WHAT IS SOCCER PRE-SEASON TRAINING? A COACH'S PERSPECTIVE AT THE COLLEGIATE LEVEL

THESIS

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By

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DEDICATION

I dedicate this thesis to my parents Claudia and William Powell who have so patiently waited and supported me while I fulfill my dream. Thank you for giving me the wings to fly and the courage to do so.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Soccer is the most widely played sport in the world, [1] spanning across 146 countries, [2] and believed to have over 40 million amateur participants.[3] There are approximately 18.2 million players in the United States alone, [4] and currently soccer is the fastest growing team sport for all levels of play.[5] This participation rate also reflects the increase in the number of collegiate programs, particularly women's teams, in the National Collegiate Athletic Association (NCAA).[4,6,7] Previously in 1981, there were no women's collegiate soccer teams, but in just 3 years that number increased to 165.[8] In 1993 there were 300 total collegiate soccer programs.[9] Today, sports such as baseball and softball have over 1750 combined collegiate programs and men's and women's basketball have approximately 2000 total programs.[10] Currently the NCAA accounts for over 1500 total soccer teams within Divisions I, II, and III for both men and women in the 1999-2000 North American College Coaches Directory.[10] As the popularity of soccer continues to grow, it is expected that the number of

teams will continue to increase.

As the number of participants continue to increase, proper training programs must be implemented at all levels and ages for both men and women soccer players. Training programs are utilized in all sports to ensure an athlete's performance and skills are maximized and to avoid injury. Training programs at the collegiate level typically occur in 3 phases; pre-season, for preparation of competitive season play, practice sessions during the competitive season, and continued training into the off-season. The types of training and seasonal parameters may vary with geographic location, skill level, and specific team needs associated with physical fitness. Skill levels, program and training variations, and player type are diverse aspects of collegiate soccer that can either establish a successful program or contribute to injury among soccer players. The effectiveness and physiological outcomes of soccer training is not sufficiently documented and currently the risks and benefits of soccer training have not been thoroughly identified. The objective of this study is to address the training variations at the collegiate level, with special attention on the pre-season programs administered throughout the NCAA. Pre-season training is restricted in duration by NCAA regulations, allowing a limited number of practices prior to the first game.[11] The constituting operating bylaw 17.18.2 for the NCAA 2000-2001 states pre-season practice restrictions are as follows: A member institution shall not commence practice sessions in soccer prior to the date that permits a

maximum of 21 practice opportunities prior to the first scheduled intercollegiate contest.[12] The actual practice opportunities bylaw 17.02.11 states: In determining the number of practice opportunities to establish the starting date for pre-season training there shall be counted 1 for each day beginning with the opening of classes, 1 for each day classes are not in session in the week of the first scheduled intercollegiate contest and 2 for each other day in the pre-season practice period, except that the institution shall not count any days during the pre-season when all institutional dormitories are closed, the institution must leave campus, and practice is not permitted.[12] This stringent time frame gives coaches limited time to prepare the athletes and address the physiological strengths and weaknesses of each player.[11]

The need to emphasize the importance of continued research of all aspects of soccer is critical. There is a lack of literature related to soccer at the collegiate level and a limited number of research studies have been performed in the US. The level of competition and the growing participation in intercollegiate athletic programs throughout the US contributes to the significance of further investigation of soccer.

CHAPTER II

LITERATURE REVIEW

The sport of soccer is in its youth. The broad-spectrum literature review related to soccer spans across the last 30 years. Research related to the many facets of soccer, including the physiology of the sport, the physiological profile of male and female players at all levels and ages, and injury epidemiology and prevalence, is growing and evolving. These topics will be discussed in this literature review to better understand the dynamics involved in the participation of soccer and to establish a strong foundation of information related to the game of soccer.

Physiology of Sport and Training

Scientists have studied physiology of exercise and sport over the last several centuries in an attempt to understand the human body and its function during athletic activities. Exercise physiology is defined as the study of how our bodies' structures and functions are altered when we are exposed to acute and chronic bouts of exercise.[13] Sport

physiology is an element of exercise physiology that applies to the concepts of training and sports specific performance.[13] The basic principles of training will be discussed briefly to provide pertinent information needed to fully understand the physiological concepts of soccer training.

The first principle of training discussed is *individuality*. The idea of individuality states not all athletes have the same capacity to endure or adapt to exercise training due to heredity, skill level, or motivation.[13] This concept is important to consider in sports, such as soccer, that involve team participation. When training soccer players, individual player type, level of play, and position must be considered in order to realistically establish fitness goals and requirements.[11,14,16-19] Individual strengths and weaknesses must also be addressed while maintaining a team concept and recognizing the needs of the group.[11]

Secondly, the principle of *specificity* is addressed. Specificity emphasizes the need for a training program to stress the physiological system that is specific to that sport.[13,19,20] This concept is critical for optimizing sports performance and achieving sport specific training adaptations.[13] It is imperative that soccer players participate in soccer specific drills. This concept must be a large part of the training regimen to fully develop the skills needed to play the game. Although endurance training is essential to a player's ability to perform the large percentage of running activities for the duration of a soccer match, specifically

addressing soccer related skills would enhance a player's tactical and technical skills unique to soccer.[14,18,19,21,22]

Third, is the principle of *disuse*, which stresses the importance of maintaining and continued training. If training is reduced or stopped completely the state of fitness will decrease and physiological gains will be lost. This principle is especially true for soccer players if endurance and ball skills training are greatly reduced between seasons of competition or during off-season. Recovering previous levels of fitness and skills is difficult and limits a player's competitiveness at any level.[13,23]

