

OVERUSE INJURIES IN PEDIATRIC AND ADOLESCENT ATHLETES AND
SPORT PARTICIPATION

By

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I dedicate this research to my family. I love you.

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ABSTRACT

Children are becoming more involved in organized and recreational sports, which increases the likelihood of an overuse injury occurring (Brenner, 2007). This can be detrimental to young athletes and can affect their social, psychological and physiological well-being. The purpose of this study is to analyze the physician's opinion about the relationship of multiple sport athletes and specialization and overuse injuries in youth athletes. Descriptive analysis was run and used to show the results of how primary care and sports medicine physicians answered the questions used for analysis. The data revealed significant results that athletes should cross train and not specialize in sports and the type of sport participated in has an effect on the type of overuse injury sustained. Specifically, this study is also a great tool to help prevent overuse injuries by educating parents, children and coaches

Keywords: overuse, pediatric, adolescent, sport medicine physician, primary care physician

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CHAPTER I

INTRODUCTION

In America, over a million children are participating in individual sports, and about thirty million are involved in team sports (DiFiori, 2010). Youth athletes participating in sports have increased over the past four decades and will continue to increase (Straccolini, Casciano, Friedman, Meehan III, & Micheli, 2013). A main concern with increasing sport participation is the amount of injuries sustained in youth athletes. It was estimated that twelve million athletes between the ages of five and twenty-two suffered a sport-related injury each year. This leads to twenty million school days missed and thirty-three billion dollars in health care (McLeod, Bay, Parsons, Sauers, & Snyder, 2009). Sport-related injuries are problematic for pediatric and adolescent athletes, specifically overuse injuries.

In athletics, overuse injuries are becoming more prevalent in the pediatric and adolescent athlete (McLeod et al., 2011). Pediatric athletes range from five to twelve years old and adolescent athletes range from thirteen to seventeen years old (Schroeder, Comstock, Collins, Everhart, Flanigan, & Best, 2014). It was reported that 50% of children who were seen at sports medicine clinics were diagnosed with overuse injuries (McLeod et al., 2011). The problem with increasing sport participation is children have begun to specialize and compete in sports at an early age (Straccolini et. al., 2013). Early specialization and increased competition makes it clear that children will be involved in sports year round and will not limit their sport to a single season (DiFiori, 2010). This can be

problematic because these athletes put themselves at greater risk for an overuse injury to develop (Brenner, 2007). Also, multisport athletes are at risk if they do not get adequate rest between seasons. When an athlete participates in the same type of sport throughout the year, the demand put on the body increases the chance of sustaining an overuse injury (Brenner, 2007). The high percentage of athletes participating in sports and being diagnosed with an overuse injury is alarming to physicians and other health care providers (McLeod et al., 2011).

Purpose Statement

Participation in sports for pediatric and adolescent athletes have grown immensely over the years and will continue to increase (McLeod et al., 2009). Sports offer several health benefits, but with the rise of injuries occurring in the youth population it is becoming problematic (McLeod, et al., 2009). The purpose of this study was to analyze and look at the physician's opinion about the relationship of sport participation and overuse injuries in youth athletes. Early specialization and multisport athletes were examined and taken into account. The research question is: Based on the Sports Medicine and Primary Care Physician's opinion, what effect does sport participation have on overuse injuries in pediatric and adolescent athletes?

Hypothesis

Based on the sports medicine and primary care physician's opinion, pediatric and adolescent athletes who specialize or participate in more sports during a single year increases the likelihood of an overuse injury.

Limitations

A limitation of the study is the potential for recall bias from sports medicine or primary care physicians who completed the survey. This is an area of concern with the study. Memory studies have shown that recalling information is not as accurate because events that occur farther away can be misreported or simple forgotten (Groves 1989). Memory decay will increase in an individual when the recall period is longer and the event is less salient (Silberstein 1989). A retrospective study can lead to inaccurate results. Another limitation is the questions within the survey can be misunderstood and may not be answered correctly by the participant. Also, when conducting a survey there may be difficulty in receiving enough data and having participants answering every question. The last limitation of this study is the diversity of the sample size. In this study only sport medicine and primary care physicians will be completing this study.

Study Implications

The increase of overuse injuries in pediatrics and adolescents are more prevalent today because sports are becoming more competitive and athletes are beginning to specialize and compete year round (Stracciolini et al., 2013). The increase of diagnosed overuse injuries can effect children long term and their involvement in physical activity (Witkowski, 2013). The results of this study will be beneficial because it will identify the youth who are at risk for sustaining an overuse injury and why overuse injuries are becoming common in athletes today.

The results from the current research will also create guidelines for coaches, parents and athletes of what an overuse injury is and how it can be prevented. The focus of this research is to provide valuable information to physician and other health care providers to make them aware of the growth of overuse injuries in the sports world and how it is their responsibility to protect the pediatric and adolescent athlete from further harm in their clinics.

CHAPTER II

REVIEW OF LITERATURE

The review of literature seeks to find relevant articles and studies that can answer the proposed research question: Based on the sport medicine and primary care physician's opinion, what effect does sport participation have on overuse injuries in pediatric and adolescent athletes?

Overuse

Overuse injuries are considered to be chronic with an insidious onset of symptoms (Soprano & Fuchs, 2007). According to Brenner (2007), "an overuse injury is microtraumatic damage to a bone, muscle, or tendon that has been subjected to repetitive stress without sufficient time to heal or undergo the natural repetitive process" (p. 1242). Pediatric and adolescent athletes are more susceptible to overuse injuries. They are vulnerable to overuse injuries because they have a larger surface area to mass ratio, a larger head, may be too small for protective equipment and pediatric athletes have not developed complex motor skills used for sports (Adirim & Cheng, 2003). Since pediatric and adolescent athletes are exposed to overuse injuries while participating in sports, their muscles, ligaments, tendons, bones and growth plates can be affected (Witkowski, 2013). The most common diagnosed overuse injury is apophyseal (Krivickas 1997). Apophyseal injuries are irritation and inflammation of the insertion of the tendon, which is caused by repetitive motion during periods of

rapid growth (Adirim & Cheng, 2003). The most severe overuse injuries are stress fractures of the tibia and tarsal bones (Krivickas 1997).

All overuse injuries are classified into five different stages based on symptoms and are graded by severity ranging from least to worst (Brenner, 2007). The clinician will make an assessment of the injury and determine the severity. The clinician will also take into account potential risk factors that can contribute to the development of an overuse injury (DiFiori, 2010). Table 1 described below displays the different symptoms and the severity of overuse injuries (DiFiori, 2010).

