletes back-to-play following a sports injury, 34.7% were confident in treating sports-related concussive injuries, and 50% were confident in treating sports-related musculoskeletal injuries. Primary care providers can use this information to expose areas for confidence improvement that can be met with continued education, in-services, and workshops. Schools of medicine and nursing can use these findings to improve musculoskeletal curricula in primary care education. Determining primary care provider confidence level in authorizing athletic return-to-play is imperative in ensuring patient safety and access to thorough and competent care from initial injury to full resolution.

## TABLE OF CONTENTS

	Page
COPYRIGHT PAGE .....	iii
ACKNOWLEDGEMENTS .....	iv
ABSTRACT .....	v
LIST OF TABLES .....	ix
LIST OF FIGURES .....	x
CHAPTER I: Introduction: Dimensions of the Problem .....	1
Problem Statement .....	2
Statement of Purpose .....	3
Significance of Study .....	4
Theoretical Framework .....	5
Research Question .....	6
Definitions of Terms .....	6
Assumptions.....	8
CHAPTER II: Review of Literature .....	9
Authorization of Athletic Return-To-Play: Relevance and Guidelines .....	9
Authorization of Athletic Return-To-Play: Primary Care Provider's Confidence Level and Knowledge .....	22
Summary .....	36
CHAPTER III: Methodology.....	37
Design of Study.....	38
Setting .....	38

Population and Sample .....	38
Methods of Data Collection.....	39
Methods of Data Analysis.....	39
CHAPTER IV: Presentation of Findings.....	41
Profile of Study Participants .....	42
Statistical Outcomes Regarding the Research Question.....	44
Provider’s Overall Confidence.....	46
Influences on Provider Confidence.....	47
CHAPTER V: Summary, Conclusions, and Recommendations .....	49
Summary and Discussion of Findings .....	50
Limitations .....	56
Conclusions.....	57
Recommendations.....	57
Summary .....	59
REFERENCES .....	61
APPENDICES	
A. Approval of Institutional Review Board .....	65
B. Letter to Committee Members.....	66
C. Letter to Survey Participants .....	68
D. MUW Primary Care Provider’s Survey of Confidence Level in Authorizing Youth Athletic Return-to-Play .....	69

## LIST OF TABLES

Table	Page
1. Frequency of Sports-related Visits per Month ( $N = 124$ ) .....	42
2. Frequency of Ratings on Confidence Questions ( $N = 124$ ) .....	45
3. Factors that Significantly Influenced Average Confidence Score .....	48

## LIST OF FIGURES

Figure	Page
1. Years of experience for survey respondents ( $N = 124$ ).....	44
2. Frequency of ratings on confident questions ( $N = 124$ ).....	46
3. Histogram of average confidence scores .....	47

## CHAPTER I

### **Introduction: Dimensions of the Problem**

Sports-related injuries affect one in every five persons between the ages of 5 and 24 years (Bell et al., 2016). The Centers for Disease Control and Prevention (CDC) (as cited in Patel, Yamasaki, & Brown, 2017) reported that 2.6 million children and teens ages 0-19 years are treated annually for sports-related injuries and 7.2 million high school students participate in sports and suffer an estimated 2 million injuries, requiring 500,000 doctor visits and 30,000 hospitalizations annually. Included in these sports-related injuries are concussions. The CDC estimates between 1.6 and 3.8 million sports-related concussions occur annually in the United States (Lynch, 2016), resulting in approximately 180,000 emergency room visits (Chrisman, Quitiquit, & Rivara, 2013). According to Bires, Leonard, and Thurber (2017), concussions contribute to one third of all injury-related deaths in the United States, and emergency department visits among children and adolescents have increased by 60% for sports and recreation-related traumatic brain injuries, including concussions in the past decade.

The compilation of these sports-related injuries on the nation's youth leads to long-term impacts on the nation's health. Musculoskeletal disorders currently affect one third of the total population in the United States, with an estimated 60 million patients expected to require treatment for such disorders by 2020. In terms of economic impact, the U.S. Bone and Joint Initiative noted that musculoskeletal disorders resulted in an estimated direct cost of \$796 billion and an additional \$77 billion in indirect costs from 2009-2011. Many sports injuries incurred in the young contributed to disability in

adults. Disability is identified as a key factor in indirect costs, meaning these disabled individuals will require long-term management for their chronic musculoskeletal conditions. This finding is an important detail to consider for primary care providers, especially nurse practitioners who are increasingly called upon to serve as primary care providers for the increased aging and medically-underserved populations (Benham & Geier, 2016).

Youth athletes and parents in the current study relied on primary care providers to treat musculoskeletal injuries and eventually authorized athletic return-to-play. With the expansion of healthcare access and implementation of the Affordable Care Act, more patients now have access to care. This increase in the insured has broadened the available provider-to-patient ratio. In rural and medically underserved areas, the population heavily depends on nurse practitioners to provide care. These nurse practitioners must be able to correctly diagnose and recognize acute orthopedic emergencies from the non-emergent musculoskeletal injuries as well as grant clearance for athletic return-to-play due to the decline in orthopedic specialty availability. These facts validate why primary care provider training, confidence in management, and knowledge of musculoskeletal conditions must be thoroughly evaluated to ensure high-quality patient care (Benham & Geier, 2016).

### **Problem Statement**

The decrease in orthopedic specialty availability has resulted in an increased dependence on primary care providers to treat musculoskeletal and concussive sports-related injuries. Although primary care providers are providing care for

musculoskeletal and concussive injuries, Benham and Geier (2016) reported that they may not have the confidence, knowledge, or skill to manage common musculoskeletal conditions in their primary care practice. Benham and Geier (2016) found that musculoskeletal content in curricula was lacking in preparing both nurse practitioners and physicians to treat musculoskeletal disorders. This lack of content has not been prioritized because common musculoskeletal injuries are not life-threatening. Benham and Geier (2016) noted that, “the value of primary care providers in promoting musculoskeletal health, treating musculoskeletal conditions effectively, and preventing disability is becoming more apparent” (p. 328). In addition to musculoskeletal conditions, the demand for primary care providers’ competency in the evaluation and management of concussions during both the initial presentation and clinical follow-up has also increased (Lynch, 2016).

### **Statement of Purpose**

With the high prevalence of musculoskeletal conditions and sports-related injuries currently being seen by primary care providers, the predicted increase in these injuries and the increase in demand for nurse practitioners to treat these patients afford the opportunity to directly improve quality of patient care and quality of life and reduce the economic burden associated with these types of injuries. Excellent provisions of such care will require providers who are safe and confident in the management and treatment of sports-related injuries to ensure high-quality patient care (Benham & Geier, 2016). The literature indicated that there may be a dearth of primary care providers who possess these skills with confidence. The purpose of this study, therefore, was to



identify the level of confidence for primary care providers in authorizing athletic return-to-play following a sports-related injury as well as treating a sports-related injury.

### **Significance of Study**

Determining primary care provider confidence level in authorizing athletic return-to-play is imperative in ensuring patient safety and access to thorough and competent care from initial injury to full resolution. The study by Benham and Geier (2016) found that musculoskeletal curriculum and clinical training in primary care education have not been prioritized and, therefore, have been lacking.

This research study will be of great use to primary care providers in that it will help identify possible factors which cause hesitation in utilizing his or her full scope of practice and, therefore, expose areas for improvement which could easily be met with continued education, in-services, and workshops. Improving provider confidence in managing sports-related injuries will streamline patient care and save time as well as costs for society as a whole and for the patient, especially those in rural areas with limited access and options for specialty healthcare providers. Findings from this study may hold significance for medical and nursing education as well as provide important information on the necessity of self-confidence of students who enter the primary care practice and manage sports-related injuries. Benham and Geier (2016) noted in one study that there was a significant increase in musculoskeletal knowledge when coupled with experience and continuing education.

Finally, there is a lack of research assessing the confidence level of primary care providers in treating and managing sports-related injuries. The results of this study can play an integral role in filling that gap.

### **Theoretical Framework**

The Health Promotion Model (HPM) is a widely used conceptual framework in healthcare research. Nola J. Pender developed the HPM with a primary focus on how individuals make decisions regarding their health and the collaboration of healthcare providers in promoting healthy lifestyle choices and the prevention of decline in overall well-being. Pender became increasingly concerned when she realized that healthcare professionals only intervened in a patient's health status once he or she developed complications from an acute or chronic illness. The HPM was "formulated with the goal of integrating what is known about health-promoting behavior to generate questions for further testing" (Alligood, 2014, p. 403).

The HPM was utilized as the conceptual framework for the research study regarding the confidence level of primary healthcare providers in authorizing athletic return-to-play after injury. The constructs that were utilized to guide the study were the following: self-efficacy, perceived barriers to action, situational influences, and interpersonal influences of healthcare providers and their level of confidence with authorizing youth athletes to return to play after a sports injury. Self-efficacy focused on the healthcare providers' own personal beliefs of confidence level. Perceived barriers to action focused attention on any outside or interpersonal factors that may be prohibiting the healthcare providers' level of confidence with return-to-play

authorization. Situational and interpersonal influences of the healthcare providers were addressed in this study including their attitude, any inherited beliefs, and self-perception of any behaviors that could hinder or enhance their level of confidence (Alligood, 2014).

### **Research Question**

The current research study sought to answer a problem pertaining to primary care practice. The study was based on the following research question: What is the level of confidence for primary care providers in authorizing return-to-play for youth athletes following a sports-related injury?

### **Definition of Terms**

The current research study includes terminology which should be defined. The purpose of these definitions is to prevent any misunderstanding of the content. The theoretical and operational definitions for research terminology are listed as follows:

#### **Confidence**

*Theoretical:* A feeling of self-assurance arising from an appreciation of one's own abilities or qualities ("Confidence," 2018).

*Operational:* The level of comfort and familiarity of primary care providers in authorizing athletic return-to-play as reflected in the survey questionnaire.

#### **Primary care providers**

*Theoretical:* A healthcare provider who sees patients with common medical problems. ("Choosing a primary care provider," 2017).

*Operational:* Physicians, nurse practitioners, physician's assistants, or other medical practitioners who practice in one of the clinics utilized in this study and participated in answering the survey questions of this study.

### **Authorization**

*Theoretical:* The action or fact of authorizing or being authorized; a document giving permission or authority (“Authorization,” 2017).

*Operational:* A primary care provider stating that his or her medical opinion is that an athlete may resume participation in athletic sports, either with full or conditional clearance.

### **Return-to-play**

*Theoretical:* The point in recovery from an injury when a person is able to go back to playing sports or participate in an activity (Herring, Kibler, & Putukian, 2012).

*Operational:* The point in recovery when injured athletes ages 6-19-years old are granted authorization to resume sports activity from the primary care providers that participated in the survey questionnaire.

### **Youth athlete**

*Theoretical:* A person who is trained or skilled in exercises, sports, or games requiring physical strength, agility, or stamina (“Athlete,” 2017).

*Operational:* An athlete engaging in any type of physical activity between the ages of 6 and 19 years who is being treated by primary care providers surveyed in this study.

**Sports-related injury**

*Theoretical:* An injury to the soft tissue or bone resulting from acute trauma or repetitive stress during athletic activity (“Sports Injuries.” 2018).

*Operational:* Any physical injury that occurs during participation in an athletic sport.

**Assumptions**

The current research makes three assumptions in regard to certain aspects of the study. These assumptions made by researchers are listed as follows:

1. The responders to the research survey are willing participants.
2. Anonymity will be protected and ensure honest responses from participants.
3. Primary care provider confidence level in treating sports-related injuries will vary.
4. Researchers will utilize Nola Pender’s Health Promotion Model in the research design and the evaluation of survey responses.