Fourth, the principle of *progressive overload* is recognized. This concept is the foundation of training and training programs must comprise the components of training progression and overload to be effective.[13] Overloading refers to loading the body beyond that which it is accustomed in order to produce an adaptive change.[13] Progression refers to an incremental increase in training such as increasing repetitions, intensity, duration and/or weight, that can encourage physiological changes.[11,13,14,20,23] It has been shown that marked improvements for most athletes in aerobic capacity can be seen when training intensities are between 50% and 90% of VO_2 max.[13] With soccer training it is easy to manipulate any one of these variables, but it is the discretion of the coach or trainer to determine the needs of the players and the situation required to achieve the desired results.[11] Progression and overload can

be effectively administered and manipulated in interval training in soccer. Interval training challenges the athlete with short but regularly repeated periods of work stress at various levels, while allowing adequate rest periods.[11,17] Interval training is often used in training soccer players, allowing an athlete to participate in a much more intense workload over a longer period of time.[11,17]

Fifth, is the principle of *hard/easy.* This principle has been disputed in the past, but as more knowledge is gained about exercise physiology the theories continue to change. It is now known that after one or two days of training at higher intensities a day of easy training or active rest must occur.[13] The body will begin to maladapt or breakdown without proper mind/body recovery from high intensity training bouts. Improved performance is a normal response to training hard but the training must be designed in a cyclical way to allow recovery time.[24]

The last principle is *periodization.* This popular principle of training refers to the gradual cycling of training as it pertains to specificity of sport, intensity, and volume of training in preparation for competition.[13] Periodization is separated into macrocycles and mesocycles. A macrocycle is defined as varied intensities and volumes of training typically occurring over a year. The macrocycle is then divided into two or more mesocycles in which there are periods of preparation, competition, and transition usually lasting many weeks to months.[13] The concepts and applications of periodization illustrated by Wathen[23]

emphasize the importance of appropriate variations in training during the competition period. Wathen[23(p461)] describes the competitive period for numerous sports as the late pre-season and regular season of play, which begins with "a shift to very high intensity work with lower volume" and "practice in skill technique and game strategy increase dramatically, as conditioning work decreases proportionally in duration." According to Wathen[23] pre-season usually begins 6-8 weeks prior to the first game as part of the preparatory period of a mesocycle. The system of periodization is essential in preventing negative outcomes of training including underperformance, overtraining, and burnout by the athletes.[13,23,24] Excessive training and overtraining in sports are concepts gaining attention in sports and exercise physiology.[13,23,24] It has been determined that "few athletes are undertrained, but unfortunately, many are overtrained, often erroneously believing that more training always produces more improvement."[13(p389)]

Excessive training is determined "when training is done with an unnecessarily high volume, intensity, or both" without adequate recovery time leading to potential injury and underperformance.[13(p388)] Overtraining can easily occur if training programs are not implemented in an appropriate manner. The effects of overtraining an athlete can lead to overtraining syndrome. Overtraining syndrome might be indicated when an athlete's physical performance declines, producing various symptoms such as loss in muscular strength, coordination, maximum

work capacity, and loss of competitive drive.[13,24] Secondary complications of overtraining syndrome are decreased appetite, depression, irritability, weight loss, muscle tenderness, frequent infections, occasional nausea, sleep disturbances, elevated resting heart rate, and elevated blood pressure.[13,24] The importance of designing training programs that follow the basic principles of physiology and training are essential to the health and performance of the athlete.[13,23,24] Training programs with adequate variations in rest, intensity and volume will allow athletes to properly recover from training regimens and avoid excessive training or overtraining syndromes.[13,23,24] These principles of training have been established over years of research and are continually being altered and updated to conform to the current body of knowledge. The principles of training have also been established to ensure maximum efficiency and performance of athletes, to ensure proper technique and training strategies, and to ensure the safety and health of the athlete.

Appropriate soccer training programs are vital to the potential achievements of the players and teams.[25-27] There is a scarce amount of literature on soccer training, including pre-season training, at the collegiate level. It has been stated by numerous authors that training methods and intensity, as well as the amount of time spent training can lead to injury[2-6,25-29] On the contrary, it is also thought by many authors that training can be a significant tool for injury prevention,[5,22,25,27,30] but if abused or inappropriately administered can be detrimental to players

and teams. Therefore, proper training techniques and protocols are vital for the athlete's safety and the integrity of the sport.[25,26,31,32]

Collegiate soccer training programs vary greatly due to differences in coaching styles, diverse levels of education among coaches, and competitive skill levels that span the NCAA. The type and amount of training executed by each individual program could negatively or positively affect the team's success and injury prevalence.[2,25,27,30,33,34]

In a study by Ekstrand et al,[25] a direct correlation was found between team success and the amount of training within a male senior soccer league over a one year period. Therefore, Ekstrand[25] established that teams with less than average training levels showed an increased number of injuries. This study indicates there is a need for training to ensure the prevention of injury, but it must adhere to the general principles of sport training, consider the physiology of the athlete, and must be administered appropriately.

Physiology of Soccer Players

The physiological profile of a soccer player and the physiological demands of the sport have been studied by numerous researchers.[11,14-16,19,35-37] By understanding the physical demands placed on soccer players, appropriate training guidelines can be determined and associated risk factors addressed. Soccer is considered a contact sport that puts many demands on the technical and tactical skills of each

individual player. Soccer is characterized as high intensity, intermittent non-continuous exercise with functional activities such as acceleration, deceleration, jumping, cutting, pivoting, turning, and kicking.[14,15,28,31] The sport of soccer is an intense physical challenge. Soccer is played on the largest playing field of any sport measuring up to 120 yards long and approximately 75 yards wide.[11] A regulation adult soccer game is approximately 90 minutes in duration with a possible additional 30 minutes for overtime.[11] It has been estimated by Inklaar[28] that soccer players cover approximately 10km or 6 miles of ground in one 90 minute game (regulation game times can vary with age) and between 8-18% of that time the individual player is at his/her peak speed. Thomas Reilly[14] found in a regulation adult soccer game a player could cover an overall distance of 9-11km while performing approximately 1000 discrete activities. A change in activity occurs every six seconds including dribbling, passing, shooting, trapping, walking, sprinting, and running.[14] Reilly[14] found soccer players spend the largest percentage of time in a game (36%) jogging with movements off-the-ball, seeking and creating space, decoy runs, support runs, and counter attacks. Walking and recovering amount to 24% of the time spent during a game. Reilly estimates three seconds of rest for every two minutes of play.[14] Cruising, defined as a sub-maximal effort with immediate purpose at a higher intensity than jogging, occurs during 20% of the game.[14] An all-out effort of sprinting occurs 11% of the time, once every 90 seconds over a