Table 1

Symptom Guide for Overuse Injuries

Injury Severity	Symptom Characteristics
Grade 1	Symptomatic at the beginning or the end of an activity and then symptoms will diminish
Grade 2	Symptoms occur during an activity, but does not restrict performance
Grade 3	Symptoms occur during an activity and restrict performance.

Table 1

Table continued

Grade 4	Considered chronic and painful during sport participation and at rest
Grade 5	An athlete is unable to participate because of symptoms

Note. Modified from DiFiori, JP, Hosey R. Overuse injuries: diagnosis and treatment. *Lin. Atlas Office Proc.* 1998; 1(2):227-42.

There are several reasons overuse injuries develop and they are categorized into intrinsic and extrinsic risk factors (DiFiori, 2010). The intrinsic factors are physical or personal factors related to overuse injuries (Wilgen & Verhagen, 2011). Also the behavior of the athlete can relate to the onset of an overuse injury (Wilgen & Verhagen, 2011). There are four domains that relate to intrinsic factors, which contribute to overuse injuries. The four domains are physical, poor technique, behavioral and hereditary. Physical risk factors are being overweight, anatomical malalignments, hyper flexibility, and muscle stiffness. Lack of technique is a risk for intrinsic factors and includes unnatural movements, compensation caused by fatigue, incorrect landings, extreme and forced motion of joints, high forces during exercises and poor specific sport

technique or posture. Behavior can factor into overuse injuries because athletes might not have boundaries when participating in sports, athletes do not know how listen to their bodies and communicate when to stop because pain is experienced, and pressure from coaches, parents and peers. The last domain is hereditary and this can be caused from genetics (Wilgen & Verhagen, 2011).

The extrinsic factors contributing to overuse injuries are also broken into four different domains, which are situational, social, training, and his or her coach (Wilgen & Verhagen, 2011). Extrinsic factors play a huge role in the number of overuse injuries that occur in athletes (DiFiori, 2010). Situational risk factors are equipment used during training, playing surfaces, shoes and diet. Situational risk factors contribute to overuse injuries the majority of the time and can be prevented (DiFiori, 2010). Social risk factors can be pressure from teammates, coaches, peers and parents and returning back to a sport before injury has healed (Wilgen & Verhagen, 2011). Training is a domain that contributes to overuse injuries because repetitive motion occurs, athletes train excessively and will compensate when pain is experienced. The last domain that impacts overuse injuries is the coach. The coach can be too demanding on the players, inadequate communication, athletes having the mentality of not wanting to let the coach down, there is not a coach and player relationship, not enough trust and the coach is not focused on the athlete, but winning (Wilgen & Verhagen, 2011). It is important for athletes, coaches, parents, and health care providers to

understand the intrinsic and extrinsic factors to assist in injury prevention and limiting recurrent injuries (DiFiori, 2010).

Sport Participation

There is a high level of sport participation among pediatric and adolescent athletes (McLeod et al., 2009). In the United States, children and adolescents participate in organized sports, such as interscholastic athletics, summer camps, club leagues and sport enhancement programs (McLeod et al., 2009). Sport participation in organized athletics can begin approximately at the age of five years old in the United States (Soprano & Fuchs, 2007). Participation in physical activity has several health benefits for children and adolescents (Emery, 2003). Physical activity reduces mortality and disease specific morbidity (Emery, 2003). It also provides social advantages and psychological improvements (Bergeron, 2010). Even though there are benefits to sport participation in athletics, there are also risks (McLeod et al., 2009). The leading cause of injury in adolescents and pediatrics comes from participation in sports (Emery, 2003). Every year one out of four athletes require medical attention for sport injuries (Emery, Meeuwisse, & McAllister, 2006). It is estimated that the two most common types of injuries that require medical attention are overuse and acute injuries (Emery et al., 2006). Diagnosed overuse injuries versus acute injuries range from 45.9% to 54% (DiFiori, Benjamin, Brenner, Gregory, Jayanthi, Landry, & Luke, 2014). Overuse injuries that occur from sport participation have continued to increase (Soprano & Fuchs, 2007). The reason overuse injuries have increased is because of

increased intensity of training, increased competition, increased expectations of skill level at a very young age, and year round training sessions (Emery et al., 2003). Sport participation has consequences, and one of the main concerns for pediatric and adolescent athletes is overuse injuries.

Pediatrics and Sport Participation

The number of overuse injuries is becoming a growing problem for athletes because of the increase of sport participation (Mitchell, 2012). The growth of overuse injuries, overtraining and burnout are a growing problem for children in the United States (Brenner, 2007). Athletes are devoting all their time to one sport and playing year round to improve, advance, and compete at the highest level (Brenner, 2007; Mitchell, 2012). This is known as specialization and it is becoming more common at an early age (Brenner, 2007). Children as young as six years old are beginning to play on travel or select teams (Cuff et al., 2010). The most common sports for children to specialize in are baseball, gymnastics and soccer (Brenner, 2007). The pediatric and adolescent athletes who specialize in sports are unable to take a break from the same activity and they are at greater risk for an overuse injury to develop (Brenner, 2007). The reasoning for this is because the growing bones of young athletes are unable to endure in the same stresses as adults (Brenner, 2007) Also, excessive repeated loading without recovery periods for bone and other tissues of the immature skeleton become more vulnerable to injuries because they are unable to adapt to such high-volume training and competition loads (Bergeron 2010). Specialization

of sports in young athletes can be detrimental to pediatric and adolescent athletes because recovery time and healing from an overuse injury can be significant (Bergeron, 2010). Athletes will still continue to specialize in only one sport while competing on multiple teams with no breaks and this will cause an overuse injury and burnout (Brenner, 2007).

Multisport Athlete. When athletes participate in a variety of sports then they have fewer injuries and are able to play sports longer than someone who specializes (Brenner, 2007). Multi-sport athletes are well-rounded and have the highest potential to achieve lifelong fitness and enjoy physical activities. Athletes who participate in more than one sport need to make sure they avoid overuse, overtraining, and burnout (Brenner, 2007). Athletes are still able to sustain an overuse injury when playing multiple sports if they are involved in ones that over-schedule 18 or more hours of athletic participation each week (Maffulli, Longo, Spiezia, Denaro, 2010). Also, athletes who compete in two or more sports with the same emphasis (swimmers and baseball pitchers) on a body part are at higher risk of an overuse injury than those who compete in sports with different emphasis (track and golf) (Brenner, 2007).