## CHAPTER II

### Review of Literature

In Chapter II, a review of literature regarding the confidence level of primary care providers in authorizing athletic return to play after a sports-related injury and this topic's relevance for this study will be presented. The researchers used academic databases, including CINAHL, Google Scholar, Medline, and PubMed, to find a pertinent literature base for this study. The researchers used keywords such as *ACL*, *athletic*, *authorization*, *comfort level*, *concussions*, *guidelines*, *musculoskeletal*, *primary care providers*, *return to play*, and *sports injuries*. The following review of literature discusses pertinent topics such as relevance of athletic injuries, return to play guidelines, and primary care providers' knowledge and comfort level of return-to-play guidelines. Of the 18 studies reviewed, 15 were utilized in the literature review section of this research project.

#### **Authorization of Athletic Return-To-Play: Relevance and Guidelines**

Patel et al. (2017) performed a retrospective article review of previous studies to show the epidemiology of sports-related musculoskeletal injuries among youth and adolescents. According to a study conducted by the Centers for Disease Control and Prevention (CDC) (as cited in Patel et al., 2017), 7 million students in high school participated in sports with an estimated 2 million injuries, 500,000 doctor visits, and 30,000 hospitalizations annually. Football accounted for the highest number of injuries in one sport. An astounding annual occurrence of sports/recreational-related injuries of 8.6 million—with a higher rate in lower extremities—accounted for 42% of these

injuries, upper extremities accounted for 30%, and head/neck injuries accounted for 16% (Patel et al., 2017).

More than 2.6 million children ages 19 years or younger were treated in the emergency department (ED) for musculoskeletal injuries due to sport participation. In 2011, the National Athletic Trainers' Association, in its Youth Sports Safety Statistics Report, stated there were 30 sports-related deaths and approximately 8,000 children per day were seen in the ED for sports-related injuries (Patel et al., 2017).

Caine, Purcell, and Maffulli (2014) provided a current review of concepts related to the epidemiology, diagnosis, and management of three of the most common sports-related injuries sustained by children and adolescent athletes. The three injuries include anterior cruciate ligament (ACL) tears, physeal injuries, and concussions. Caine et al. (2014) suggested that among sports-related injuries these three mentioned above pose the most serious complications if left untreated or treated improperly. Sports injuries in these young athletes should be taken seriously and treated respectively.

Caine et al. (2014), through analysis of studies related to sports injuries, found that most injuries involved the knee and ankle. For example, in a representative sample of 100 high schools in the United States involved in nine sports during 2005–2007, ankle injury was most common (20.9%), followed by the knee (15.2%). Physeal injuries account for between 15% and 30% of all emergency room skeletal injuries in children. A systematic review of the case series literature on growth plate injuries revealed that 38.3% of 826 acute cases were sport-related. Among these, 45 (14.2%) were associated

with some degree of growth disturbance. It is estimated that as many as 3.8 million concussions occur in the United States per year during competitive sports; however, as many as 50% of concussions may go unreported (Caine et al., 2014).

Young athletes may be more vulnerable to athletic injuries based on the physical and physiological processes of growth. Risk factors of young athletes in relation to the three injury types include growth plate vulnerability, possible differences between biological and chronological age, the adolescent growth spurt, and differential growth. Young athletes might also be at increased risk of injury because of immature or underdeveloped coordination, skills, and perception. These processes are another primary reason that children and adolescents are at high risk of complications later in life after being injured (Caine et al., 2014).

Caine et al. (2014) focused on each of the three injuries when explaining proper diagnosing and management. The proper diagnosis and management of ACL tears are important because the youth, depending on their age and developmental stage, require different management techniques, such as bracing the affected leg, physical therapy, or surgery. Caine et al. (2014) conferred about concussive injuries in youth. Children and adolescents take longer than adults to recover after a concussion, which underscores the need for a more conservative approach to management and return to play. Caine et al. stated any child or adolescent suspected to have sustained a concussion should be immediately removed from play and not allowed to return until cleared by a physician and symptoms have resolved for several days. Further, activity should be returned to gradually. Lastly, Caine et al. (2014) discussed the management of a physeal injury.



These injuries are managed depending on the location and type of fracture. These can cause deformities in the growing bones of these athletes and require rest or sometimes even surgery for correction.

Caine et al. (2014) suggested that the youth population participating in sports early gives rise to the coincidence of injuries. Prevention of these injuries is essential to decrease complications like osteoarthritis, disabilities, and discomfort as children and adolescents continue throughout their lifespan. Caine et al. (2014) offered primary care providers information on epidemiology, diagnosis, and management of ACL injuries, concussions, and physal injuries in youth athletes.

Carson et al. (2014) conducted a retrospective study of electronic medical records to determine what proportion of patients experience an exacerbation of their symptoms as a result of premature return to play (RTP) and return to learn (RTL) following sport-related concussions. The setting was a sports and family practice in Ontario, Canada, of a physician who assessed sports-related concussions after self-referral or referral from other primary care physicians, teams, and schools. A total of 170 charts of 159 patients were assessed for sports-related concussions during a 5-year period (April 2006-March 2011). Participants were students participating in sports at the time of injury. Many students with sports-related concussions experience a recurrence of worsening of symptoms after premature RTP or RTL which suggests that the students have not adequately recovered. Most sport-related concussions are first assessed by family physicians and emergency physicians, who play an important role in determining the duration and effects of concussions and guaranteeing quick and

thorough recoveries. Physicians can pose a barrier to recovery if they have inadequate knowledge of sports-related concussion management.

Carson et al. (2014) suggested the best-practice recommendation for concussion management is rest until all symptoms resolve followed by the implementation of a graded program of exertion before complete return to play activity. Cognitive and physical rest is emphasized, particularly in the days following the injury, as activities that require concentration and attention might exacerbate symptoms and delay recovery. Carson et al. (2014) discovered that concussions occurred in 41 elementary students, 95 in high school students, and 34 in college age students. Only 45 (26.5%) of the concussion cases were seen in an emergency department after his or her concussion. This is significant as it reveals that the remaining concussion cases were seen in their primary care provider's clinic. Researchers revealed that a relapse of symptoms occurred in 82 (48.2%) of concussions, and recurrence or worsening symptoms were noted in 43.5% of cases following RTP and in 44.7% of concussions following RTL. Patients who had a history of one or more previous concussions required more days of rest before being medically authorized to return to any physical activity when compared to patients with no previous concussions (Carson, et al., 2014).

Increased awareness, dialogue, and formal concussion management strategies involving students, physicians, parents, coaches, school administrators, and teachers could provide better support and a more accommodating environment that would likely yield quicker resolution of post-concussion symptoms. It is important to understand cognitive rest is the best process of returning to play because about half of the students

with concussions experience symptom recurrence on RTP and RTL. Physicians recommended restrictions in mental and physical activity following sport-related concussion without a clear understanding of what guidelines for RTP and RTL entails (Carson et al., 2014).

Carson et al. (2014) revealed that premature physical and cognitive exertion can delay complete recovery or cause symptoms to recur, hence, the importance of preventing premature RTP and RTL in student athletes. If primary care providers are given more information of what guidelines entail, fewer incidences of premature RTP and RTL may occur.

Makdissi, Davis, and McCrory (2014) published guidelines for managing sports-related concussions in the general practice settings. Makdissi et al. provided detailed information on the overview of concussions in sports, issues in clinical diagnoses and management, and criteria for return to play. Concussion is a very common injury in body contact sports. Recent reports from the United States estimate 1.6 to 3.8 million cases of sports-related brain injuries. With such a high incidence rate, it is important for primary care providers to be able to recognize the signs and symptoms of concussions, manage and treat their symptoms, and determine when it is safe for the athlete to return to play (Makdissi et al., 2014).

After the diagnosis of concussion has been made, it is the decision of the primary care provider to determine when the athlete can safely return to play. According to Makdissi et al. (2014) a player should not be allowed to return to play until they have fully recovered from their injury. Since there is no standard method for

providers as to when athletes may return to competition, they must rely on indirect measures to inform clinical judgement. This involves a comprehensive clinical approach including the following: (a) a period of cognitive and physical rest to facilitate recovery, (b) monitoring post-concussion symptoms and signs to assess recovery, (c) the use of neuropsychological tests to estimate recovery of cognitive function, and (d) a graduated return to activity with monitoring for recurrence of symptoms (Makdissi, et al., 2014).

Davies, McCarty, Provencher, and Manske (2017) published a mixed qualitative descriptive/systematic review of current literature pertaining to guidelines and criteria for returning an athlete to sports participation after anterior cruciate ligament (ACL) reconstructive surgery. The purpose of this study was to describe the current literature related to criteria for return to sports (RTS) authorization following anterior cruciate ligament reconstruction (ACL-R), with primary focus on the usage of a functional testing algorithm (FTA). Davies et al. (2017) also stated that their literature review raised the following research question: What are the criteria used for clinical reasoning and decision-making for return to sports (RTS)?

Injuries affecting the anterior cruciate ligament (ACL) are quite common with approximately 350,000 requiring reconstructive surgery each year in the United States. Despite effective surgical correction and comprehensive physical rehabilitation, ACL re-injury rates and 5- to 10-year post-injury incidence of osteoarthritis remains high. These factors also contribute to further knee dysfunction as well as negatively impact

the patient's quality of life. The researchers postulated that the individualization in the authorization of returning athletes to participation in sports is of paramount importance.

While this particular type of complicated injury requiring surgical repair would certainly fall outside the scope of care for a primary care nurse practitioner, it is important to be aware of the delicate nature of this injury and its treatment due to its frequency of occurrence and the high likelihood of re-injury and chronic alteration in functionality. It is noteworthy to mention that the patient will at some point thereafter require primary care which may be provided by a primary care nurse practitioner. It is also important to note that a primary care nurse practitioner should be aware of tests or guidelines that he or she could use in clinic to assess for and identify possible ACL injury or reinjury in order to make timely and appropriate specialty referral (Davies et al., 2017).

Davies et al. (2017) reviewed 50 FTA-focused articles (one of which was a systematic review of 264 studies). These researchers found a lack of standardized, evidence-based criteria for authorizing RTS and that most current trends in research were in support of "milestone-based progression with examination via objective and functional testing" regarding the authorization of RTS. It is based on these findings from the review of literature that the primary focus of this study would pertain to "quantitative and qualitative FTA criterion-based impairments, strength and power testing, and functional testing" (p. 308). Davies et al. (2017) first defined the *FTA* as "an objective, quantitative, and qualitative method to safely and effectively assess a patient's progress from immediate post-injury/post-op to return to complete resolution

of injury and RTS” (p. 309). Davies et al. further defined the purpose of the FTA as “to identify a patient’s particular deficits so that they can be addressed through the rehabilitation program” (p. 309). The FTA is composed of strength/power tests that assess for functional limitations and functional tests that assess for residual disability, with each test sequentially increasing stress on the patient. If a particular test indicates a deficit, targeted physical rehabilitation is implemented and then the patient is retested. The researchers noted that this method of incremental testing resulted in rapid physical rehabilitation times due to the focused physical therapy implemented to address the specific deficit of the patient (Davies et al., 2017).

Davies et al. (2017) showed that despite the numerous recent studies published on the topic, they are lacking in predictive validity for specific criteria in authorizing RTS. Therefore, based on the current literature and the 37 years of clinical experience of the senior author, the following recommendations were offered to assist in the guidance of authorizing RTS and focus on future studies in developing standardized criteria for RTS:

- 1) testing to evaluate psychometric characteristics, 2) testing to evaluate deficits as well as strength/power, 3) assessment of function and performance, 4) sport-specific testing/simulation, 5) final-phase fatigue factors during testing, 6) psychological testing for kinesiphobia, and 7) patient-reporting of outcomes.
- (Davies, et al., 2017, p. 311)

A systematic review of literature pertaining to various methods of functional testing following ankle injuries was conducted by Clanton, Matheny, Jarvis, and

Jeronimus (2012). Clanton, et al. (2012) stated that the decision to authorize athletic return to play is based on a multitude of factors, of which there are currently no standard evidence-based guidelines. This study was performed to appraise the evidence that supports the use of functional tests as determining factors in the decision for authorizing return to play. Functional tests used were the following: (a) Range of Motion: The Dorsiflexion Lunge Test, (b) Balance and Proprioception: The Star Excursion Balance Test, (c) Agility: Agility T-Test, and (d) Strength: Sargent/Vertical Jump Test which evaluated patient readiness for return to play following ankle injury.