mean distance of 14 meters.[14] Running backwards and dribbling (running with the ball) occur 7% and 2% of the time, respectively.[14] In a study by Ekblom[15] of elite male soccer players, an average total distance of 10-11km is covered by a player and 10% of that total distance is spent sprinting or high speed running. Factors that may affect the work rate and total distance covered are player position, fitness and fatigue, and style of play.[14] Reilly[14] found midfielders cover an average of 10km at a lower exercise intensity, while forwards/strikers and defenders cover less distance (8km) at a higher intensity.

The energy demands required to sustain a soccer player for the duration of a game or practice rely on both the aerobic and anaerobic systems.[11,15,16,19] Ekblom[15] states one of the most important physiological performance related factors in soccer focuses on the large demands placed on the anaerobic system. Aerobic endurance is also a significant factor that contributes to a soccer player's potential and performance. Distance covered in a game, mean heart rate (HR), and maximal oxygen uptake (VO_2 max) measurements are necessary in estimating the aerobic energy yield to determine the fitness and endurance levels of a player. Because a considerable portion of the game is performed at maximum speed, an elite player can utilize up to 80% of their maximum aerobic yield.[28] Ekblom's[15] study indicated there is no difference in male and female mean heart rate (between 173±10bpm and177±11bpm) response to the aerobic demand of soccer.[15] The stress

on the oxygen transport system chain of a midfielder was evaluated in a regulation game using a portable oxygen monitor.[15] In many parts of the game the soccer player's HR stayed above 90% of his peak HR.[15] Reilly documented the relative intensities of training and found the average HR during different soccer specific activities varied.[14] Reilly[14] noted the following variations: the average HR of a player during warm-up was 120±2bpm while running activities in games or practices the average HR was 144±4bpm.[14] During skills practices or drills the average HR can range from 128±5bpm to 137±4bpm.[14] Game intensities are represented by an average HR of 157±7bpm while recovery bouts or rest periods average 102±3bpm.[14]

Aerobic capacity, maximal oxygen uptake, or VO_2 max represents an athlete's aerobic fitness and can be used to predict athletic success in endurance events.[13] Because a soccer player spends a significant percentage of time participating in endurance activities such as jogging, cruising, and walking, soccer influences both the anaerobic and aerobic energy systems. Ekblom[15] found that the average VO_2 max of soccer players is between 55-65 $ml/kg^{-1}/min^{-1}$ and the average energy turnover rate in both males and females are in the range of 75%-80% of a player's maximum aerobic power. The most recent information suggests this VO_2 max estimate is considered to be accurate especially in European countries.[19] Reilly[14] also discovered on average a soccer player works at 75% of his/her VO_2 max during a game. A study by Tapia[35]

investigating VO_2 max and body composition between spring training and fall pre-season training in female collegiate soccer players found these Division I NCAA players have a high aerobic capacity with a VO_2 max greater than 129% of predicted. The VO_2 max measurements for spring training and fall pre-season training were 48.0±4.4 ($ml/kg^{-1}/min^{-1}$) and 49.3±5.1 ($ml/kg^{-1}/min^{-1}$), respectively. There were no differences in VO_2 max between seasons noted in this study, indicating female collegiate soccer players maintain aerobic fitness through the off-season.[35]

The physiological variables such as work-rate profiles, average and percent maximum heart rate, and VO_2 max measurements discussed in this paper are only a few indicators of a soccer player's fitness level and performance predictors. Other factors including body temperature, blood lactate levels, strength, flexibility, speed, dietary applications and training efforts can all be used to determine the physiological profile of a soccer player.* It has been thought by numerous researchers that by improving the physiological profile of an athlete, performance will be improved and injuries may be prevented.ϕ

Soccer Injury and Prevalence

Soccer injuries have recently been the subject of attention for researchers throughout the world, but research in the US is severely

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* *References* 11, 14, 16, 19, 32-34, 36, 37, 39

ϕ *References* 5, 6, 11, 13, 19, 23-27, 30, 32, 34, 36, 38-41

lacking. Several researchers have emphasized the need for a better system of preventing sports injuries with an emphasis on soccer.[1,14,18,25,27,30] Inklaar[27(p81)] concludes that the "epidemiological information of the sport medical aspects of soccer injuries is inconsistent and far from complete." It is also the opinion of Inklaar[27(p82)] that "more research is needed to identify high risk groups and independent and predictor variables of injury within those subgroups."

Due to the increased physical exertion and high intensity activities such as sudden changes in direction, hard cutting and pivoting, and occasionally violent collisions, the risk for injury in soccer is relatively high.[1-14,16,17,19-28,30-37] Injuries associated with the sport of soccer have been the topic of research dating back to the late 1970's [30,32-35] and early 1980's.[1,23,36] Numerous studies on soccer have focused on injury epidemiology,[2,11,14,19,20,24,25,28] the complex interaction of various risk factors [2,5,8,23] and assorted mechanisms of injury associated with soccer.[1-8,10-14,16-28,30-36] According to Knapp,[4] theories explaining the frequency of soccer injuries include field conditions, poor shoe design, training progressions and abnormalities in nutrition and endocrine variables. Many researchers have attempted to identify intrinsic and extrinsic factors contributing to injury in soccer players. Extrinsic factors are defined as environmental conditions including training load, intensity, and level, shoe-ware, playing surfaces, protective equipment, player position, weather and temperature.[4-7,25-27,29,34,40] Harmon[7] has

stated extrinsic factors are difficult to quantify, yet there has been little research in this area. Intrinsic factors are considered personal player characteristics including previous injury, joint instability, muscle strength imbalance, flexibility or range of motion, physical capacity (VO_2 max), physical maturity, skill, gender, attitude and behavior. [4-7,25-27,29,34,40]