Year-round training. Overtraining or burnout is when psychological, physiologic and hormonal changes are affected and decrease athletic performance. This is very common in sports and is becoming a serious problem (Brenner, 2007). Practice, conditioning and tournament schedules for pediatric and adolescents resemble those of professional athletes (Bergeron, 2010). Youth

athletes are now expected to train, compete in tournaments and practice excessively without the proper rest, hydration and nutrition (Luke, Lazaro, Bergeron, Keyser, Benjamin, Brenner, d'Hemecourt, Grady, Philpott, & Smith, 2011). Pediatric and adolescent athletes who are overtraining can experience chronic muscle or joint pain, personality changes, elevated resting heart rate, decreased sports performance, fatigue and lack of enthusiasm about practice and games (Brenner, 2007).

Athletes also experience physiologic effects (Bergeron, 2010). According to Bergeron (2010), "growth cartilage and the bone mineral content of the immature skeleton during the adolescent growth spurt especially are susceptible to the high-volume of training and competition loads that are determined to be necessary in many sport academy models designed for specialized sport development" (p.357). When children do not have sufficient recovery time from competitive seasons and year round training then there will be an increase in the number of overuse injuries (Difiori, 2010).

A solution to decrease the amount of overuse injuries is to concentrate on more technique and movement versus volume and intensity of training and competition (Bergeron, 2010). An athlete should also only participate in sports up to five days per week with at least one day off from activity (Brenner, 2007). Athletes should also have two to three months off from sport participation to allow injuries to heal. The two to three months off from sport participation will allow the

athlete to improve and concentrate on strength, conditioning and proprioception, which should reduce overuse injuries in the future (Brenner, 2007).

Overtraining, burnout and increase in sport participation have a deleterious relationship to the amount of overuse injuries that occur in pediatric and adolescent athletes (Brenner, 2007). A study was conducted in five high schools in northeast Ohio between spring of 2006 and spring of 2007 (Cuff et al., 2010). It was a survey that consisted of nine questions about the athlete's sport participation and their history of injuries. The study evaluated the relationship between seasonal patterns of athletic participation and overuse injuries in high school athletes. The study in high school athletes found that 57% of athletes participated in sports all four seasons and 37% of athletes played the same sport year round. Participation in sports for all four seasons appeared to be the greatest risk factor for overuse injuries. The athletes who participated in sports year round had a 42% chance of sustaining an overuse injury over those who took a break from playing sports for one season. It was reported that 51% of athletes reported some type of injury and 18% of those were overuse injuries. In conclusion, if athletes participate in more sport seasons per year and do not take a season off from physical activity then the athletes' exposure to overuse injuries is high (Cuff et al., 2010).

External Influences on Overuse Injuries

Overuse injuries compared in male and female athletes are different (Straccolini, et al., 2014). Sport participation is also different when comparing males and females (Straccolini, et al., 2014). The reason overuse injuries differ between genders are because of hormonal differences, increased joint laxity in female athletes, anatomical differences, and differences in motor control of the knee (Caine, C., Caine D., & Maffulli, 2006). Based on the research of Caine and Maffulli, sex and the type of sport do contribute to overuse injuries in pediatric and adolescent athletes.

Sex. A study was conducted from 2000 to 2009 in a large pediatric hospital that collected and analyzed medical records from patient visits (Straccolini, et al., 2014). The children ranged in age from five to seventeen. The study compared boy and girl athletes who sustained a sport-related injury. The study found girl athletes to be at greater risk for overuse injuries than boy athletes. Girl athletes sustained 62.5% of overuse injuries versus boys who sustained 41.9% of overuse injuries. Girl athletes also had more upper extremity injuries versus boys. Boys sustained more lower body and traumatic injuries (Straccolini, et al., 2014).

More traumatic injuries occur in boy athletes than girl athletes because boys participate in more contact and collision sports (Straccolini, et al., 2014). Traumatic injuries occur after a blow or force and can result in fractures, sprains, strains, concussions and lacerations. In lacrosse, boys sustained more injuries

than girls (McGuine, 2006). The reason is because male lacrosse players endure more contact than female lacrosse players (McGuine, 2006). The number of overuse injuries and sport participation is affected by gender. Another factor is the type of sport athletes participate in (Stracciolini, et al., 2014).

Type of sport. The type of sport has an effect on sport participation and overuse injuries (Mitchell, 2012). A study was conducted in Northeast Ohio from 2006/2007 to 2011/2012 and examined 2,834 overuse injuries in high school athletes (Schroeder et al., 2014). The greatest total number of overuse injuries occurred in girls' track and field and girls' field hockey. The lowest amount of diagnosed overuse injuries occurred in boys' volleyball and boys' ice hockey. The reason the greatest total number of overuse injuries occur in girls' field hockey and girls' track and field could be that the teams are larger and have younger athletes and they were not ready to handle repetitive motion associated with these sports. The greatest number per athlete of all overuse injuries were in boys' and girls' swimming and diving and girls' track and field. The reasoning for this is because these sports require repetitive movements and long training sessions (Schroeder et al., 2014). Also another contributing factor to overuse injuries are athletes who participate in the same type of sport year round (Mitchell, 2012). This is common in soccer, baseball and gymnastics (Brenner, 2007). These sports expect athletes to participate for long hours daily and on one or more team at a time (Brenner, 2007). The type of sport participated in increases the athlete's risk of sustaining an overuse injury (Mitchell, 2012).

Conclusion

Overuse injuries are becoming more common in pediatric and adolescent athletes and will continue to increase (Mitchell, 2012). Overuse injuries occurring in pediatric and adolescent athletes is preventable (Adirim & Cheng, 2003). According to McGuine (2006), “implementing valid, systematic, cost-effective injury-prevention strategies for high school athletes should be the goal of medical professionals, researchers, and sport-governing bodies” (p.488). Athletes, parents and coaches need to be educated on the signs and symptoms of an overuse injury, the internal and external risk factors, the importance of delayed specialization, and how to avoid overtraining and burnout (McLeod et al., 2011). It is important to understand the type of sport an athlete participates in because it could increase the likelihood of sustaining an overuse injury. It is also important to know that sustaining an overuse injury can affect girl and boy athletes differently. The review of the literature provides significant research relating to the opinions of primary care and sports medicine physician’s opinion to what effect does sport participation have on overuse injuries in pediatric and adolescent athletes?