Ankle sprains and fractures respectfully accounted for 76.7% and 16.3% of sports-related injuries, making them the most common site for injury (Clanton et al., 2012). Of these sprains, 80% will have a recurrence of the injury and 72% will manifest with chronic symptoms. Clanton et al. stated that premature return to play is a strong factor with re-injury. There are no specific evidence-based guidelines, especially regarding ankle injuries, in authorizing return to play (Clanton et al., 2012).

Clanton et al. (2012) described the following four simple and easy-to-use functional tests: Range of Motion: The Dorsiflexion Lunge Test, Balance and Proprioception: The Star Excursion Balance Test, Agility: Agility T-Test, and Strength: Sargent/Vertical Jump Test. These functional tests evaluated patient readiness for return to play following ankle injury, along with a full health history and assessment of risk factors, and are of great use to nurse practitioners in the primary care setting. These four tests align with the World Health Organization's support of assessing health and disability in terms of function. The Dorsiflexion Lunge Test assessed range of motion,

balance, gait, and ease of positional change. The Star Excursion Balance Test assessed balance, position sense, joint stability, muscle strength, and flexibility. The Agility T-Test assessed cognitive processes and the ability to quickly alter directional movement. The Sargent/Vertical Jump Test assessed strength, speed, dexterity, and “explosive power of the lower limb” (Clanton et al., 2012, p. 473).

Bell et al. (2016) conducted a one-year-observational, cross-sectional study of the prevalence of high school athletes who were involved in sport specialization with a secondary study focused on lower extremity injuries in relation to a sport specialization. A sports-related injury accounts for 1 in every 5 persons between the ages of 5 and 24 years. Medical professionals have previously reported the dangers on athletes and the practice of sport specialization. A total of 302 athletes completed the survey. The results revealed that athletes who had a classification of high in sport specialization ( $n = 110$ , 36.4%) also had the highest percentage reported for overuse injury on the survey ( $n = 18$ ) compared to moderate ( $n = 8$ ) or low ( $n = 7$ ). Of the athletes that completed the survey, 64 reported a history of knee injuries and 33 with a history of hip injuries. It was noted that the athletes who admitted to overuse knee injuries specialized in one sport with training > 9 months out of the year. Participants who reported overuse knee injuries are at higher risk for chronic conditions, such as Osgood-Schlatter disease (Bell et al., 2016).

Smith et al. (2015) performed a prospective observational cohort study in 2011 on 98 softball players. The purpose of this study was to perform a descriptive analysis of reported injuries in youth fast-pitch softball during a single select-level season.



Although minimal research has been conducted, there are just as many or more injuries in softball than in baseball. Over 2 million women play fast-pitch softball—making it one of the most popular female sports in the United States. With the differences in physical maturity, youth softball players are at greater risk for sustaining injuries than high school or collegiate softball players (Smith et al., 2015).

Smith et al. (2015) claimed the clinical significance of their study would be to recognize patterns of injury that could lead to safer competitive fast-pitch play. Youth players participate in select leagues or travel teams that play at elevated levels and have a strenuous schedule. Tournaments can be strenuous with some players possibly accumulating up to 36 hours of playing time in 4 days. Youth softball pitchers bear a huge load of physical stress pitching up to 100 pitches a game and sometimes playing three games a day in a 4-day tournament, but youth baseball pitchers are limited to 210 pitches a week. In the past, underhand pitching was considered safe with no need for pitch count, but recently “studies have shown that the windmill pitch produces similar biomechanical stresses on the shoulder as the overhand pitch” (Smith et al., 2015, p. 499).

Over 100 students were enrolled into the study and recruited from Washington University in St. Louis orthopedic clinics and the St Louis Baseball and Fast-pitch Academy (Smith et al., 2015). Ninety participants completed the surveys throughout the season. A total of six surveys went out to the participants. Smith et al. (2015) stated that each survey asked about their participation in fast-pitch softball since the prior survey, the type of participation (games, practice, instruction), injuries sustained

playing fast-pitch softball, number of games or amount of time lost due to the injury, and treatment received for any injury related to softball. Although 90 athletes completed the surveys throughout the season, 8 more athletes completed the surveys during the first 6 weeks of the season making a total of 98 participants for statistical data. There were 48 pitchers and 50 positional players in this survey, and 49 injuries were stated in 43 players (Smith et al., 2015).

Smith et al. (2015) stated that the “cumulative incidence of injury in all participants, including censored participants, was forty percent during the select season” (Smith et al., 2015, p. 501). Questions regarding games pitched, games played, and days of playing were answered in 50% of the surveys at the beginning and middle of the season and were answered in 30% at the end of that season. Smith et al. (2015) claimed that this made the data less useful in evaluating exposure. Thirty-one injuries were not related to pitching; out of those, 70% were lower extremity injuries. There were 18 injuries in 48 pitchers, and 78% of those occurred in the first 6 weeks of the season. Smith et al. found that 4 pitchers’ injuries were season-ending, 3 lost > 6 weeks, and one pitcher required shoulder surgery. The majority (40.9%) of pitchers threw between 50 and 75 pitches or between 75 and 100 pitches (36.5%) per game. It is noteworthy to mention that pitchers are more at risk for injuries (Smith et al., 2015).

Minimal research exists regarding softball players and even more importantly about softball pitching. Primary care providers need to be aware of the injuries that can and do occur with softball pitching. Without knowing these risks, providers cannot adequately prevent players from re-injury or educate about injuries.

## **Authorization of Athletic Return-To-Play: Primary Care Providers' Confidence Level and Knowledge**

Bires et al. (2014) conducted a study to compare the awareness of guidelines and the comfort levels of healthcare providers when authorizing athletes to return to play after concussions. Bires et al. intended to evaluate the protocols being used by the health care providers and determine whether they overlap with other suggested guidelines. Concussions contributed to a third of all injury-related deaths in the United States. During the last decade, emergency department visits among children and adolescents increased by 60% for sports- and recreation-related traumatic brain injuries (TBIs), which included concussions. Although there is evidence on the increase in diagnosis of concussions, there is no primary method to assess, evaluate, or treat these patients. It is important for healthcare providers to be aware of suggested guidelines to become more comfortable when making the decision of return-to-play. Bires et al. (2017) stated there is evidence that returning an athlete to play too early after concussion can have lifelong consequences.

A quantitative design was used to guide this study that consisted of a pretest and posttest for the participating subjects. The subjects in this study were recruited at a nurse practitioner conference held in Lancaster, Pennsylvania, in November 2013. The eligibility of the participants was only that they must have a current nurse practitioner license. The sample size of participants included 92% female participants and ranged from 20-60 years in age with majority of them being ages 51-60 years. The nurse practitioners ranged in specialties from adult, family, and pediatric areas. All of the

participants except one saw 0-5 concussions per week, and the others saw 6-10 concussions per week (Bires et al., 2017).

Bires et al. (2017) utilized a 15-item questionnaire consisting of multiple categories to assess the professional background of the participants, how often they were faced with concussions in their clinic, their comfort level with diagnosing, managing and deciding return-to-play, referral and follow-up processes, and an area for additional comments. The pretests were given to a convenient sample of nurse practitioners before they reviewed an educational PowerPoint on the material. Subsequently, the same items from the pretest were given to these participants as the posttest 8 weeks later. This allowed the researchers to assess their knowledge and confidence before and after the educational material was provided. Data were collected from 90 pretests and 25 posttests. The results of their data concluded a substantial increase in scores of the posttest after the educational material was provided. The educational intervention increased confidence level in making a diagnosis of concussion, assessing danger signs, and understanding when to refer to a specialist and were more comfortable finding resources for athletes and their parents (Bires et al., 2017).

Mitchell, Hildenbrand, and Pietz (2016) conducted a 32-question cross-sectional internet survey to evaluate emergency department physicians' knowledge of sports-related concussions (SRC) and return to play (RTP) guidelines. According to Mitchell et al. (2016), this study was conducted due to the increasing number of nationally reported concussions and the fact that little is known about emergency physicians'

knowledge of SRC and RTP guidelines. The Zackary Lystedt Law that was passed in 2009 was the first law in the nation to recognize that individuals lack knowledge and education about issues surrounding concussions which leads to incorrect care for athletes (Mitchell et al., 2016).

Mitchell et al. (2016) stated that, “Failure to recognize and properly manage concussions may be due to lack of knowledge and understanding among physicians of the most current and widely recognized Zurich Consensus Statement on Concussion in Sport form 2012” (p. 209). Based on the large number of resources available, many physicians often struggle to determine which are the most reliable and practical to use regarding concussion diagnosis and management. Healthcare providers may not have the proper training in best practices for SRC. Since primary care specialists tend to provide staffing in rural hospitals, it is imperative to determine the level of knowledge that physicians possess in relation to SRC and RTP guidelines (Mitchell et al., 2016).

In November 2016, Mitchell et al. conducted the survey in the states of Washington and Montana. The researchers attempted to contact all emergency departments’ physicians in these two states. The medical directors of the emergency departments were obtained through a listserv maintained by the Washington Chapter of American College of Emergency Physicians. After contacting the medical directors, the directors were asked to forward the survey to their colleagues working in their respective emergency departments. The survey was available via SurveyMonkey and could be assessed via computer or mobile device. The Centers for Disease Control and Prevention-ACTive Athletic Concussion Training for Coaches and the Sports

Concussion Assessment Tool 2 were used to develop the 32-question survey. Questions from both sources were used to develop the overall survey which included signs and symptoms, diagnosis, treatment, return to activity, and referral protocols for SRC. Ten Likert scale questions were also included in the survey. A total of 152 respondents completed the survey (Mitchell et al., 2016).

Mitchell et al. (2016) then used descriptive statistics to evaluate the differences in concussion knowledge based on identifying factors, such as training, years of experiences, SRC training, number of SRCs evaluated, trauma rating, and practice setting. The awareness and use of RTP guidelines and referral patterns were also evaluated. Of the 152 respondents, all stated that they had cared for patients with SRC within the past year; and 63% stated that they had cared for 11 or more patients with SRC. Mitchell et al. were unable to identify any significant difference in the physicians' training or practice setting when evaluating their SRC knowledge.

According to Mitchell et al. (2016), 63% (92 of 149) respondents were aware of RTP guidelines with only 37% (55 of 149) admitting they provided the guidelines to patients with SRC at discharge from the emergency department. When the physicians were asked questions pertaining to concussion knowledge, most questions were answered correctly the majority of the time. According to Mitchell et al. (2016), two notable exceptions were “Most (> 80%) concussions resolve in 7 to 10 days” and “Most (> 80%) concussions last a few weeks to a month” (p. 213). These were only answered correctly 60% (88 of 146) and 56% (83 of 147) of the time, respectively. It was also

concluded that the majority of referrals were sent to primary care physicians (86%, 128 of 149) (Mitchell et al., 2016).

Further research is needed to address why healthcare providers are not providing the RTP guidelines even though they are aware of their existence and the benefits of utilizing the guidelines. Future research into the presence of RTP guidelines within the hospital's electronic medical records would be beneficial to inform other healthcare providers about the issue based on lack of use of the guidelines. Ongoing management of SRC is needed amongst a variety of healthcare providers. Although most physicians are aware of the RTP guidelines, these researchers revealed that it is not being given to patients and family members upon discharge. Mitchell et al (2016) discovered that 94 of 149 (63%) of respondents were aware of RTP guidelines, but only 55 of the 149 (37%) chose to include RTP guidelines at discharge. This number is concerning as the number of sports injuries, specifically SRC, continues to grow; and more and more primary care physicians are being tasked with management of concussions and return-to-play authorization. It will be beneficial to determine if there is a low confidence level when it comes to providing RTP guidelines or to determine if emergency physicians are wanting to pass the responsibility off to someone else (Mitchell et al., 2016).