The prevalence of soccer injuries is cause for concern internationally and at all levels of play. In 1990 a population survey in the Netherlands estimated outdoor soccer injuries requiring medical attention accounted for 29% of all sports injuries.[28] A 1990 study by Engstrom[2] observed 49 of 64 Swedish soccer players (75%) sustained 85 injuries during the year. In a 1991 study by Engstrom[29] of female elite Swedish soccer players more than 80% of the players sustained one or more injuries during the year, indicating a high incidence of injury among this population. Knapik et al[37] also found among female collegiate athletes over a three year period that soccer players had an injury incidence rate of 42%. The epidemiology of sports injuries was studied over a period of eight years in Harstad, Norway where soccer accounted for 44.8% of all sports injuries.[42] The injury prevalence in soccer is still of concern among researchers, coaches and trainers, and health care providers indicating the need for continued research focusing on injury prevention among soccer players. Other problems related to soccer players in general are long term physiological effects on players at

all levels. It has been shown that there are long term effects from soccer due to the potential high risk for major knee injuries leading to degenerative changes and early onset of osteoarthritis.[3,43] In addition to these long term consequences it has also been shown by Engstrom et al,[2] only one-third of players sustaining a severe knee injury ever return to elite level play. The remaining two-thirds either transferred to lower divisions or still required long term rehabilitation.[2] Clearly, this situation poses a potential threat to coaches at the collegiate level whose elite players sustain a major injury altering participation at the players' previous level. The importance of avoiding injury and maintaining a player's level of performance is obvious; therefore it is critical that coaches and trainers understand the implications of training at all levels and understand the physiological ramifications of inadequately administered training programs.

Pre-season training and injury

Knowledge to date indicates there are few studies that touch on the subject of pre-season training or comparable training regimens, while other studies only make secondary observations to levels of training and their consequences.*

In 1978 Cahill and Griffith[38] published an 8-year study of high school football players participating in a pre-season training program

* References 1, 2, 4, 6, 7, 11, 14, 22, 28, 29, 36-38, 44

that consisted of cardiovascular fitness, weight training, flexibility, and agility exercises. Results of this study indicated that by participating in this pre-season program for the duration of 5-6 weeks prior to the football season, players had fewer and less serious injuries compared to those who did not participate in the pre-season program. This study supports the need for proper training programs to decrease the incidence of injury in sports.[38]

Ekstrand and Gillquist[1] first made note of injuries pertaining to pre-season training in a 1980 study of a senior division (highest level of play) male soccer team over a one-year period. The study revealed, as a secondary finding, that overuse injuries are common among soccer players and are most frequent in the pre-season training period. Within this study, pre-season training was not clearly defined, and only brief statements related to overuse injuries were mentioned, as it was not the focus of the study. It was suggested in the discussion portion of the study that modifications in training methods, careful warm-up, flexibility exercises, proper equipment, and high quality playing ground could reduce the number of overuse injuries.[1] The ambiguous nature of pre-season training in this study leaves many unanswered questions as to the nature and method of the training, but perpetuates the need for further investigation in this area. Ekstrand et al[26] continued their work in 1980-1981 by studying the efficacy of a prophylactic program they designed and implemented. The program consisted of 7 aspects that

were established through previous research to be possible factors contributing to soccer injury. These 7 parts were determined to be injury mechanisms that could be altered and identified easily. The 7 factors identified were: corrections of training, provision of optimum equipment, prophylactic ankle taping, controlled rehabilitation, exclusion of players with grave knee instability, information about the importance of disciplined play and the increased risk of injury at training camps, and correction and supervision by physicians and physical therapists. The supervising physician and physical therapist developed the corrective training methods in this particular study. The protocol consisted of disallowing risky activities before adequate warm-up, and implementing a warm-up routine focusing on correct stretching techniques and proper activities. At the end of each practice session an appropriate cool down and additional stretching programs were performed. Information was given to coaches and players about the risk of injuries from violating the official game rules of soccer, and how to avoid injuries during training camps where there was potential for increased incidence of injury.[26] Ekstrand et al[26] found that there were 75% fewer injuries in the experimental group compared to the control group. The authors concluded that all parts of the program, including the supervision and correction by physicians and physical therapists, were responsible for these findings and significantly reduced injuries.[26]

In an additional study by Ekstrand et al[25] in 1980 in a senior level

men's team, a higher incidence of injury occurred during training camps where training intensity was increased over a short period of time. This study revealed the individual player incidence of injury was 7.6 injuries per 1000 practice hours of exposure and 16.9 injuries per 1000 game hours of exposure. These statistics do not include the injury incidence associated with training camps exposure. The training camps lasted 3 and 5 days, respectively, with 1-2 practice sessions per day. The injury incidence for the 3 day spring training camp was 3 times the average injuries associated with practice at 21.3±15.2 injuries per 1000 hours of exposure ($P < .01$); and the 5 day autumn training camp also had an injury incidence higher than average, but was lower than the spring training camp.[25]

In a 1986 study, Nielsen and Yde[45] investigated the epidemiology and traumatology of injuries in soccer. These researchers examined male Danish soccer players through 3 periods of the season, including pre-season, spring season, and an autumn season, ranging from January to November. The investigation revealed a significant number of injuries occurring within the season, but found the incidence, pattern, and traumatology of injury varied among players participating at different levels of soccer competition. It was noted in this study that overuse injuries and strains were most commonly seen during pre-season training, in which the training intensity was significantly increased.[45] Pre-season was not clearly defined in this study either, and

was only referred to as a portion of training that did not have a specified time frame during the season.