CHAPTER III

METHODS

The purpose of the study is to analyze and look at the relationship between sport participation and overuse injuries. The hypothesis that was tested is based on the sports medicine and primary care physician's opinion; pediatric and adolescent athletes who specialize or participate in more sports during a single year increases the likelihood of an overuse injury. In order to test the hypothesis sports medicine and primary care physicians will complete the survey and the results will be analyzed and a conclusion of the results will be determined.

Participants

The sample consists of fifty sports medicine and primary care physicians. Participants were recruited through direct contact using personal emails and also networking with athletic trainers. Networking with athletic trainers will allow the survey to be distributed to their sports medicine and primary care physicians that work with their athletes. Participants were also recruited through Twitter, Facebook and professional organizations. The researcher has direct contact with sports medicine and primary care physicians who work in Georgia, Tennessee, and Ohio children's hospitals.

The study completed and was approved by Middle Tennessee State University's Institutional Review Board (IRB). This helped ensure the protection of the human subjects in this study. The participants in the study remained anonymous to protect the physicians and their practice. The researcher will be

the only one to have access to the data and will code the participants in order to ensure anonymity. Consent was directly obtained before the participant was able to participate in the survey by electronically signing their name.

Design

The study is a non-experimental cross-sectional design. This means that the participants for this study were asked for information at only one time and then given a window of opportunity in which they may choose to participate and answer the survey. Upon completion of this survey and resubmission, the participating sports medicine and primary care physician gave their consent as they may choose not to answer.

Variable Measurement

The independent variable for this research is sport participation and was measured by sports medicine and primary care physicians completing a survey. Sport participation in pediatric and adolescent athletes were measured by using questions from the survey, which are opinions from physicians. The opinions were assessed whether or not participation in sports has increased. The research analyzed whether specialization or competing in multiple sports has become popular with youth athletes today and if it is a contributing factor to overuse injuries.

Overuse injuries sustained in pediatric and adolescent athletes is the dependent variable in this research. Again, overuse injuries in pediatric and adolescent athletes are measured by having sports medicine and primary care

physicians complete a survey about their patients who have sustained and been diagnosed with an overuse injury.

Instruments

The instrument used in the study was a survey that was distributed among sports medicine and primary care physicians. PROMIS was used to distribute the surveys to the physicians. This website allows surveys to be distributed and returned electronically. PROMIS is an effective way of gathering the data compared to mailing surveys through the post offices. Using PROMIS was also a more cost efficient method compared to mailing costs. The online survey was pilot tested before it was sent out to the physicians. An athletic trainer and a statistician reviewed the form extensively. After the survey was pilot tested the online survey was sent to the Physicians through Twitter, Facebook, personal email or professional organizations. These instruments were utilized for the completion of this study.

Data Analysis

Using the survey data, the relationship between sport participation and overuse injuries were determined. Based upon the participant's answers from the survey a descriptive analysis was calculated using SPSS. The final conclusions were developed after the data analysis was completed.

CHAPTER IV

RESULTS

A survey was sent to sport medicine and primary care physicians. The survey was based on sports medicine and primary care physician's professional opinions about overuse injuries, the relationship between specialization and multiple sport athletes, and return to play protocols. This section discusses demographics of the participants, the background and experiences of the clinical physician, overuse injuries of the student athlete, specialization and cross training and return to play protocols. These will also be presented in a table and descriptive analysis of the data was ran. The tables show the responses of the sports medicine and primary care physicians for each question in the survey and it will show the analysis percentage of how the participant answered the question.

Demographics of the Participants

Table 2 shows the demographics of the sport medicine and primary care physicians who participated in the survey. Approximately 100 surveys were sent out to sport medicine and primary care physicians and thirty-five people registered, thirty-four people started and twenty-seven people completed the survey. There was a 27% response rate for the survey. The twenty-seven participants in the study were primarily Caucasian males. The median range for sport medicine and primary care physicians was 40.6%. The youngest physician

to participate in the survey was twenty-four years old and the oldest physician was sixty-four.

Table 2

Demographic Variable

Variable	<i>n</i>	%	<i>M</i>	SD
Age (years)			40.6	8.6
Sex				
Male	24	70.6		
Female	9	26.5		
Race				
Caucasian	28	82.4		
Black or African-American	0	0.0		
Asian	1	2.9		
American Indian or Alaska Native	1	2.9		
Native Hawaiian or Other Pacific Islanders	0	0.0		
Other	4	11.8		
Not Provided	0			

Note. *n* = participants, % = analysis percentage, *M* = median, *SD* = standard deviation

Background and Experience of Clinical Physician

Table 3 shows a descriptive analysis of the background and experience of the twenty-seven sports medicine and primary care physicians who participated in the survey. The data shows that the 30.3% of the participants have been a practicing doctor for approximately 1-5 years and 11-15 years. The physicians were asked to list all active memberships that they are part of. The physicians listed twenty three different active memberships. The most common memberships are American Medical Society for Sport Medicine, American College of Sports Medicine, American Academy of Family Physicians, American Academy of Pediatrics and American Orthopedic Society for Sport Medicine. Also, 77.4% of the physicians did their fellowship in sports medicine and 80% of the physicians are working at a sports medicine clinic currently. This is beneficial because the physicians are primarily seeing pediatric and adolescent athletes with sport injuries. The patients seen in the clinic are primarily adolescent athletes (96.5%) that are both male (62.0%) and female (55.1%).

Table 3

Background and Experience of Clinical Physician

Variables	<i>n</i>	%
Participants that are a practicing Doctor (years)		
0	0	0.0
1-5	10	30.3
6-10	8	24.2
11-15	10	30.3
16+	5	15.1
Type of practice		
Sport Medicine	20	80.0
Primary Care	6	20.0
Participants that are practicing in sports medicine (years)		
0	3	10.0
1-5	9	30.0
6-10	8	26.6
11-15	8	26.6
16+	2	6.6
Participants that are practicing in primary care (years)		
0	13	43.3
1-5	7	23.3
6-10	3	10.0
11-15	4	13.3
16+	3	10.0
Fellowship in Sport Medicine		
Yes	24	77.4
No	7	22.5

Table 3

Variables continued	<i>n</i>	%
Most common active memberships that physicians are part of		
American Medical Society for Sports	15	33.3
American College of Sport Medicine	11	23.9
American Academy of Family Physicians	9	19.5
American Academy of Pediatrics	6	13.0
American Orthopedic Society for Sports Medicine	5	10.8
Size of practice that physicians work in		
Small Practice (≤ 5 physicians)	5	16.6
Large Practice (≥ 5 physicians)	25	83.3
Patients seen each day by the physician		
0	0	0.0
1-5	0	0.0
6-10	0	0.0
11-15	7	23.3
16+	23	76.6
Pediatric Patients at Practice (years)		
0	0	0
1-5	10	33.3
6-10	8	26.6
11-15	10	33.3
16+	2	6.6