Arbogast et al. (2017) conducted a quality improvement study to determine whether a primary-care based intervention was effective in changing provider behavior surrounding two concussion management strategies: (a) performance of a vestibular oculomotor examination, an emerging technique in concussion assessment; and (2) provision of return-to-play (RTP) and return-to-learn (RTL) guidelines to patients at the

time of care. Due to the increasing number of concussions in youth, families are utilizing primary care providers (PCPs) for initial and follow-up care related to concussions. Insufficient time and training may limit adoption of best practices, including the implementation of emerging assessment techniques that can lead to over-referral to specialists, thereby unnecessarily burdening the healthcare system (Arbogast et al., 2017).

Minimal research is available on how primary care providers are managing the concussions and RTP guidelines. This study was performed with the goal that primary care providers would embrace and utilize the systematic documentation and the recommended best practice concussion management guidelines. The interventions used in this study were implemented within Children's Hospital of Philadelphia (CHOP). CHOP includes over 30 locations in Philadelphia and New Jersey. Arbogast et al. (2017) used the electronic health record to identify all concussion-related office visits to CHOP's primary-care practices from July 1, 2010, through June 30, 2014, for patients, ages 0 to 17 years, with an initial concussion visit during this period. A thorough needs assessment was performed to inform the development of the intervention, which included surveying primary care providers with regard to their current concussion knowledge, practices, and comfort level in providing care.

Arbogast et al. (2017) introduced a concussion-specific clinical decision support tool, the Concussion SmartSet referred to as the "SmartSet" (EpicCare, Epic Systems, Inc.) to primary care providers within the CHOP EHR system (Arbogast et al., 2017). This tool was used as a clinical decision support menu for documentation and order



options that helped standardize and streamline patient care. Further, this tool was also designed to guide PCPs through concussion-specific patient assessments for diagnosis and management (Arbogast et al., 2017). The researchers then used the EHR to identify all concussion-related office visits to CHOP's primary care practices from July 1, 2010, through June 30, 2014, for patients age 0 to 17 years, with an initial concussion visit during this period (Arbogast et al., 2017).

Arbogast et al. (2017) identified 14,527 concussion-related primary care office visits for 7,284 unique patients from July 1, 2010, to June 30, 2014. According to Arbogast et al., most patients were aged 5 to 19 years on the date of visit (98.5%), non-Hispanic white (76.0%), and had private insurance (86.4%). Slightly more than half (52.5%) were male. Exams performed after implantation of the SmartSet template increased to 95.3% which provides strong evidence that the template facilitated performance and systematic documentation of the examination components. Similarly, an increase from 19% pre-intervention to 85% post-intervention was seen with the implementation of RTL/RTP instructions. According to Arbogast et al. (2017), changing provider behavior is important in aligning contemporary strategies of healthcare quality and process improvement including the following: (a) the use of structured screening and diagnostic assessments, (b) the systematic and consistent documentation of care across a broad healthcare network, and (c) the conversion of best practice management guidelines into clinical practice. A result of this study is that by implementing screening tools into practice it generates improved provider-specific behaviors when caring for pediatric concussions. Arbogast et al. (2017) revealed an

improvement by PCPs' pre-intervention and post-intervention. This improvement indicates the providers believe that using the SmartSet is beneficial in clinical practice. Limitations of this study included that the researchers did not evaluate whether or not initiation of the SmartSet template increased the accuracy of the concussion diagnosis, the likelihood that a diagnosis would be made, or treatment decisions and clinical outcomes.

According to Arbogast et al. (2017), the PCPs in the CHOP network did not have an existing systematic approach to concussion assessment and management before the implementation of SmartSet. The researchers revealed that most primary providers were originally unfamiliar with vestibular oculomotor examination—a vital tool in concussion management practices. Overall, Arbogast et al. (2017) suggested that an intervention utilizing an electronic clinical decision support tool, coupled with in-person training, can effectively and quickly change provider behaviors leading to the early adoption of existing and emerging guidelines for concussion management and consistent and systematic documentation of those practices. With the rapid rise in concussions in youth and concussion care being provided by PCPs, it is important to investigate the screening tools that the PCPs are using in determining RTP authorization. According to the researchers, there is a need for additional training and support for PCPs in concussion screening and management. Such tools can increase PCP proficiency in concussion assessment, accelerate uptake of emerging knowledge, and promote practice consistency throughout an entire health care network (Arbogast et al., 2017).

Benham and Geier (2016) conducted an online population survey evaluating the degree of nurse practitioner (NP) preparedness to treat musculoskeletal conditions in primary care. Benham and Geier stated that the three-part purpose of this study aimed to answer the research question (How well are nurse practitioners prepared to treat common musculoskeletal conditions?) was as follows: (a) to estimate the number of musculoskeletal education hours provided in nurse practitioner curricula, (b) to evaluate nurse practitioner confidence in their management of musculoskeletal conditions, and (c) to assess nurse practitioner performance on a knowledge-based musculoskeletal test.

Musculoskeletal disorders currently affect one third of the population of the entire United States, and it is estimated that approximately 60 million patients will require treatment for such disorders by 2020. Benham and Geier (2016) noted that musculoskeletal disorders are a frequent complaint among patients seen in primary care settings, and nurse practitioners are increasingly needed as the primary care physician-to-patient ratio continues to broaden. It is for this reason that nurse practitioner training, comfort in management, and knowledge of musculoskeletal conditions should be thoroughly evaluated to ensure high-quality patient care. Strong statistical data were utilized to emphasize the importance of musculoskeletal knowledge as a provider of primary care (Benham & Geier, 2016).

Methodology involved the use of a self-reporting population survey which was conducted online through the secure SurveyMonkey website, which protected participant anonymity. The study was conducted from June 2014 through September 2014, and the population studied consisted of 185 practicing NPs in the United States.

To entice participant interest, the chance to win a cash prize of \$500 was offered to those who completed the online survey. The 51-question survey utilized included knowledge-based questions created and validated for the evaluation of physician training, comfort in management, and knowledge of musculoskeletal conditions. The survey was divided into three parts to assess demographics, confidence, and musculoskeletal knowledge (Benham & Geier, 2016).

The researchers discovered that of the 185 nurse practitioner survey participants, 114 (62%) completed the survey entirely and 71 (38%) did not answer any of the 25 knowledge-based musculoskeletal questions in the final section of the survey, which researchers speculated as either test fatigue, loss of interest in test, or lack of knowledge of the topic. The three portions of the test (demographics, confidence, and knowledge) were reported in separate tables. Of the 114 nurse practitioner participants who answered the knowledge section of questions, only 6 passed with at least a 70%. Chi-square tests were performed to determine a relationship between demographic data, confidence, and musculoskeletal knowledge. It was found that years of experience, musculoskeletal CEUs, number of patients seen daily, and percentage of patients seen with musculoskeletal conditions were significant indicators of higher confidence and performance on the knowledge-based test while hours of musculoskeletal education in nurse practitioner curricula, practice setting, and focus had no significant impact on confidence or knowledge (Benham & Geier, 2016).

This study offered insight as to areas of focus for improvements to nurse practitioner primary care practice in the treatment and management of musculoskeletal

conditions. While years of experience is not an area that can be directly impacted for immediate improvement of nurse practitioner management of musculoskeletal conditions, the development of and participation in musculoskeletal-focused CEUs is an excellent opportunity for immediate practice improvement. Benham and Geier (2016) concluded that nurse practitioners, as well as their primary care physician counterparts, are not fully prepared for the management of musculoskeletal conditions and postulated that the lack of musculoskeletal education in nurse practitioner and physician education curricula “has not traditionally been prioritized . . . [because] most musculoskeletal conditions are not imminently life threatening” (p. 328). Benham and Geier noted that primary care providers are valuable in encouraging musculoskeletal health, treating musculoskeletal conditions effectively, and preventing disability. Benham and Geier suggested improvements of nurse practitioner curricula, increasing CEU requirements, and certification exam subject matter regarding musculoskeletal topics due to the prevalence of musculoskeletal conditions already being seen and expected to increase. Consequently, this approach will improve quality of patient care and quality of life and reduce societal burden financially (Benham & Geier, 2016).

Battistone et al. (2016) performed a quality improvement study composed of a mixed-method educational initiative that they called the Musculoskeletal Mini-Residency. Musculoskeletal injuries were the most common reason for primary care clinic visits. Even with the numerous office visits regarding musculoskeletal injuries, many primary care providers are not adequately trained in treating these conditions. Researchers stated that the U.S. Bone and Joint Initiative’s 2011 Summit stated many

graduates report a lack of knowledge of musculoskeletal conditions and capability in patient treatment, including the musculoskeletal physical (Battistone et al., 2016).

To the knowledge of the researchers, the U.S. Bone and Joint Initiative's 2011 Summit was the first continuing professional development (CPD) program for musculoskeletal problems in primary care. Moore's expanded outcomes were used to guide the study and defined *competence* "as the ability to demonstrate how to do something in an educational setting—as being the extraordinarily important link between knowledge and performance" (Battistone et al., 2016, p. 1306). In this study, a week long CPD program was created to teach practicing providers to evaluate and care for musculoskeletal (MSK) issues. After the pilot study, the researchers saw a critical need to determine the generalizability to other sites and scale to a national dimension. For the national mini-residency, the program was shortened to a 3-day event that focused on the knees and shoulders and included elbow, hip, and back issues. The three goals of the program were the following: "(1) to evaluate and manage common MSK conditions, (2) to develop the procedural skills of joint aspiration and injection, and (3) to screen patients for osteopenia and osteoporosis" (Battistone et al., 2016, p. 1305). Self-reflection could encourage the providers to take responsibility in obtaining continuing medical education hours in caring for musculoskeletal injuries.

The 227 participants were comprised of physicians, nurse practitioners, physician assistants, and nurses. Sixty-one were nurse practitioners. Each was given a self-evaluation in a Likert scale format before the training, after the training, and a post pre-training evaluation. The post pre-training evaluation stressed that the participants

“Didn’t know they didn’t know” information (Battistone et al., 2016, p. 1303). After the training, the post self-evaluations increased, and the OSCE results were high (90% for shoulder, 86% for knee) which indicated the success of the program at teaching proficiency in these physical examinations. The researchers felt that they had successfully implemented a training program that facilitated primary care provider ability to treat musculoskeletal conditions (Battistone et al., 2016).

Heyworth et al. (2016) conducted a case series through a retrospective chart review from a database at a large children’s hospital to identify cases of little league shoulder from 1999 to 2013. Little league shoulder (LLS) is an injury to the proximal humeral physis of the throwing arm of skeletally immature baseball, player but it can affect any overhead sport athlete, such as tennis or swimming. According to the researchers, LLS can cause pain with everyday activities and rest but not likely to cause pain with premature physal closure and physal fracture extending into the metaphysis (Heyworth et al., 2016). This study was performed with an emphasis on identifying underlying risk factors for the development and recurrence of LLS after non-operative treatment. The most common long-term issue is the recurrence that limits competitive participation or activity level in adolescence due to aggravating symptoms. Since 1953, minimal research has been done on LLS regardless of the growing occurrence of the injury (Heyworth et al., 2016).

Heyworth et al. (2016) found 95 children who had been diagnosed with LLS in the electronic database from 1999 to 2013. Participants of the study were not strictly chosen by radiographic diagnosis of LLS, but children who were diagnosed from

clinical presentation were also included. Exclusion criteria included if the shoulder pain was inconsistent with LLS and if the child had achieved physal closure. Further exclusion criteria included children with and without identified glenohumeral internal rotation deficits (GIRDs). Heyworth et al. (2016) also obtained demographics (i.e., age, sex, hand dominance, and sports/positions played). The researchers examined treatment, injuries, and recurrences which were defined as a return of LLS symptoms 2 weeks after symptom resolution, with some period of symptom-free throwing after primary treatment. To determine if there was a definite increase of LLS, a method was developed to account for possible clinic or program growth accounting for the increase of LLS diagnosis.