Subsequent studies by Engstrom et al[2,29] were published in the early 1990's focusing on injuries, particularly of the knee, in elite soccer players. Again, overuse injuries predominated during pre-season training, but the definition of pre-season was still absent and was often used synonymously with off-season. Engstrom,[29(p374)] stated that "it is difficult to define the specific etiology for the overuse injuries, although one may speculate that training errors are a major cause." In summary, these studies revealed that the increased incidence of injury in soccer at the elite level is unacceptable and the long-term effects of major injuries could debilitate or permanently sideline an elite soccer player.[2,29]

A study by Knapik et al[37], in 1991 of 138 female collegiate athletes participating in various sports including soccer, found specific muscular imbalances in strength and flexibility were associated with injuries of the lower extremities. Strength and flexibility tests were administered during pre-season and were followed up during the sports season. Knapik[37] found 40% of the female athletes suffered one or more injuries during practice or competition. In this study it was also noted that soccer had the fourth highest incidence of injury (42%) behind lacrosse, volleyball, and basketball.[37] A 1996 study by Arnason et al[46] of soccer injuries in Iceland among 5 elite male teams revealed the 2 teams with the longest pre-season training period had significantly ($P < .01$) fewer injuries

during the season than the other 3 teams. Arnason et al[46] also reported the 3 teams that started pre-season later for a shorter training period were administered by coaches with less educational background in sports training. It was therefore concluded by the researchers in this study[46(p43)] "short pre-season preparation period by some of the teams and coaches with poor education in sport can be risk factors for injury."

In 1998 Engstrom and Renstrom[5] looked at identifying risk factors and preventing injuries in the world cup athlete. Pre-season examination was discussed as an injury prevention criteria used to establish baseline fitness measurements and an athlete's history. The information included gathering aerobic endurance, anaerobic endurance, strength in lower extremities, flexibility and range of motion measures, performing stability and alignment tests, functional tests, and proprioception. This article did not discuss pre-season training or analogous training protocols. The pre-season examination was simply suggested as a tool for possible diagnosis of injury, rehabilitation programs, and minimizing injury.[5]

More recently in 2000, a study by Heidt et al[22] compared 2 groups of female adolescent high school soccer players over a 1- year period analyzing incidence of injury in respect to trained and untrained athletes. One group participated in the Frappier Acceleration Training Program, a 7 week pre-season training program that combines sport-specific cardiovascular conditioning, plyometric work, sport cord drills,

strength training, and flexibility exercises to improve player's speed and agility.[22] The other group of players was considered "untrained" with respect to the Frappier Training protocol, but it was unclear in this study if the players participated in a pre-season program of any kind. The objective of this study was to establish the role of a pre-season conditioning program on the occurrence and severity of injury in adolescent female soccer players.[22] The results of this study indicated a significantly lower incidence of injury in the players who participated in the 7 week Frappier Acceleration Training Program during the pre-season. In conclusion, Heidt[22] reported lower extremity sport-specific activities and conditioning should be the primary focus of soccer training to address the prevention of injuries. Thus, the latest information does indicate that pre-season training, if administered correctly and within an adequate time frame, can reduce the number and severity of injury to soccer players.

The ultimate goal of a pre-season training period, as well as the competitive season, is to prepare the athletes for significant competition while reaching the highest level of fitness and performance.[23] Due to the prevalence of injury in soccer as indicated by the previous studies mentioned, prevention is the key to regulating and decreasing the injury statistics. Coaches, trainers, physical therapists, and all others associated with the sport of soccer have a responsibility to stay current

on training techniques, injury prevention, and rehabilitation programs to ensure the safety of each athlete.

Physical Therapy and Soccer

The role of physical therapy is substantial given the injury prevalence occurring at all levels in soccer. Of the outdoor soccer injuries reported in the 1990 population survey in the Netherlands, 45.6% required treatment and referral to an outpatient physical therapy clinic.[28] The role of physical therapy is consistently increasing as the popularity of soccer and the number of injuries continue to rise.

In a study by Engstrom et al[2] in 1990 of an elite Swedish soccer team, 75% of the players were noted to sustain injury, and of those sustaining injury 90% were treated by physical therapists. Within the same study it was also noted that 11 out of 13 knee injuries required surgery and long-term rehabilitation.[2] In 1991, Engstrom et al[29] designed a similar study, but recorded the prevalence of injury in 2 Swedish elite female soccer teams during one year. The data collected reveal 28% of injuries required hospitalization (requiring outpatient rehabilitation after hospitalization) and 38% were treated with physical therapy specifically.[29] Not only will physical therapists be treating a plethora of injuries associated with soccer, they will also have the added responsibility of educating coaches and players on injury prevention.

In a study by Ekstrand et al[26] in 1980-1981, the efficacy of an

injury prevention program was tested against a control group. The prophylactic program consisted of 7 parts, the first being a correction of training methods supervised by a physician and physical therapist. The results indicated that the test teams had 75% fewer injuries than the control groups. It was concluded that the proposed prophylactic program, including close supervision and correction by physicians and physical therapists, significantly reduced soccer injuries.[26] Although supervision and training corrections were a significant factor in preventing injuries, the reality of soccer programs would not suggest this type of regulation would typically occur.[26] Therefore, it has been suggested by Ekstrand et al[26(p120)] that the "efficacy of the program in the hands of coaches without supervision should be tested" and approved by a physician or physical therapist. The avoidance of injury is crucial for soccer players to maintain their physiological status and maximize their skills and techniques while playing. Strength and conditioning programs, proper exercise and flexibility programs, and skill specific drills could be designed and administered by physical therapists knowledgeable about soccer at various levels. The opportunities for physical therapists involvement in soccer is continuous and necessary.

Conclusion/Purpose

The purpose of this study was to begin to define soccer pre-season training at the collegiate level, examine the associated perceptions of

coaches throughout the NCAA, and determine if pre-season soccer training adheres to the general principles of sport training. Coach's perspectives on general training activities and common perceptions related to training outcomes were examined. Pre-season training variations at the collegiate level are also reported. Finally, this study was the first step in an on-going research project that will lay the foundation for further research regarding the role of pre-season training in soccer.