Table 3

Variables continued	<i>n</i>	%
Adolescent Patients at Practice (years)		
0	0	0.0
1-5	9	31.0
6-10	9	31.0
11-15	9	31.0
16+	2	6.8
Patients are student athletes (percent)		
0-25%	12	41.3
26-50%	5	17.2
51-75%	3	10.3
76-100%	9	31.0
Target population at practice		
Pediatric Patients (2-11 years)	1	3.4
Adolescent Patients (12-21 years)	28	96.5
Student athletes seen in the clinic who have an athletic trainer at their Middle Schools (percent)		
0-25%	18	62.0
26-50%	3	10.3
51-75%	4	13.7
76-100%	4	13.7
Student athletes seen in the clinic who have an athletic trainer at their High Schools (percent)		
0-25%	2	6.8
26-50%	2	6.8
51-75%	5	17.2
76-100%	20	68.9

Table 3

Variables continued	<i>n</i>	%
Male athletes seen in clinic (percent)		
0-25%	4	13.7
26-50%	18	62.0
51-75%	6	20.6
76-100%	1	3.4
Female athletes seen in the clinic (percent)		
0-25%	2	6.8
26-50%	2	6.8
51-75%	5	14.3
76-100%	20	57.1

Note. *n* = participants, % = analysis percentage

Overuse Injuries of the Student Athlete

Table 4, 5 and 6 display injury questions pertaining to the student athletes seen in the sport medicine and primary care physician's clinic. This section used descriptive analysis. Participants were asked to list the top three determining factors of how they diagnose an overuse injury in a student athlete. Sport medicine and primary care physicians most commonly examine the patient (26.3%), then take an oral history (20.8%) and then send the patient for imaging (11.1%) (magnetic resonance imaging, bone scans and computerized axial tomography). In the survey, 72% of the participants answered that they saw

more lower extremity injuries versus upper extremity injuries 28%. The three most common lower extremity injuries were Patellar Tendinitis, Patella Femoral Syndrome and Osgood Schlatters Disease. The top upper extremity injuries are Little League Elbow, Little League Shoulder and Rotator Cuff Tendinitis. 42.3% of sports medicine and primary care physicians diagnosed a student athlete with an overuse injury versus an acute injury 26-50% of the time. In the data, there was not a significant difference in the percent of male (38.4%) and female athletes (34.6%) diagnosed with overuse injuries.

Table 4

Diagnosing an Overuse Injury

Variables	<i>n</i>	%
The most common method of how to DX an overuse injury		
Exam	19	26.3
History	15	20.8
Imaging	8	11.1
Type of sport/position and amount of sports participated in	11	15.2
Number of hours participating	7	9.7
Where and how long has pain been present	5	6.9
Mechanism of Injury	7	9.7

Table 4

Variables continued	<i>n</i>	%
Model or specific approach when diagnosing		
Yes	7	24.1
No	22	75.0

Note. *n* = participants, % = analysis percentage, DX = diagnosed

Table 5

Overuse Injuries

Variables	<i>n</i>	%
More lower or upper extremity overuse injuries dx by physician		
Upper Extremity	7	28.0
Lower Extremity	18	72.0
Most common dx upper body overuse injuries		
Little league elbow	12	20.0
Little league shoulder	11	18.3
Rotator cuff tendinitis	10	16.6
Biceps tendinitis	5	8.3
Medial and lateral epicondylitis	5	8.3
Wrist tendinitis	4	6.6
Ulnar collateral ligament sprain/tear	4	6.6
Shoulder impingement	3	5.0
Spondylolysis	3	5.0
Apophysitis	2	3.3
Snapping scapula	1	1.6
Most common dx lower body overuse injuries		
Patellar tendinitis	10	17.8
Patella femoral Syndrome	9	16.0
Stress fractures	8	14.2
Osgood schlatters disease	7	12.5
Severs	6	10.7
Illofibial band Tendinitis	4	7.1
Hip tendinitis	3	5.3
Quadriceps tendinitis	2	3.5
Other	7	12.5

Table 5

Variables continued	<i>n</i>	%
<i>Note.</i> <i>n</i> = participants, % = analysis percentage, dx = diagnosed		

Table 6

Demographics of Athletes Diagnosed with an Overuse Injury

Variables	<i>n</i>	%
Male athletes diagnosed with overuse injuries (percent)		
0-25%	12	46.1
26-50%	10	38.4
51-75%	3	11.5
76-100%	1	3.8
Female athletes diagnosed with overuse injury (percent)		
0-25%	11	42.0
26-50%	9	34.6
51-75%	5	29.2
76-100%	1	3.8

Table 6

Variables continued	<i>n</i>	%
Athletes dx with overuse vs. acute injuries		
(percent)		
0-25%	8	30.7
26-50%	11	42.3
51-75%	7	26.9
76-100%	0	0.0
Increase in pediatric overuse injuries (percent)		
0-25%	14	56.0
26-50%	5	19.2
51-75%	3	12.0
76-100%	3	12.0
Increase in adolescent overuse injuries (percent)		
0-25%	10	40.1
26-50%	8	32.0
51-75%	4	16.0
76-100%	3	12.0

Note. Dx = diagnosed

Specialization and Cross Training

Table 7 shows descriptive analysis and the questions pertain to athletes specializing and cross training. The average athlete that was seen by a sport medicine and primary care physician primarily participated in 1-5 sports (100%) and the average amount of hours participated in games and practice for one

week was 6-10 (46%) and 11-15 (42.3%) hours. Sports with the highest reported rates of overuse injuries are baseball, running and gymnastics. Also, student athletes are commonly seen specializing in sports (92%) rather than cross training (8%). When asked “What is the percent that specialization of sports influences overuse injuries in student athletes?” respondents chose the answer 51-75%, 45.8% of the time. Physicians believe that athletes should not specialize in sports 88% of the time. In the current study physicians believe the only true benefit of specializing in sports is when an athlete participates in gymnastics or figure skating because more success comes from a younger age. 92.3% of physicians believe that athletes should cross train.