Of the 95 children involved with the research, 93 were males and 2 were females who pitched in little league baseball. Fifty percent of the patients were either 12 years old (21%) or 13 years old (29%). Ninety-two children were baseball players, and 79 of them were pitchers and 7 were catchers. Three participants were tennis players. All patients had shoulder pain with throwing or racquet swinging, and 10% of the patients had muscle weakness or fatigue in the shoulder. Heyworth et al. also found that “on physical examination, 70 patients (74%) demonstrated tenderness of the proximal humerus; 32 patients (34%) demonstrated decreased shoulder range of motion” (Heyworth et al., 2016, p. 1434). Also, 28 patients were found to have GIRD along with LLS. According to Heyworth et al., of the 21 patients who “had no evidence of LLS on radiographs (24% of patients with radiographs, 22% overall), 5 patients



(24% of patients with negative radiographs, 5% overall) underwent MRI, which confirmed the diagnosis in all 5 cases” (Heyworth et al, 2016, p. 1435).

Of the 64 patients that followed up, symptoms resolved in nearly 2 months with return-to-play or competition in 4 months, and 7 patients had recurrent symptoms that on average occurred 7 months after diagnosis (Heyworth et al, 2016). Not only are these injuries common, but they are increasing with Heyworth et al. stating that “it was found that incidence of LLS—which is a reflection of the volume of LLS relative to overall departmental and divisional patient volume—increased approximately 8% per year on average” (Heyworth et al., 2016, p. 1434). With increasing interest in year-around sports, mostly baseball, nurse practitioners need to be aware of the injuries so that they can educate the parents of these athletes. In this research, 31 children did not attend their follow-up appointment, and it could be argued that the reason behind that absence is the lack of transportation (Heyworth et al., 2016).

### **Summary**

The review of literature included studies about relevance and guidelines related to authorization of athletic return-to-play and primary care providers’ confidence level and knowledge of authorization guidelines. The majority of the literature review proposes that premature athletic return-to-play can lead to future sports injuries resulting in lifelong consequences. At least one study indicated that insufficient time and training may limit adoption of best practices, including the implementation of emerging assessment techniques which can lead to over-referral to specialists and unnecessarily burdening the healthcare system.

## **CHAPTER III**

### **Methodology**

The purpose of this study was to identify the level of confidence of primary care providers in authorizing athletic return-to-play after injury. Annually, millions of youth sports players experience musculoskeletal injuries and concussions that have required or will require a medical visit for assessment, follow-up, and authorization for release-to-play after the injury. The public is becoming increasingly dependent on primary care providers (nurse practitioners, physicians, etc.) for treatment of various illnesses and diseases as well as injuries. Although nurse practitioners are providing care for these injuries, studies have shown that nurse practitioners do not have the knowledge and skills to confidently manage common musculoskeletal conditions in primary care settings (Benham & Geier, 2014).

An additional study conducted by Benham and Geier (2016) concluded that in addition to nurse practitioners, primary care physicians are not fully prepared for the management of musculoskeletal conditions and suggested that the lack of musculoskeletal education in nurse practitioner and physician education curricula was not a priority in their education due to most musculoskeletal injuries are non-emergent.

Due to the evidence that revealed lack of knowledge, education, and skills to manage musculoskeletal injuries, it was imperative that the level of confidence of primary care providers for authorizing athletic return-to-play after an injury was determined due to patient safety and health. The population, setting, methods of data collection, and the data collection tool (survey) are presented in this chapter.

**Design of Study**

The researchers utilized a descriptive, quantitative survey design to examine primary care providers' level of confidence in authorizing youth (ages 6-19 years) athletic return-to-play after injury. Data for this research project were collected from 200 healthcare providers via written surveys and surveys provided through the electronic database SurveyMonkey, social media, and email. This design study was most appropriate given the time constraints for collecting the data, accessibility of participants, and the likelihood of obtaining quality information (e.g., perceived barriers to action and self-efficacy) from the use of anonymous surveys.

**Setting**

The anonymous survey design was conducted in several primary care clinics located in southeast United States and online using SurveyMonkey, social media, and emailed to qualifying participants. The written surveys were distributed by the current researchers conducting the study to primary care providers (e.g., primary care physician, nurse practitioners, and physician assistants).

**Population and Sample**

The research study included 200 primary care providers from the southeastern United States. The researchers targeted primary care providers who provide primary care to patients in the age range of 6-19 years to obtain their level of confidence in authorizing athletic return-to-play after a sports-related injury.

### **Methods of Data Collection**

After approval was obtained from Mississippi University for Women's Institutional Review Board (see Appendix A), a descriptive, quantitative survey was distributed to primary care providers in Mississippi to complete voluntarily. The survey was also made available to providers online via SurveyMonkey, social media, and email. The participants' anonymity was kept throughout the data collection process. No incentives were used to encourage participation from the volunteers. The surveys were available and completed over a 3-month period from February through April 2018. Approximately 200 surveys were collected. The survey consisted of 7 Likert-style questions and 12 multiple-choice questions, 4 of which pertain to demographic information. A text box was made available for participants to add any additional information. The surveys were not scored but were developed into a descriptive statistical format to make inferences about the confidence level of primary care providers authorizing athletic return to play.

### **Methods of Data Analysis**

Data were analyzed and reported. The data collected from the surveys represented the ordinal measurements from the Likert-style format questions and the nominal measurements from the multiple-choice format questions. Parameters were calculated for each question and displayed as a percentage. These percentages were used to assess the sample population's confidence level of authorizing athletic return to play. In turn, this assessment can be used as a tool for providers in which they can assess and possibly improve their treatment of athletic injuries and patient care. The

demographic data obtained were used to help identify any trends that may exist between confidence level, experience, and area of practice. Because surveys were completed at random and on an anonymous volunteer basis, the current researchers were unable to personally thank the participants. However, the participants were provided access to the results of the study.

## **Chapter IV**

### **Presentation of Findings**

Sports-related injuries among youth athletes continue to be on the rise in the United States. These rising numbers create a larger impact on the healthcare system. Youth athletes and parents rely on healthcare providers to be knowledgeable and confident when providing medical care and clearance for the youth athlete to return-to-play after a sports injury. According to Benham and Geier (2014), a decline in orthopedic specialty availability has increased the dependence on primary care providers to treat musculoskeletal and concussive sports-related injuries. As reported by Benham and Geier (2016), primary care providers may not have the confidence, knowledge, or skill to manage those common musculoskeletal and concussive conditions in their primary care practice. The researchers conducted this study with specific focus on providers' level of confidence with authorizing return-to-play for youth athletes following a sports-related injury. The results of this study may lead to identifying factors that cause uncertainty in utilizing their full scope of practice and reveal areas for improvement which could easily be met with continued education, in-services, and workshops. The researchers collected data from 124 respondents. Each respondent was a medical practitioner (e.g., physician, nurse practitioner, and physician assistant). Data were first compiled in Microsoft Excel with sequential analyses performed using IBM SPSS statistical software, version 24. Data results for the research question as well as description of clinics surveyed, frequency of sports-related visits, and years of experience for survey respondents will be described next.

### Profile of Study Participants

Data were collected by 6 different researchers using SurveyMonkey as well as hand-delivered surveys. The surveys were completed by participants ( $N = 124$ ) from regions of southeastern United States. A description of the clinics surveyed is shown in Table 1. Regarding clinic type, 50.0% ( $n = 62$ ) were family medicine, 14.5% ( $n = 18$ ) were internal medicine, 10.5% ( $n = 13$ ) were pediatrics, 5.6% ( $n = 7$ ) were orthopedic, and 19.4% ( $n = 24$ ) were other types of clinics (e.g. urgent care clinics and emergency rooms).

Table 1

*Frequency of Sports-related Visits per Month ( $N = 124$ )*

Visit	<i>f</i>			
	0-5	6-10	11-15	> 15
Sports-related injuries (musculoskeletal)	60.5	23.4	4.8	11.3
Sports-related concussions	94.4	4.0	0.0	1.6

Of the clinics surveyed, 84.7% ( $n = 105$ ) stated that the type of sport played has a role in a patient's return to play. A slight majority of clinics (54.0%,  $n = 67$ ) have a return to play protocol. The most common procedure for return to play is a follow-up visit (42.7%,  $n = 53$ ), followed by referral to a specialty clinic (32.3%,  $n = 40$ ),

symptom free (21.8%,  $n = 27$ ), and none (3.2%,  $n = 4$ ). A large majority of the clinics were aware of return-to-play guidelines (68.5%,  $n = 85$ ), and 68.5% ( $n = 85$ ) provide written instructions to the patient upon release.

The clinics reported a variety of people serving as the primary decision maker in return-to-play decisions. The most common was the physician (57.3%,  $n = 71$ ), followed by parents (17.7%,  $n = 22$ ), nurse practitioner (12.9%,  $n = 16$ ), athletic trainer (5.6%,  $n = 7$ ), and coach (4.8%,  $n = 6$ ).

The surveys were completed most often by nurse practitioners (74.2%,  $n = 92$ ), followed by physicians (18.5%,  $n = 23$ ), physician assistants (3.2%,  $n = 4$ ), orthopedic surgeon/practitioner (2.4%,  $n = 3$ ), and other (1.6%,  $n = 2$ ). Years of experience was varied, as shown in Figure 1. The majority of respondents worked 30+ hours per week (84.7%,  $n = 105$ ), followed by 21-25 hours (8.1%,  $n = 10$ ), 16-20 hours (3.2%,  $n = 4$ ), 10-15 hours (2.4%,  $n = 3$ ), and other (1.6%,  $n = 2$ ).



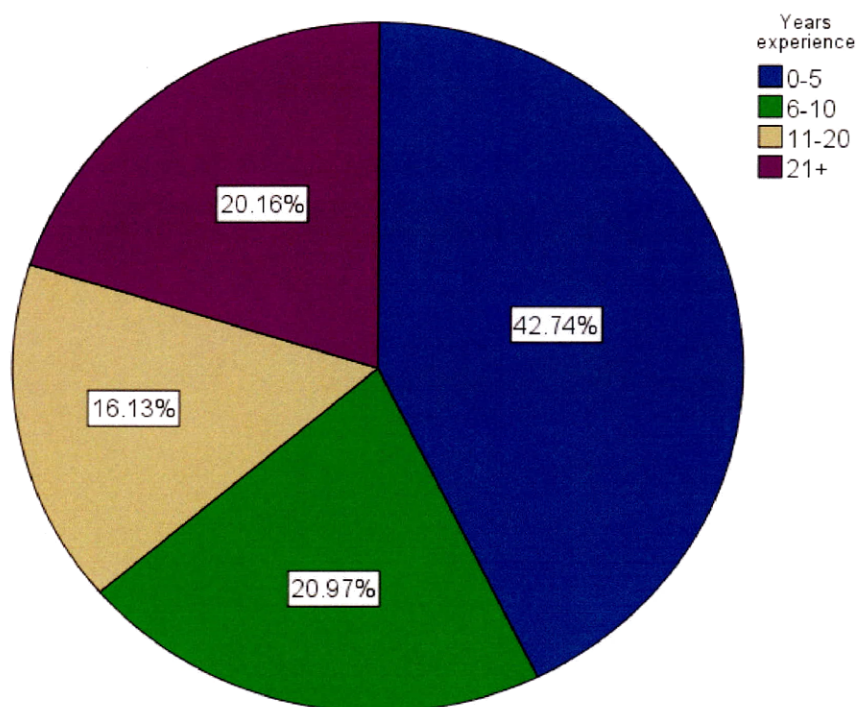


Figure 1. *Years of experience for survey respondents (N = 124).*

### **Statistical Outcomes Regarding the Research Question**

Provider confidence was assessed using nine 4-point Likert questions. The answers to each Likert question are shown in Table 2 and Figure 2.