CHAPTER III

METHODS

The survey method was utilized in this study to establish descriptive characteristics of NCAA soccer coaches. The survey was designed by the investigator based on previous participation in an NCAA collegiate pre-season soccer training program and numerous years of coaching and training soccer experience.

Questionnaire Design/Procedure

A 2-page, 29 item questionnaire (Appendix A) was designed by the investigator based on previous participation in a collegiate pre-season soccer training program to establish the common perspectives of collegiate soccer coaches and determine universal perceptions of pre-season soccer training for 420 NCAA Division I, II, and III schools. On June 26, 2000 a pilot survey (Appendix B) was mailed to 20 randomly selected NCAA Division I, II, and III collegiate soccer coaches across the United States for the purpose of determining reliability, and face and content validity. Ten men's teams and 10 women's teams were randomly

selected to ensure feedback from both men's and women's programs. All coaches and teams were randomly selected from the National Directory of College Athletics, the official directory of the National Association of Collegiate Directors of Athletics (NACDA).[10] A cover letter (Appendix D) detailing the purpose of the research was sent with each survey, as well as a numerically coded self-addressed return envelope. Twenty percent of the pilot surveys (4/20) were completed and returned with appropriate feedback. On August 7, 2000 a revised final survey (Appendix A) was mailed to 400 randomly selected NCAA Division I, II, III collegiate soccer coaches across the United States. Two hundred men's and 200 women's teams were chosen to ensure feedback from both men's and women's soccer programs. A revised cover letter (Appendix C) detailing the purpose of the research was sent with each survey, as well as a numerically coded self-addressed return envelope. All envelopes were numerically coded to ensure anonymity and confidentiality. Despite efforts to maintain anonymity and confidentiality some respondents included identifiable information.

Many adjustments were made to the final survey following the pilot survey. These changes were as follows: (Appendices A, B)

- Font size was reduced and all capital letters were reduced to lower case to accommodate the survey on 2 pages.
- Elaborated slightly on instructions to include this statement for clarification, "This questionnaire is not specific to your current

pre-season; it is relevant to pre-season in general past or present."

- Moved the "age" category to same row as "sex" and "date" to accommodate 2 pages.
- Eliminated the question "Do you currently coach at the collegiate level: Females/ Males- if you coach both please choose one program to answer remaining questions"- This question was eliminated because coaches coaching both men's and women's programs completing the pilot study were included in the exclusion criteria to avoid discrepancies in data related to coaching methods regarding male and female soccer players.
- Eliminated the question " Do you as a coach require individual or team participation in an off-season program- yes/no?"- Respondents of the pilot survey stated it is against NCAA regulations to "require" any player or team to participate in an off-season program.
- The arrangement of questions was altered to provide a more logical flow to the questions.
- The "optional" statement following the survey questions was removed and edited to fit in the cover letter to accommodate 2 pages.

- A symbol ♣ was added to the end of the survey to signify the end of the survey.

Subjects

The subjects were comprised of male and female soccer coaches associated with the NCAA Division I, II, or III. (Appendix E, F) All coaches and teams were randomly selected from the National Directory of College Athletics, the official directory of the National Association of Collegiate Directors of Athletics (NACDA).[10] The exclusion criterion for the sample was coaches for teams not associated with the NCAA, including NAIA, Canadian colleges, and junior colleges. Coaches within the NCAA Divisions I, II, and III who shared coaching responsibilities for both men and women were excluded as well. A total of 420 coaches were surveyed, including:

- 140 total NCAA Division I -(82 women's programs, 58 men's programs)
- 92 total NCAA Division II -(49 women's programs, 43 men's programs)
- 188 total NCAA Division III -(79 women's programs, 109 men's programs)
- All states except Alaska were surveyed at least once (Alaska did not have soccer programs meeting inclusion criteria)- Puerto

Rico and District of Columbia were also included and surveyed at least once.

Data Analysis

SPSS version 10.0 software package (SPSS Inc. Chicago, Illinois) was used to perform all statistical analyses in this study. Descriptive statistics including coach's age, sex, years of participation in soccer, years coaching soccer, level of education, and additional licensures were calculated. Frequency distributions and measures of central tendency were used to describe pre-season parameters including time spent training, components of fitness, importance of pre-season training issues, coach's perceptions of intensity of training, risk of injury, goals accomplished, and utilization of other staff members. Chi-square and cross-tabulation analysis of Division, risk of injury, education level, pre-season intensity, coach's gender, and components of fitness were performed. One-way ANOVA was used to determine any differences regarding the amount of time spent in pre-season training with regard to Division, region, years coaching collegiate soccer or coach's gender and differences regarding perceived risk of injury with regard to team sex, years coaching collegiate soccer, Division, region, highest level of education or coach's gender. The predetermined α level was .05.

CHAPTER IV

RESULTS

One hundred sixteen of the 420 surveys mailed were received for a response rate of 27.6%. Four hundred twenty (27.6%) of the total 1519 NCAA teams were surveyed. The number of surveys returned represents 7.6% of all NCAA combined men's and women's Division I, II, and III programs. Three Divisions, 20 states, and 9 regions were represented in the 116 surveys returned.

Frequency distributions for team gender, coach's gender, team region, and team Division are presented in Tables 1-5 and Figures 1-3. All raw data were tabulated for total survey results and can be found in Appendix F. Presented in Table 1 are the number and percentage of surveys returned by men's (47.4%) and women's (52.6%) teams and the number and percentage of surveys mailed by men and women's teams as compared to the total number of NCAA programs. Table 2 breaks down the demographics of soccer teams within the NCAA by team gender, with the total number of NCAA men's (47.8%) and women's (52.2%) soccer programs. Table 3 represents the number of male

(80.9%) and female (19.1%) coaches who returned the survey. Regional results are displayed in Table 4 dividing the United States into 9 separate regions all containing NCAA soccer programs. The regions used in the survey were divided using the Contemporary Atlas of the United States (1990), and regional status of each NCAA team was individually determined by hand count by the researcher using both the men's and women's addition of the 1999-2000 National Directory of College Athletics.[10] Regional status for 100 of the total NCAA teams was unable to be determined using this method; therefore, these teams were excluded from the calculations. The Middle Atlantic (R-2) region contains the largest percentage (24.3%) of total NCAA soccer programs but the largest number of surveys returned (19.8%) was from the South Atlantic (R-5) region. Table 5 presents the Division results for both men's and women's programs revealing the largest percentage of NCAA soccer programs are in Division III (47.9%) and the largest percentage of surveys returned were from Division III (47.4%).