Table 7

Specialization and Cross Training

Variables	<i>n</i>	%
Physician’s opinion that sport influences overuse injuries		
Yes	26	100.0
No	0	0.0

Table 7

Variables continued	<i>n</i>	%
Most common sports seen with the most overuse injuries		
Baseball	13	50.0
Running(cross country and track)	7	26.9
Gymnastics	6	23.0
Athletes seen by physician in the clinic commonly specializes or cross trains		
Specialization	23	92.0
Cross Training	8	8.0
Specialization influencing overuse injuries (percent)		
0-25%	1	4.1
26-50%	8	33.3
51-75%	11	45.8
76-100%	4	16.6
Average sports participated in by student athlete		
0	0	0.0
1-5	26	100.0
6-10	0	0.0
11-15	0	0.0
16+	0	0.0
Average practice and games participated in 1 week by student athlete (hours)		
0	0	0.0
1-5	0	0.0
6-10	12	46.0
11-15	11	42.3
16+	3	11.5

Table 7

Variables continued	<i>n</i>	%
Physician's opinion if athletes should specialize		
Yes	3	12.0
No	22	88.0
Benefits in specializing in sports		
Yes	11	42.0
No	15	57.6
The benefits of specializing in sports for student athletes		
The younger the athlete is the more success (gymnastics/figure skating)	5	55.5
To train and practice properly at a higher level of competition	2	22.2
Exposure to showcases and college recruiters	2	22.2
Youngest age athlete was seen specializing by the physician		
5	6	24.0
6	5	20.0
7	3	12.0
8	6	24.0
9	3	12.0
10	1	4.0
11	0	0.0
12	0	0.0
13	0	0.0
14	0	0.0
15+	1	4.0

Table 7

Variables continued	<i>n</i>	%
Appropriate age an athlete should specialize		
5	0	0.0
6	0	0.0
7	0	0.0
8	0	0.0
9	0	0.0
10	1	3.8
11	0	0.0
12	3	11.5
13	5	19.2
14	7	26.9
15+	10	38.4
Doctor's opinion of specialization or cross training		
Specializing	2	7.6
Cross Training	24	92.3

Note. *n* = participants, % = analysis percentage

Return to Play Protocols for Student Athletes

Table eight shows the sport medicine and primary care physician's professional opinions about return to play protocols for student athletes.

Descriptive analysis was run in this section as well. The number one

recommendation for a student athlete who has sustained an overuse injury is to rest. When an athlete has rested after being diagnosed with an overuse injury, the number one deciding factor of a physician to allow an athlete to participate in sports again is when pain is absent. 65.3% of physicians factor age into their return to play protocol and 100% of physicians have their patient return for a follow-up appointment. The number one misunderstanding of overuse injuries with coaches, student athletes and parents is that they are not educated and aware of what an overuse injury is and the signs and symptoms. The main recommendation from the physician to prevent an overuse injury is to take time off during the year and to cross train instead of specializing in sports.

Table 8

Return to Play Protocol for Student Athletes

Variables	<i>n</i>	%
A physician decides an athlete can return to their sport		
No pain	19	52.7
Full strength and range of motion in physical exam	6	16.6
Rehabilitation and improved mechanics	5	13.8
Return to play sport program	5	13.8
Diagnostic Testing(Bone scan, MRI, Cat Scan)	1	2.7
Tanner Scale factored in RTP		
Yes	4	16.0
No	21	84.0

Table 8

Variables continued	<i>n</i>	%
Number one recommendation for student athlete dx with an overuse injury		
Rest	15	53.5
Rehab	6	21.4
Activity limits	4	14.2
Do not push through pain	2	7.1
Participate in a variety of sports	1	3.5
Preventive measures recommended for student athlete and parent		
Cross Training	12	29.2
Rest	8	19.5
Strength training/flexibility	6	14.6
Avoid repetitive activities	3	7.3
Training limits (pitch counts)	3	7.3
Education	3	7.3
Proper Technique	2	4.8
Rehab	1	2.4
Do not push through pain	1	2.4
Warm-up and cool down before and after activity	1	2.4
Adequate amount of sleep	1	2.4
Recommended by a physician to stop participating when dx with an overuse injury		
0-25%	9	34.6
26-50%	6	23.0
51-75%	3	11.5
76-100%	8	20.7

Table 8

Variables continued	<i>n</i>	%
Age factored into RTP		
Yes	17	65.3
No	9	34.6
Follow up appointment after dx		
Yes	26	100.0
No	0	0.0
The misunderstanding of overuse injuries with coaches, student athletes and parents		
Not educated and aware of what overuse injuries are	8	40.0
Athletes can play through pain	5	25.0
Not aware of the risk in the amount of training that leads to overuse injuries	4	20.0
The importance of rehab	2	10.0
Surgery fixes everything	1	5.0

Note. *n*=participants, %= analysis percentage

RTP=Return to play, DX= diagnosed

CHAPTER V

DISCUSSION

This study provided the opportunity to examine the research question, which is based on the sport medicine and primary care physician's opinion, what effect does sport participation have on overuse injuries in pediatric and adolescent athletes? The purpose of this study was to analyze and look at the relationship between sport participation and overuse injuries. This study is important because participation in sports for pediatric and adolescent athletes has grown immensely over the years and will continue to increase (McLeod, et al., 2009). Sports offer several health benefits, but with the rise of overuse injuries occurring in the youth population it is becoming problematic (McLeod, et al., 2009). This chapter will discuss the major findings of the current study specialization and cross training, overuse injuries and the type of sport, prevention, limitations and future research will be discussed.

Specialization and Crossing Training

Sport medicine and primary care physicians believe that one-hundred percent of the time sport specialization influences overuse injuries. Findings revealed sport specialization is more common in athletes than cross training. According to Emery et al., 2003, specialization is more popular than cross training is because the increased expectations of skill level at a very young age, year round training sessions, increased competition and increased intensity of training. The majority of the athletes seen by physicians are practicing and

participating in games six to ten hours in one week and playing on an average of one to five sports teams per year. The youngest age an athlete was seen in the clinic by a sport medicine or primary care physician and was specializing was at the age of 5. This is problematic because pediatric and adolescent athletes are growing and their bones, muscles, ligaments and tendons are unable to endure the same stresses as adults (Brenner, 2007). Specializing in sports can be detrimental to pediatric and adolescent athletes with minimal benefits (Bergeron 2010). The present investigation found that physicians believe the only benefits to specializing in sports is if you are a gymnast or figure skater because there is more success at a younger age, to train and practice properly at a higher level of competition and to expose athletes to showcases and college recruiters. Cross training has more benefits than specializing and 92.3% of sport medicine and primary care physicians believe athletes should cross train instead of specialize.