Table 2

*Frequency of Ratings on Confidence Questions (N = 124)*

Question	Not confident	Somewhat confident	Confident	Extremely confident	<i>M</i>	<i>SD</i>	<i>Mdn</i>
	1	2	3	4			
1	0.7	27.4	50.0	16.1	2.76	0.80	3
2	29.0	29.8	34.7	6.5	2.19	0.93	2
3	8.9	35.5	47.6	8.1	2.55	0.77	3
4	23.6	32.5	34.1	9.8	2.30	0.94	2
5	0.0	7.3	39.8	52.8	3.46	0.63	4
6	4.1	8.2	48.4	39.3	3.23	0.77	3
7	0.0	0.0	33.3	66.7	3.67	0.47	4
8	13.7	39.5	36.3	10.5	2.44	0.86	2
9	29.3	43.1	19.5	8.1	2.07	0.90	2

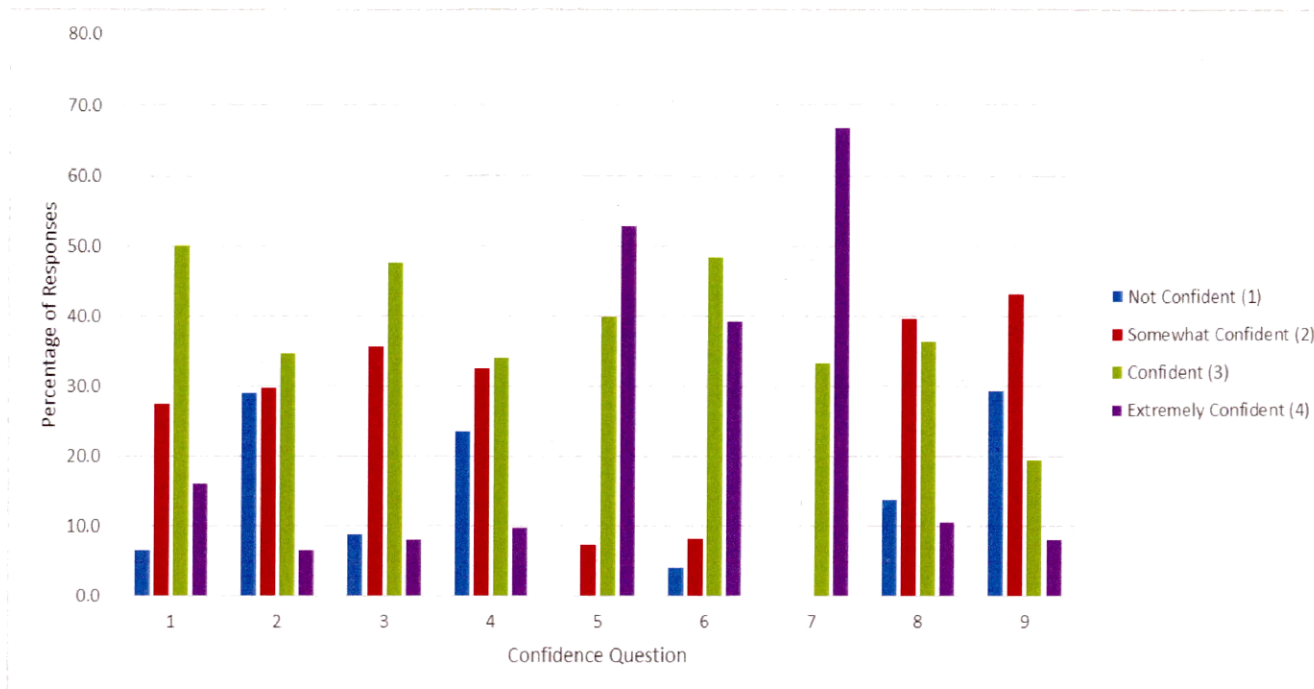


Figure 2. *Frequency of ratings on confident questions (N =124).*

### Provider's Overall Confidence

To analyze a person's overall confidence, their nine question scores were averaged. The average confidence score was 2.74, with a standard deviation of 0.56. The average confidence scores for respondents ranged from a minimum of 1.44 to a maximum of 4.00. A histogram of average confidence scores is shown in Figure 3.

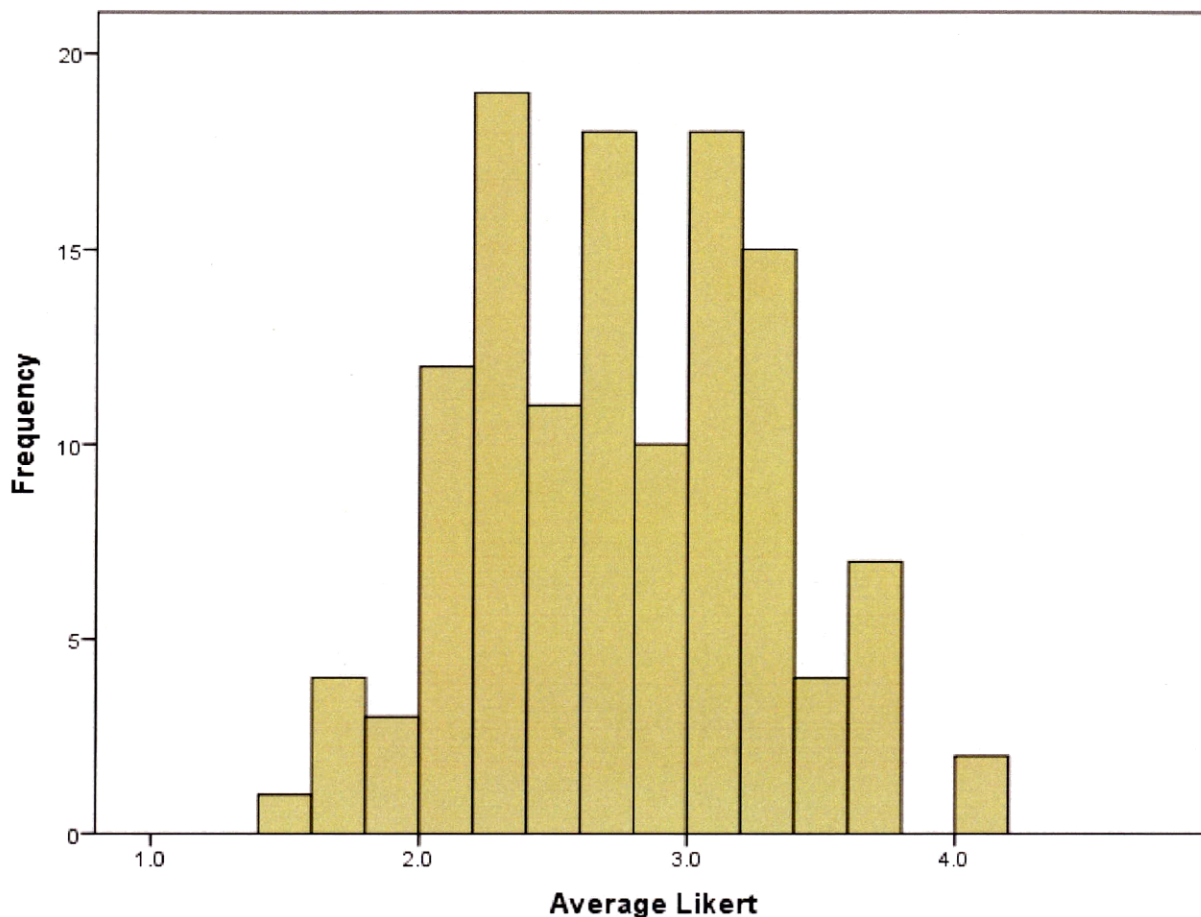


Figure 3. Histogram of average confidence scores.

### Influences on Provider Confidence

Average confidence score was significantly influenced by how many sports injuries the clinic treated per month ( $F(3, 90) = 2.750, p = .047$ ), type of sport impacting return to activity ( $F(1, 90) = 7.110, p = .009$ ), most common procedure for returning to activity ( $F(3, 90) = 4.408, p = .006$ ), credentials ( $F(4, 90) = 3.545, p = .010$ ), years of experience ( $F(3, 90) = 3.679, p = .015$ ), and hours worked per week ( $F(4, 90) = 3.681, p = .008$ ). Details regarding the influence of these variables on confidence are

shown in Table 3. The other variables (e.g., having a return-to-play protocol) did not significantly influence confidence score.

Table 3

*Factors that Significantly Influenced Average Confidence Score*

Factor	Factor level	<i>n</i>	Average confidence score
<i>Overall</i>		<i>124</i>	<i>2.74</i>
Sports-related injuries treated per month	0-5	75	2.58
	6-10	29	2.95
	11-15	6	3.28
	> 15	14	2.89
Type of sport plays a role in return-to-play	Yes	105	2.68
	No	19	3.05
Most common procedure for returning to activities	Follow-up	53	2.86
	Referral	40	2.51
	Symptom free	27	2.92
	None	4	2.15
Credentials	Nurse practitioner	92	2.63
	Physician	23	3.09
	Orthopedic surgeon/Practitioner	3	3.11
	Physician's assistant	4	3.00
	Other	2	2.72
Years' experience	0-5	53	2.56
	6-10	26	2.56
	11-20	20	3.13
	21+	25	2.98
Hours worked per	10-15	3	3.33

week	16-20	4	2.67
	21-25	10	2.96
	30+	105	2.70
	None of the above	2	3.00

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## Chapter V

### Summary, Conclusions, and Recommendations

The Centers for Disease Control and Prevention (CDC) (as cited in Patel, Yamasaki, & Brown, 2017) reported that 2.6 million children and teens ages 0-19 years are treated annually for sports-related injuries and that 7.2 million high school students participate in sports and suffer an estimated 2 million injuries, requiring 500,000 doctor visits and 30,000 hospitalizations annually. Although primary care providers are providing care for musculoskeletal and concussive injuries, Benham and Geier (2016), reported that they may not have the confidence, knowledge, or skill to manage common musculoskeletal conditions in their primary care practice. Excellent provisions of such care will require providers who are safe and confident in the management and treatment of sports-related injuries to ensure high-quality patient care (Benham & Geier, 2016). The current researchers sought to determine primary care provider confidence level in authorizing athletic return-to-play after a sports-related injury.

This chapter will include a discussion of the findings from the survey conducted to evaluate primary care provider level of confidence with authorizing return-to-play after a sports-related injury. Limitations were addressed. The current researchers identified areas of practice in which providers lacked confidence and exposed areas for

improvement that could be met with continuing education, changes in education curricula to improve level of confidence when treating sports-related injuries in primary care, and in-services or workshops. Recommendations were made for future research.

### **Summary and Discussion of Findings**

The researchers found a correlation between providers' level of confidence and authorizing return-to-play for youth athletes following a sports-related injury. Of the providers surveyed, 47.6% of participants reported being confident with returning youth athletes back to play following sports-related injuries. Providers generally responded confidently to confidence-based questions and had an apparent belief in oneself based on the following:

1. Treating sports-related musculoskeletal injuries in youth athletes (66.1%).
2. Treating sports-related concussive injuries in youth athletes (41.2%).
3. Returning youth athletes back to play following sports-related injuries (55.7%).
4. Using a return to play protocol (43.9%).
5. Collaborating with other healthcare providers (physicians, nurse practitioners, athletic trainers, etc.) for questions about diagnosis/treatment/return to play (92.6%).
6. Recommending appropriate resources for patients about diagnosis/treatment/return to play (87.7%).
7. Referring patients if necessary (100%).

8. Primary care education in preparation of managing sports-related musculoskeletal injuries (46.8%).
9. Primary care education in preparation of managing sports-related concussive injuries (27.6%).