Chi-square and cross-tabulation analysis of Division, risk of injury, education level, pre-season intensity, coach's gender, and components of fitness were performed finding no significant difference between any variables. (Table 6) One-way ANOVAs were used to determine any differences regarding the amount of time spent in pre-season training with regard to Division, region, years coaching collegiate soccer or coach's gender and differences regarding perceived risk of injury with

regard to team sex, years coaching collegiate soccer, Division, region, highest level of education or coach's gender. (Figure 4, 5) Table 7 shows that the One-way ANOVA results indicated a significant difference in total hours spent in pre-season training and coach's gender. (Figure 5) On average, female NCAA soccer coaches spend more hours training during pre-season than male coaches ($P < .05$), although no difference was found in the number of days spent training between genders. A significant difference was also found in the average total number of days spent training during pre-season between Divisions. (Figure 4) On average, Division I schools spend significantly more days and total hours training than Division III schools ($P < .05$), and although not significant, strong differences were also noted with Division II schools spending more days training than Division III schools. (Figure 4) Table 8 shows post hoc analyses of multiple comparisons for total days and total hours spent training by Division. A significant difference was found in the mean number of days and hours spent in pre-season training between Division I and Division III schools ($P < .05$) with Division I schools spending significantly more time training. Although the mean difference in average number of days and hours spent training between Division II and Division III schools was not significant at the $P < .05$ level, the difference varied enough to determine Division I and Division II schools spent more time on average training than Division III schools. (Table 8)

CHAPTER V

DISCUSSION

Soccer is a multi-skill, long duration, high intensity, and highly competitive sport. The physiological demands placed on soccer players are numerous and complex due to the intense nature of the sport. Training at all levels plays an important role in preparing players for the physiological and psychological challenges placed on them. It has been observed, "most scholastic, intercollegiate, and professional sports have an annual schedule that consists of off-season, pre-season, and in-season periods and phases."[23(p461)] At elite levels of play, specifically collegiate levels, appropriate training programs are essential for building and maintaining competitive fitness levels, maximizing player potential, and preventing injury. NCAA regulations restrict the number of practices allowed prior to the first game of the season, limiting the amount of time coaches have to prepare for the competitive season. All NCAA coaches and teams are regulated to ensure consistency and fairness among the athletic programs. Indicated by the survey results (Appendix F) and statistical analyses (Tables 6, 7) the general definition and perceptions

related to pre-season training are generally agreed upon by NCAA college coaches without regard to age, educational level or background, geographical location, experience coaching or participating in the game of soccer. Division and coach's gender regarding time spent training were the only variables associated with pre-season training that were found to be significantly different, but the perceptions related to pre-season training in general were consistent.

The restrictions placed on coaches in the NCAA inevitably cause controversy and anxiety because the appropriate physiological principles cannot be correctly addressed in this limited time frame. Numerous comments were made on the surveys indicating the frustration coach's experience regarding pre-season training. A Division III men's coach stated, "Collegiate soccer pre-season is a disservice to the athlete and to the sport! No one can adequately address fitness concerns in less than 4-5 weeks. College coaches have about 2 weeks to train, get tactically organized, and get players fit." In addition, a Division I women's coach stated " We believe our pre-season runs throughout the spring and summer, then when our athletes return in August before the season we view this as rehearsal time because 10 days is not enough time for a pre-season. Too many coaches try to get their team fit in these 10 days and it is impossible if you understand the body and training." Although the ANOVA results indicated a significant difference in the number of hours spent training during pre-season between male and female coaches, it is

unclear at this point if this finding is generalizable to all female coaches due to the disproportionate number of male (80.9%) and female (19.1%) coaches participating in the survey. The survey comments also indicate coaches perceive their athletes return from off-season unfit or deconditioned; therefore, coaches must spend more time during pre-season conditioning players. Pre-season training at the collegiate level typically involves high to medium intensity training levels for an average of 10.45±3.10 days, 4.37±1.07 hours/day with 2.20±.44 sessions/day for a total average of 45.01±15.92 hours of training (Appendix F). Also reflected by coach's comments on the survey, coaches perceive this unfit state of the player to be the reason for injury risk associated with pre-season training. However, research indicates collegiate female soccer players maintain their high aerobic fitness level even through the off-season.[35]

It is unclear without further investigation if the time restriction placed on pre-season training negatively affects players by predisposing them to injury or hinders a team's success during the season. Twenty-five percent of coaches surveyed perceived pre-season training to be a high risk for injury while 59% perceived at least a medium risk of injury. Despite the relative risk associated with this type of pre-season training, 100% of coaches surveyed continue to participate in pre-season training and 51.8% of coaches hope to prevent injury by participating in pre-season training. Minimum fitness requirements and components of

fitness measures before, during, and after pre-season training to determine individual and team fitness levels prior to the competitive season are established by 92.2% of coaches. Within the approximate average of 10 days and 45 hours of training, 78.3% of coaches perceived the overall intensity of pre-season training to be highly intense. Coaches also perceived the intensity of pre-season training to be relatively higher (73.0%) than that of off-season training but the same (62.3%) when compared to competitive season training. Because it has been established by Knapp[4(p840)] that increasing activity to a level that is "inconsistent with an athlete's pattern and quality of response to adaptation...results in a maladaptive response to injury, " this sudden change in intensity and increased duration of training may predispose players to injury.