Overuse Injuries and Type of Sport

There are numerous different types of overuse injuries. The most common diagnosed overuse injury is apophyseal (Krivickas 1997). The most severe overuse injuries are stress fractures of the tibia and tarsal bones (Krivickas 1997). The present study found that the most common lower body overuse injuries seen in the clinic are Patellar Tendinitis, Patella Femoral Syndrome and Osgood Schlatter Disease. The most common upper body overuse injuries diagnosed in an athlete was Little League Elbow, Little League Shoulder and Rotator Cuff Tendinitis. There is a relationship between the current findings in the

study and what Krivickas 1997 states about what the most common overuse injury is. The participants in the survey commonly diagnosed athletes with Little League elbow 20.0% and Patellar Tendinitis 17.8%. These two injuries are considered apophyseal injuries because there is inflammation of the growth plate that is below the insertion of the tendon (Krivickas 1997).

The type of sport participated in has an effect on the type of overuse injury (Mitchell, 2012). The results indicated that the most common sports diagnosed with more overuse injuries were baseball, cross country and track, and gymnastics. Given that the most common upper body overuse injuries are associated with baseball, there is a relationship between the type of sport participated in and type of overuse injuries. There is also a relationship with the most common lower body overuse injuries and track and cross county athletes. The type of sport has an effect on sport participation and the type of overuse injury sustained (Mitchell, 2012).

Prevention

Sport injuries are more prevalent in pediatric and adolescent athletes because sport is increasing (McLeod et. al., 2009). Since sport and overuse injuries are increasing in youth athletes it is essential that middle school and high schools have athletic trainers (McLeod et. al., 2009). The present study reported that 13.7% of physicians chose 75-100% of the time that Middle Schools do have an athletic trainer. 68.9% of physicians chose 76-100% of the time that High Schools do have an athletic trainer. Participation in sports begins at the early age

of five years old (Soprano & Fuchs, 2007). Pediatric athletes begin participating in recreational sport teams and then move to middle school sports. The present research states that pediatric athletes rarely have an athletic trainer available when they are participating in sports. It would be very beneficial to have an athletic trainer at recreational fields and middle schools because they would be able to protect these young athletes and educate coaches and parents on what an overuse injury is and the signs and symptoms. If athletic trainers are present, it is paramount that recreational sport programs and middle schools take the responsibility to educate coaches and parents on overuse injuries and pros and cons of sport specialization.

According to the present study, the most common misunderstanding of overuse injuries with athletes, parents and coaches are not being aware and educated about what an overuse injury is. Also another misunderstanding is the common belief that “no pain, no gain.” Athletes, parents and coaches believe that athletes can play through pain and it will not affect them. The common beliefs about overuse injuries are preventable. To prevent misunderstandings from occurring coaches, parents and athletes need to be educated. A plan needs to be implemented to recreational leagues about overuse injuries and how to prevent them in pediatric and adolescent athletes. Recreational leagues needs to have a specific approach where coaches complete a form stating that they can recognize an overuse injury and how to prevent them from occurring. Also, parents need to be informed about the significance of avoiding an overuse injury

and what it is and this can be completed through educational fliers and handouts. This specific approach can help reduce overuse injuries in pediatric and adolescents athletes and help explain the importance of delayed specialization and how to avoid burnout and overtraining.

Limitations

A limitation in the study was that the sport medicine and primary care physicians were recalling information and completing a survey through electronic means. In person data collection and participant observation could have governed more detailed responses. Another limitation in the study was question number twenty in the overuse injury section. The question asked participants to choose the largest contributing factor of an overuse injury in student athletes? The participants chose more than one answer and PROMIS coded the responses. The researcher was unable to interpret the answers, so the question was removed from the data. Finally, the sample was confined to the states of Georgia, Tennessee and Ohio predominately.

Future Research

The number of overuse injuries is becoming a growing problem for athletes because of the increase of sport participation (Mitchell, 2012). Research is needed to investigate the increase in overuse injuries. An epidemiology study should be conducted about athletes who specialize and cross train. This would be important and very beneficial to sports medicine and primary care physicians because it would study the effects of sport specialization and cross training.

Future research should consider having parents, coaches and athletes complete a questionnaire about their perceptions of injuries, specialization, cross training and return to play protocols. This study would be beneficial because it would tell health care providers how knowledgeable parents, coaches and athletes are about overuse injuries and sport specialization and cross training.

Given the limited number of participants in the present investigation, future research should strive for larger samples. If there are more participants taking the survey then there will be more opinions from sport medicine and primary care physicians about overuse injuries, specialization and multiple sport athletes and return to play protocols. There is not enough research about prevention programs for overuse injuries (Emery, Meeuwisse, & McAllister, 2006). In the future, this study should ask specific questions focusing on prevention programs. If there are specific questions that pertain to prevention programs for overuse injuries then sport medicine and primary care physicians are able to give their professional opinions and a plan can be implemented. This would allow athletes who sustain an overuse injury to be able to return to their sport and remain physically active throughout their childhood and adulthood.

Conclusion

Results from this study enabled a better understanding of the relationship between sport participation and overuse injuries in athletes. The study pursued to answer the research question which is: Based on the sports medicine and primary care physician's opinion, what effect does sport participation have

overuse injuries in pediatric and adolescent athletes? The data revealed significant results that athletes should cross train and not specialize in sports and the type of sport participated in has an effect on the type of overuse injury sustained. Specifically, this study is also a great tool to help prevent overuse injuries by educating parents, children and coaches on what an overuse injury is, knowing the signs and symptoms, the importance of delayed specialization and how to avoid burnout and overtraining.