Previous researchers, such as Benham and Geier (2014; 2016), conducted an online survey evaluating the degree of nurse practitioner (NP) preparedness to treat musculoskeletal conditions in primary care as they noted that musculoskeletal disorders are a frequent complaint among patients seen in primary care settings. Further, nurse practitioners are increasingly needed as the primary care physician-to-patient ratio continues to broaden. When tasked with determining primary care providers' confidence with treating sports-related musculoskeletal injuries in youth athletes, the current researchers determined that 71.9% of participants are confident or extremely confident with the treatment of sports-related musculoskeletal injuries in youth athletes. However, of the respondents, only 27.6% rated themselves as *Confident* or *Extremely confident* that their primary care education prepared them to manage sports-related musculoskeletal injuries. These data correlate with previous researchers' findings from the U.S. Bone and Joint Initiative's 2011 Summit that many graduates reported a lack of knowledge of musculoskeletal conditions and capability in patient treatment, including the musculoskeletal physical (Battistone et al., 2016). Even with the numerous office visits regarding musculoskeletal injuries, many primary care providers are not



adequately trained in treating these conditions. It is for this reason that nurse practitioner training, comfort in management, and knowledge of musculoskeletal conditions should be thoroughly evaluated to ensure high-quality patient care.

Most sports-related concussions are first assessed by family physicians and emergency physicians, who play an important role in determining the duration and effects of concussions and guaranteeing quick and thorough recoveries management. The surveys were completed most often by nurse practitioners (74.2%,  $n = 92$ ), followed by physicians (18.5%,  $n = 23$ ), physician assistants (3.2%,  $n = 4$ ), orthopedic surgeon/practitioner (2.4%,  $n = 3$ ), and other (1.6%,  $n = 2$ ). The majority, 58.8% ( $n = 73$ ), of the current survey respondents reported being *Somewhat confident* or *Not confident* in treating sports-related concussive injuries in youth athletes. In a study conducted by Carson et al. (2014), the researchers revealed a relapse of symptoms occurred in 82 (48.2%) patients with concussions, and recurrence or worsening of symptoms was noted in 43.5% of cases following RTP. Many students with sports-related concussions experienced a recurrence or worsening of symptoms after premature RTP or RTL which suggested that the students have not adequately recovered. Of the current study participants, 72.4% ( $n = 90$ ) reported being *Somewhat confident* or *Not confident* that their primary care education prepared them to manage sports-related concussive injuries which suggested that they feel unprepared to care for concussive injuries upon completion of their primary care education. Providers can pose a barrier

to recovery if they have inadequate knowledge of sport-related concussion management. Findings from the current study validate that further training and education are needed among providers in regard to treating sports-related concussive injuries.

Carson et al. (2014) suggested the best-practice recommendation for concussion management is rest until all symptoms resolve followed by the implementation of a graded program of exertion before complete return-to-play activity. Of the participants surveyed in the current study, 42.7% ( $n = 53$ ) required patients to follow up in clinic before authorizing RTP, 32.3% ( $n = 40$ ) referred patients before authorizing RTP, 21.8% ( $n = 21$ ) of participants would release patients for RTP as long as they were symptom free, and 3.2% ( $n = 4$ ) of participants had no procedure in place for authorizing RTP. A slight majority of the current clinics (54.0%,  $n = 67$ ) have a return-to-play protocol, and only 56.1 % ( $n = 69$ ) of respondents reported being either *Somewhat confident* or *Not confident* in using a return-to-play protocol. The current researchers identified areas of concern when evaluating the use of RTP protocols in the clinical setting. The participants' decreased confidence in use of RTP protocols can lead to an increase in premature RTP injuries in student athletes that can result in negative and lasting health consequences. These data correlated with findings that nurse practitioners need to be further educated on research, the available systems for

grading and diagnosing concussions, and the existence of return-to-play protocols (Bires et al., 2017).

With the large number of resources available, many providers often struggle to determine which are the most reliable and practical to use regarding concussion diagnosis and management. However, when current participants were surveyed on their confidence in recommending appropriate resources for patients about diagnosis/treatment/return-to-play, a rather large majority of participants (87.7%) answered that they were *Confident* or *Extremely confident*. In a study on follow-up care related to concussions, Arbogast et al. (2017) suggested that insufficient time and training may limit adoption of best practices, including the implementation of emerging assessment techniques; this dilemma can lead to over-referral to specialists and unnecessarily burdening the healthcare system. Even with 100% ( $n = 124$ ) providers reporting being *Confident* or *Extremely confident* in referring patients if necessary, only 32.3% ( $n = 40$ ) of current participants chose referral to a specialty clinic as their most common procedure for returning youth athletes to their activities, with the most common procedure for return-to-play being a follow-up visit (42.7%,  $n = 53$ ). These findings correlate with the 92.7% of participants that were *Confident* or *Extremely confident* in collaborating with other healthcare providers (physicians, nurse practitioners, athletic trainers, etc.) if they should have questions about diagnosis/treatment/return-to-play. Providers are confident in their ability to refer and

collaborate with other providers if and when necessary. However, the current researchers found only a small number actually refer and suggested that many providers are managing sports-related injuries independently which again supports the need for increased training and education on injury assessment and RTP protocol.

Davies et al. (2017) conducted a study pertaining to the guidelines and criteria for athletic return-to-play after anterior cruciate ligament (ACL) reconstructive surgery in which researchers revealed that there was a lack of standardized, evidence-based criteria for authorizing return-to-play. Evidence-based guidelines are pertinent in the standardization and streamlining of patient care; however, current researchers have found a disconnect between knowing the guidelines and using the guidelines. Current researchers found that 76.4% of respondents demonstrated confidence in using a return-to-play protocol, yet only 43.9% of responders use one which can lead to compromises in patient care and safety.

Mitchell et al. (2016) conducted an internet survey to evaluate emergency department physicians' knowledge of sports-related concussions (SRC) and return to play (RTP) guidelines and discovered that 94 of 149 (63%) of respondents were aware of RTP guidelines, but only 55 of the 149 (37%) chose to include RTP guidelines at discharge. Current researchers determined that a large majority of the clinics were aware of return-to-play guidelines (68.5%,  $n = 85$ ), and 68.5% ( $n = 85$ ) provide written instructions to the patient upon release. As the number of sports injuries, specifically

SRC, continues to grow and more and more primary care physicians are being tasked with management of concussions and return to play authorization, it is important to determine why at least 31.5% ( $n = 39$ ) of healthcare providers surveyed are not providing or aware of return-to-play guidelines. Education and research are needed to ensure that healthcare providers are aware of the existence and benefits of utilizing RTP guidelines.

### **Limitations**

A number of limitations to the study were identified. Although some of these limitations could be presumptively anticipated, but not controlled, some could only be identified in hindsight. The limitations identified for this study were as follows:

1. The sample for this study was limited to small, convenient geographic locations within the southeastern United States that were relatively rural which does not provide the researchers with adequate representation of the many providers throughout the region. Therefore, the ability to generalize the findings was limited.
2. Due to lack of previous research regarding providers' level of confidence authorizing return-to-play for youth athletes following a sports-related injury, there was limited research to use for comparison.
3. Time constraints of the research limited the ability to ensure that providers of specialty services were represented in the sample.
4. The small population size of survey participants ( $N = 124$ ) limited the

amount of data received.

5. The majority (92%) of participants in the survey were nurse practitioners, which do not adequately represent all primary care provider types and may skew findings.
6. The questionnaire designed by the researchers had never been used or undergone statistical testing.

### **Conclusions**

Providers generally responded confidently to confidence-based questions and seemed to have greater confidence in treating musculoskeletal injuries rather than concussive injuries. These responses could be related to response percentages that revealed a lack of education preparing them to treat musculoskeletal injuries (Question 8), a greater deficiency in education preparing them to treat concussive injuries (Question 9), and the frequency of musculoskeletal and concussive injuries seen. Confidence was significantly influenced by number of sports injuries treated per month, type of sport indicated for return-to-play, most common procedure for return-to-play, credentials, years of practice experience, and number of hours worked per week. Providers responded with 100% confidence in referring these athletes to the appropriate care.

### **Recommendations**

The number of sports-related injuries is on the rise with the majority of these injuries being seen and managed by primary care providers. The results of the study indicated that further research is needed to gain a better understanding of the confidence

level of primary care providers in authorizing athletic return-to-play. A larger population sample needs to be studied to determine provider confidence throughout the United States.

This study should also be conducted for a longer period of time. The research took place in the spring, and many sports are played throughout the year. Researchers suggest an extension of this study for a longer period of time with a larger, more diverse group of participants in order to increase the number and nature of injuries reported. The current researchers also recommended more education targeting the knowledge deficits of primary care providers on the existence of return-to-play protocols. Further recommendations were that research should be conducted focusing on the implementation and effectiveness of screening tools in clinics to evaluate provider confidence in authorizing athletic return-to-play. Recommendations also included more diligent efforts to educate providers on the existence and benefits of utilizing return-to-play guidelines.

A standardized guideline could assist providers with making the return to play decision for young athletes after a sports-related injury. Guidelines consistently and efficiently utilized by the primary care provider would help to ensure that young athletes are screened adequately and aid in preventing premature RTP injuries. It is also recommended that further investigation is needed to determine why providers are not administering RTP guidelines to patients upon discharge, even though the provider is aware that they exist.

Furthermore, researchers recommend a need for further education and research to ensure that healthcare providers are aware of the consequences related to premature RTP. The current researchers recommend increased CE requirements regarding the treatment and management of musculoskeletal and concussive injuries in youth athletes. This recommendation stands to increase provider confidence, ultimately resulting in improved quality of patient care and reduction in the number of injuries related to premature return-to-play.

Efforts are needed to further education regarding return-to-play authorization by promoting the benefit of adding more musculoskeletal and concussive injury content to program curricula to help increase student knowledge and confidence.

### **Summary**

The compilation of these sports-related injuries on the nation's youth leads to long-term impacts on the nation's health. The CDC reports that 2.6 million children and teens are treated annually for sports-related injuries, and between 1.6 and 3.8 million suffer sports-related concussions that result in approximately 180,000 emergency room visits. Musculoskeletal disorders currently affect one third of the total population in the United States, with an estimated 60 million patients expected to require treatment for such disorders by 2020. It is estimated that from 2009-2011 musculoskeletal disorders resulted in direct and indirect costs of \$796 and \$77 billion, respectively. With a rising increase in youth sports participation, there is a growing need for awareness, preparedness, and appropriate management of sports-related injuries. Providers must be aware of the potential negative long-term effects that



inappropriate treatment or premature return-to-play can cause following a musculoskeletal or concussive injury. The concern for overall provider's confidence, awareness, and knowledge regarding return-to-play protocols dealing with youth athletic injuries led the researchers to conduct this study. After conducting a survey regarding primary care providers' confidence level in authorizing athletic return-to-play, the research concluded that 68.5% of the respondents were aware of return-to-play protocols, and 43.9% of the providers were confident in using them. The survey revealed that 46.8% of the participants believed their primary care education prepared them for the management of sports-related musculoskeletal injuries, and 27.6% believed their education prepared them to manage sports-related concussive injuries. As primary care providers are increasingly called upon to provide care for sports-related injuries and eventually authorize return-to-play, it has become apparent that providers must be thoroughly trained, knowledgeable, and confident in the management of these injuries to deliver high-quality care. In doing so, primary care providers have the ability to directly improve quality of patient care and quality of life and reduce the economic burden associated with these injuries.

Further research, implementation of evidence-based guidelines, and comprehensive education on the proper assessment and treatment of musculoskeletal and concussive injuries are all needed to positively affect the confidence level of primary care providers in authorizing return-to-play after sports-related injuries.

## REFERENCES

- Alligood, M. R. (2014). *Nursing theorists and their work* (8th ed., pp. 281-293, 396-405). St. Louis, MO: Elsevier.
- Arbogast, K. B., Curry, A. E., Metzger, K. B., Kessler, R. S., Bell, J. M., Haarbauer-Krupa, J., & Master, C. L. (2017). Improving primary care provider practices in youth concussion management. *Clinical Pediatrics*, *56*(9), 854-865.
- Athlete*. (2017). In *Merriam Webster Online*. Retrieved from <https://www.merriam-webster.com/dictionary/athlete>
- Authorization*. (2017). In *Dictionary online*. Retrieved from <http://www.dictionary.com/browse/authorization>
- Battistone, M. J., Barker, A. M., Grotzke, M. P., Beck, J. P., Lawrence, P., & Cannon, G. W. (2016). "Mini-Residency" in musculoskeletal care: A national continuing professional development program for primary care providers. *Journal of General Internal Medicine*, *31*(11), 1301-1307. doi:10.1007/s11606-016-3773-4
- Bell, D. R., Post, E. G., Trigsted, S. M., Hetzel, S., McGuine, T. A., & Brooks, M. A., (2016). Prevalence of sport specialization in high school athletics. *American Journal of Sports Medicine*, *44*(6), 1469-1474. doi:10.1177/0363546516629943
- Benham, A. J., & Geier, K. A. (2014). Preparing nurse practitioners to provide orthopedic primary care. *Journal for Nurse Practitioners*, *10*(8), 603-606. doi:10.1016/j.nurpra.2014.04.015

- Benham, A. J., & Geier, K. A. (2016). How well are nurse practitioners prepared to treat common musculoskeletal conditions? *Orthopaedic Nursing, 5*(35), 325-329. doi: 10.1097/NOR.0000000000000278
- Bires, A. M., Leonard, A. L., & Thurber, B. (2017). Educating providers in return-to-play suggested guidelines post-concussion. *Critical Care Nursing Quarterly, 40*(1), 49-58.
- Caine, D., Purcell, L., & Maffulli, N. (2014). The child and adolescent athlete: A review of three potentially serious injuries. *BMC Sports Science, Medicine & Rehabilitation, 6*22. doi:10.1186/2052-1847-6-22
- Carson, J. D., Lawrence, D. W., Kraft, S. A., Garel, A., Snow, C. L., Chatterjee, A., & Frémont, P. (2014). Premature return to play and return to learn after a sport-related concussion: Physician's chart review. *Canadian Family Physician, 60*(6), e310-5.
- Choosing a primary care provider.* (2017). Retrieved from <https://medlineplus.gov/ency/article/001939.htm>
- Chrisman, S. P., Quitiquit, C., & Rivara, F. P. (2013). Qualitative study of barriers to concussive symptom reporting in high school athletics. *Journal of Adolescent Health, 52*(3), 330-335.e3. doi:10.1016/j.jadohealth.2012.10.271
- Clanton, T. O., Matheny, L. M., Jarvis, H. C., & Jeronimus, A. B. (2012). Return to play in athletes following ankle injuries. *Sports Health, 4*(6), 471–474. Retrieved from <http://doi.org/10.1177/1941738112463347>

- Confidence*. (2018). In *Oxford Dictionaries*. Retrieved from <https://en.oxforddictionaries.com/definition/confidence>
- Davies, G. J., McCarty, E., Provencher, M., & Manske, R. C. (2017). ACL return to sport guidelines and criteria. *Current Reviews in Musculoskeletal Medicine*, 3(10), 307-314. doi:10.1007/s12178-017-9420-9
- Herring, S. A., Kibler, W. B., & Putukian, M. (2012). The team physician and the return-to-play decision. *Medicine & Science in Sports & Exercise*, 44(12), 2446-2448. doi:10.1249/mss.0b013e3182750534
- Heyworth, B. E., Kramer, D. E., Martin, D. J., Micheli, L. J., Kocher, M. S., & Bae, D. S. (2016). Trends in the presentation, management, and outcomes of little league shoulder. *American Journal of Sports Medicine*, 44(6), 1431-1438. doi:10.1177/0363546516632744
- Lynch, S. (2016). Managing concussion in primary care. *Clinical Advisor*, 19(9), 24-28.
- Makdissi, M., Davis, G., & McCrory, P. (2014). Updated guidelines for the management of sports-related concussion in general practice. *Focus: Neurology*, 43(3), 94-99.
- Mitchell, S. H., Hildenbrand, K., & Pietz, K. (2016). Emergency physicians' knowledge of sports-related concussion, referral patterns, and use of return to play guidelines. *Athletic Training & Sports Health Care*, 8(5), 209-215.
- Patel, D. R., Yamasaki, A., & Brown, K. (2017). Epidemiology of sports-related musculoskeletal injuries in young athletes in United States. *Translational Pediatrics*, 6(3), 160-166. doi: 10.21037/tp.2017.04.08

Smith, M. V., Davis, R., Brophy, R. H., Prather, H., Garbutt, J., & Wright, R. W. (2015).

Prospective player-reported injuries in female youth fast-pitch softball players.

*Sports Health: A Multidisciplinary Approach*, 7(6), 497-503.

doi:10.1177/1941738115606058

*Sports injuries*. (2018). Retrieved from [https://medicaldictionary.thefreedictionary](https://medicaldictionary.thefreedictionary.com/Sports+Injuries)

[.com/Sports+Injuries](https://medicaldictionary.thefreedictionary.com/Sports+Injuries)

**APPENDIX A****Approval of Institutional Review Board**

February 27, 2018

Alena Lester, Ph.D.  
Mississippi University for Women  
College of Nursing and Health Sciences  
1100 College Street, MUW-910  
Columbus, Mississippi 39701

Dear Dr. Lester:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

Name of Study: "Confidence Level of Primary Care Providers in  
Authorizing Athletic Return to Play."  
Research Faculty/Advisor: Alena Lester, Ph.D.  
Investigators: Cassie Austin, Laura Flippin, Cody Gullick, Jess Hodnett,  
Camille Lott, Hilary Lott

I wish you much success in your research.

Sincerely,



Thomas C. Richardson, Ph.D.  
Provost and Vice President for Academic Affairs

TCR/ tc

pc: Tammie McCoy, Institutional Review Board Chairman

## **APPENDIX B**

### **Letter to Committee Members**

October 17, 2017

Committee Member  
Mississippi University for Women  
1100 College Street MUW-910  
Columbus, MS 39701

Dear Committee Member,

The Lester Research Group requests you as a committee member for our MSN research project for the 2017-2018 school year. After the initial proposal is approved by Dr. Alena Lester, each member of the committee will receive a hard copy of the proposal. Once committee members are selected, a proposal defense meeting will be arranged.

The purpose of the defense meeting is to allow feedback from all members of the committee and to amend the proposal as needed in preparation for submission to the MUW IRB. All committee members will be provided a finalized copy of the research proposal for review, approval, and signature. By accepting this position, you are agreeing to supervise and monitor the progression of our research project and attend all committee meetings for the project. We welcome any recommendations to improve the project. The title of our research project is Confidence Level of Primary Care Providers in Authorizing Athletic Return-To-Play.

Please indicate your acceptance to serve as a committee member by responding to this email. You may contact our Principal Investigator, Cassie Austin (662-832-4477), or Dr. Alena Lester, Chair (662-299-2985) for any questions or additional information.

Thank you for your time and consideration.

Sincerely,

Cassie Austin, Principal Investigator, Graduate Student  
Laura Flippin, Investigator, Graduate Student  
Cody Gullick, Investigator, Graduate Student

Jess Hodnett, Investigator, Graduate Student  
Camille Lott, Investigator, Graduate Student  
Hilary Lott, Investigator, Graduate Student



## APPENDIX C

### Letter to Survey Participants

Dear Potential Participants,

We are graduate students from Mississippi University for Women. We are reaching out to you for assistance with our research project regarding confidence level of primary care providers in authorizing youth (ages 6-19 years) athletics' return-to-play following a sports-related injury (e.g., musculoskeletal injury, concussion).

It would be of utmost importance if you could please provide us with a moment of your time to complete the attached survey. All responses and participants will remain anonymous. It will take approximately 5 minutes or less to complete the survey. There is no *right* or *wrong* answer. Please respond to each question/statement.

If you have any questions regarding the survey or our research, please contact our Principal Investigator, Cassie L. Austin (662-832-4477), or Dr. Alena Lester, Chair (662-299-2985).

Thank you for your participation.

Sincerely,

Cassie L. Austin, Principal Investigator, Graduate Student  
Laura H. Flippin, Investigator, Graduate Student  
Cody R. Gullick, Investigator, Graduate Student  
William J. Hodnett, Investigator, Graduate Student  
Camille W. Lott, Investigator, Graduate Student  
Hilary B. Lott, Investigator, Graduate Student

## APPENDIX D

### MUW Primary Care Provider's Survey of Confidence Level in Authorizing Youth Athletic Return to Play

**A *youth athlete* is defined as a person between the age of 6 and 19 years that is engaged in any type of skilled physical activity regarding exercise, sports, or gaming.**

**A *sport-related injury* is defined as an injury that occurs in athletic activities or exercising that may involve bone, soft tissue, or brain trauma.**

Survey Questions:

How many sport-related injuries (involving muscle and bone) do you treat monthly at your clinic?

- a. 0-5
- b. 6-10
- c. 11-15
- d. >15

How many sports-related concussions do you treat monthly at your clinic?

- a. 0-5
- b. 6-10
- c. 11-15
- d. >15

Does the type of sport they are engaged in play a role in their return to play?

- a. Yes
- b. No

Do you use a return to play protocol?

- a. Yes
- b. No

What is your most common procedure for returning youth athletes to their activities?

- a. Follow up in clinic over a set standard or clinically decided upon period of time.
- b. Referral to specialty clinic
- c. Athlete must be symptom free

Are you aware of return-to-play guidelines?

- a. Yes
- b. No

Do you provide your patients with written instructions pertaining to their injury upon release to return-to-play?

- a. Yes
- b. No

In your experience, who is the primary decision maker in regard to returning youth athletes to their activities?

- a. Parents
- b. Nurse Practitioner
- c. Physician
- d. Athletic Trainer
- e. Physician's Assistant
- f. Coach

What are your professional credentials?

- a. Nurse Practitioner
- b. Physician
- c. Orthopaedic Surgeon/Practitioner
- d. Physician's Assistant
- e. Other: \_\_\_\_\_

What is your primary practice specialty

- a. Family Medicine
- b. Orthopaedic
- c. Internal Medicine
- d. Pediatrics
- e. Other: \_\_\_\_\_

How many years of experience do you have as a healthcare provider?

- a. 0-5
- b. 6-10
- c. 11-20
- d. 21+

What are the mean hours per week you work in this clinic?

- a. 10-15
- b. 16-20
- c. 21-25
- d. 30+

\_\_\_\_\_ e. None of the above

In the following text box, please provide any additional information (e.g., hindrance of releasing athletes back-to-play, what could improve your level of comfort, etc.).

For each of the questions below, circle the response that best characterizes how you feel about the statement: **1 = Not confident, 2 = Somewhat confident, 3 = Confident, 4 = Extremely confident.**

	<b>Not confident</b>	<b>Somewhat confident</b>	<b>Confident</b>	<b>Extremely confident</b>
1. How confident are you with treating sports-related <b>musculoskeletal injuries in youth athletes?</b>	1	2	3	4
2. How confident are you with treating sports-related <b>concussive</b> injuries in youth athletes?	1	2	3	4
3. How confident are you with returning youth athletes back to play following sports-related injuries?	1	2	3	4
4. How confident are you in using return to play protocol?	1	2	3	4
5. How confident are you in collaborating with other health care providers (physicians, nurse practitioners, athletic trainers, etc.) if you should have questions about diagnosis/treatment/return to play.	1	2	3	4

6. How confident are you in recommending appropriate resources for patients about diagnosis/treatment/return to play?	1	2	3	4
7. How confident are you referring patients if necessary?	1	2	3	4

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	<b>Not confident</b>	<b>Somewhat confident</b>	<b>Confident</b>	<b>Extremely confident</b>
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8. How confident are you that your primary care education prepared you to manage sports-related <b>musculoskeletal injuries</b> ?	1	2	3	4
9. How confident are you that your primary care education prepared you to manage sports-related <b>concussive injuries</b> ?	1	2	3	4