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APPENDICES

APPENDIX A: SURVEY

Participant ID Number:

Date:

Overuse Injuries in Pediatric and Adolescent Athletes

Please take your time and answer each question as accurately as possible

Background and Experience Questions of Clinical Physician:

1. How many years have you been a practicing Doctor?

0 1-5 6-10 11-15 16+

2. Please list the active memberships you are part of?

3. Did you do your fellowship in Sport Medicine?

Yes or No

4. What type of practice are you currently practicing in?

Sports Medicine Primary Care

5. How many years have you been practicing in Sports Medicine?

0 1-5 6-10 11-15 16+

6. How many years have you been practicing in Primary Care?

0 1-5 6-10 11-15 16+

7. What is the size of your practice?

A small practice (5 or fewer physicians) or A large practice (6 or more physicians)

8. Approximately how many patients do you see a day?

0 1-5 6-10 11-15 16+

Background Questions of Student Athletes

1. How many years have you seen pediatric patients at your practice?

0 1-5 6-10 11-15 16+

2. How many years have you seen adolescent patients at your practice?

0 1-5 6-10 11-15 16+

2. What percent of your patients are student athletes?

0-25% 26-50% 51-75% 76-100%

4. What is the age range that best represents the target population seen in your practice?

Pediatric Patients (2-11 years old) or Adolescent Patients (12-21)

5. What percent of your student athletes have athletic trainers at their middle schools?

0-25% 26-50% 51-75% 76-100%

6. What percent of your student athletes have athletic trainers at their high schools?

0-25% 26-50% 51-75% 76-100%

7. What percent of female athletes do you see in your practice?

0-25% 26-50% 51-75% 76-100%

8. What percent of male athletes do you see in your practice?

0-25%

26-50%

51-75%

76-100%

Injury Questions

1. Please list the top three determining factors of how you diagnosis an overuse injury in a student athlete?

1.

2.

3.

2. When diagnosing an overuse injury do you use a specific approach or model?

Yes or no

3. What approach or model do you use to diagnosis an overuse injury?

4. In your practice what is the largest contributing factor of an overuse injury in student athletes?

Training errors

Specialization

Improper footwear

Growth

Anatomical malalignment

Muscle-tendon imbalance

Playing/running surface

Other: _____

5. Please list the top three upper body overuse injuries diagnosed in student athletes at your practice?

- 1.
- 2.
- 3.

6. Please list the top three lower body overuse injuries diagnosed in student athletes at your practice?

- 1.
- 2.
- 3.

7. In your practice, do you see more lower or upper extremity overuse injuries in student athletes?

Upper extremity or Lower extremity

8. In your practice what is the percent of male athletes who are diagnosed with overuse injuries?

- 0-25%
- 26-50%
- 51-75%
- 76-100%

9. In your practice what is the percent of female athletes who are diagnosed with overuse injuries?

- 0-25%
- 26-50%
- 51-75%
- 76-100%

10. What is the percentage that you diagnosis student athletes with overuse injuries versus acute injuries?

0-25% 26-50% 51-75% 76-100%

11. Since you began practicing, how much of an increase of overuse injuries have you seen in the pediatric population?

0-25% 26-50% 51-75% 76-100%

12. Since you began practicing, how much of an increase of overuse injuries have you seen in the adolescent population?

0-25% 26-50% 51-75% 76-100%

Specialization and Cross training Questions

1. Does the type of sport influence the type of overuse injury?

Yes or No

2. What sport do you commonly see more overuse injuries in student athletes?

3. Do you commonly see student athletes specialize in sports or cross training?

Specialization or Cross training

4. What is the percent that specialization of sports influences overuse injuries in student athletes?

0-25% 26-50% 51-75% 76-100%

5. On average how many sports do your student athletes participate in?

0 1-5 6-10 11-15 16+

6. On average how many hours do your student athletes participate in practice and games for one week?

0 1-5 6-10 11-15 16+

7. Do you think student athletes should specialize in sports?

Yes or No

8. As a physician, do you see any benefits of specializing in sports in student athletes seen at your practice?

Yes or No

9. If answered yes, please list the benefits of specializing in sports for student athletes?

1.

2.

3.

10. What is the youngest age a student athlete was seen in your office that was specializing in sports?

5 6 7 8 9 10 11 12 13 14 15+

11. If an athlete chooses to specialize in a sport what age would be appropriate?

5 6 7 8 9 10 11 12 13 14 15+

12. As a physician do you believe in specialization or cross training for student athletes?

Specialization or Cross training

Return to Play for Student Athletes

1. How do you decipher when a student athlete diagnosed with an overuse injury is ready to return back to their sport?

2. As a physician, do you use the Tanner scale to factor in your decision?

Yes or No

3. What is the number one recommendation that you give to a student athlete that has been diagnosed with an overuse injury?

4. What preventive measures do you recommend to student athletes and parents about overuse injuries?

5. How often do you recommend a student athlete to stop participating in their current sport when they have sustained an overuse injury?

0-25% 26-50% 51-75% 76-100%

6. When treating a student athlete and deciding whether they are ready to return to play, do you factor age into your decision?

7. After making a diagnosis, do you suggest that the student athlete with an overuse injury return for a follow up appointment?

Yes or No

8. What do you find to be misunderstanding about overuse injuries with coaches, student athletes and parents?

APPENDIX B: CONSENT TO PARTICIPATE

You are being asked to participate in a Middle Tennessee State University research project regarding Overuse Injuries in Pediatric and Adolescent Athletes and Sport Participation by completing a brief survey. There are no foreseeable risks or immediate benefits, but your responses will help parents, coaches and health care providers become more aware of the increase of overuse injuries in the sports world and how it is affecting pediatric and adolescent athletes today. All information collected will remain confidential. Your participation as a subject is completely voluntary and you may withdraw at any time. If you have any questions or concerns, please contact the Chelsey Clutter at 404-550-2216 or cc5r@mtmail.mtsu.edu. By continuing on you provide consent to participate in this research project.

APPENDIX C: STUDY APPROVAL

2/19/2015

Investigator(s): Chelsey Clutter, Brian G. Ragan

Department: Health and Human Performance

Investigator(s) Email Address: cc5r@mtmail.mtsu.edu; brian.ragan@mtsu.edu

Protocol Title: Overuse Injuries in Pediatric and Adolescent Athletes and Sport Participation

Protocol Number: #15-188

Dear Investigator(s),

Your study has been designated to be exempt. The exemption is pursuant to 45 CFR 46.101(b)(2) Educational Tests, Surveys, Interviews, or Observations.

We will contact you annually on the status of your project. If it is completed, we will close it out of our system. You do not need to complete a progress report and you will not need to complete a final report. It is important to note that your study is approved for the life of the project and does not have an expiration date.

The following changes must be reported to the Office of Compliance before they are initiated: Adding new subject population

- Adding a new investigator
- Adding new procedures (e.g., new survey; new questions to your survey)
- A change in funding source
- Any change that makes the study no longer eligible for exemption.

The following changes do not need to be reported to the Office of Compliance:

- Editorial or administrative revisions to the consent or other study documents

- Increasing or decreasing the number of subjects from your proposed population

If you encounter any serious unanticipated problems to participants, or if you have any questions as you conduct your research, please do not hesitate to contact us.

Sincerely,

Lauren K. Qualls, Graduate Assistant

Office of Compliance

615-494-8918