The physiological principles of training also establish a strong interaction between training intensity and volume, stating training at high intensities require significantly less training volume (time spent) to achieve positive physical adaptations.[13] This concept is violated by NCAA coaches who use increased intensities during pre-season training with double and triple practice sessions averaging over 4 hours of training per day. Fifty-seven out of 116 (49.1%) coaches returning the survey indicated they practice 2 or more sessions per day of training for an average of greater than 4 hours during 1 day of training. (Appendix F) Researchers have also indicated there is no significant difference in

improvement of fitness or performance between athletes who train with normal training volumes once a day and those who train with twice the volume (twice a day).[13] The study of sport physiology also indicates that high-intensity training can be tolerated only for brief periods and the fatigue that follows exhaustive training sessions requires a few days of rest and replenishment of energy supplies.[13] According to the respondents in this study, pre-season training does not allow for necessary consecutive recovery days while maintaining a significant intensity of training throughout the training time frame. The coaches surveyed perceive pre-season training to be very influential (80.5%) on individual player performance and very influential (91.2%) on team performance. Despite the vast array of educational backgrounds found in the NCAA coaches surveyed (Appendix E, F), 67.0% utilize other staff members with backgrounds related to fitness training, strength, or conditioning to assist them in establishing pre-season training programs and 49.6% of coaches receive assistance with measuring the components of fitness. Further investigation may be needed to determine if correct training methods and information related to physiology of sport is appropriately communicated to coaches by other health and fitness professionals.

Numerous researchers have found inappropriate training progressions in duration, intensity, and frequency can lead to injury, but training programs properly administered that adhere to the principles of

sport training can help prevent injury and maximize athletic performance.[φ] It has also been stated by Ekstrand and Gillquist[39(p77)] in their study on the frequency of muscle tightness and injuries to soccer players that "the disposition of soccer training has influenced the injuries discussed in this paper, and that many injuries probably could be avoided if training methods were modified." Unlike NCAA collegiate soccer pre-season training programs, most reported pre-seasons last anywhere from 4 to 20 weeks in duration allowing for an appropriate progression of training to occur.[1,2,22,23,29,36,45] The most recent study in 2000 by Heidt[22] reported a 7-week pre-season conditioning program significantly reduced the incidence of injury. If administered correctly and within an adequate time frame (>4weeks), pre-season training can and should emphasize fitness and conditioning, tactical play, ball skills and techniques,[11,36] but due to the restrictions of the NCAA guidelines, this is not possible. Therefore, the challenge for coaches is to determine what the focus of pre-season training should be, given the physiological parameters set by the amount of time allowed by the NCAA. The need for continued research in soccer specifically examining training programs is critical for the prevention of injury, education of coaches and players, to maximize player potential, and to assure general safety in the sport as the numbers of participants at all levels continue to increase.

[φ] *References* 1, 2, 4, 5, 11, 19, 20, 22, 24-26, 28, 29, 31, 33, 36, 39-42, 45

Limitations

Survey limitations

Many survey questions were left unanswered for reasons outside the scope of the researcher and this investigation. Numerous questions were also partially answered, but when asked to "specify", responses were unanswered for unknown reasons.

The question asking "Years coaching soccer (all other levels combined)" was thrown out and not used in the statistical analyses because there were discrepancies in the answers according to total years coaching collegiate level soccer and the coach's age. This discrepancy in years might be attributed to the coaches combining years of coaching college and all other coaching (soccer) levels. The question states "all other levels" meaning separate from coaching the collegiate level but this may have been unclear.

The question pertaining to "the number of scholarship athletes, total number of scholarship athletes, full scholarship, or partial scholarship" may have been too vague; therefore, coaches may have included athletes receiving full or partial academic scholarships as well, and the researcher intended to evaluate the number of athletic scholarships only. This information was determined pertinent because if coaches have money invested in these players, it may change their view of training, or training tactics and they may be more apt to pay attention

to injuries and renegotiate training sessions/protocols to accommodate for this investment in their athletes.

According to many of the answers to the question "How would you compare pre-season training to off-season training with respect to intensity? Higher, same, or lower," many survey answers seemed to indicate the coaches could have misunderstood the comparison if the team had a higher intensity pre-season than off-season, or vice versa. Therefore, the answers may have varied depending on which way the coach perceived the question. Pre-season training is usually considered high to medium intensity training (according to the survey results, and my experience), whereas off-season training is usually a self-paced, non-coach directed type of training that spans several months. It seemed illogical that coaches would have answered "high intensity" for pre-season training and stated that off-season training was of " higher intensity."

The components of fitness question asking WHEN are the components of fitness measured may have also been misinterpreted. Many coaches answered "before pre-season starts" for first day measurements or " during pre-season" and specified first day measurements. It is my experience, and with combined results of this survey question, it can be determined that the first day of pre-season training is commonly used to test and measure the chosen components of fitness by coaches.

Study Limitations

Many of the limitations of this study were directly associated with possible misinterpretations of several survey questions. Although the response rate for this study was 27.6%, the number of surveys returned was only 7.6% of all NCAA soccer programs. A larger percentage of programs surveyed and a larger response rate could provide a more accurate description of coaches' perceptions regarding pre-season training and could possibly reveal a larger variance in pre-season training protocols. The regional distribution for NCAA soccer teams throughout the U.S. was not representative of the population in this study; the Middle Atlantic (R-2) region contains the largest percentage (24.3%) of total NCAA soccer programs; however, the largest number of surveys were returned (19.8%) from the South Atlantic (R-5) region. (Table 3) The reason for this response rate is not within the scope of this study and could be a limitation affecting generalizability.

An optional portion of this study requested actual pre-season protocols from coaches to determine exact training activities and time frames. Only 4 of the 116 surveys returned provided this information; therefore, it was not used in this study but would be helpful in future studies regarding pre-season training. The small number of training protocols provided may be attributed to the possibility that coaches do not formally establish, organize, and print out pre-season training activities, although 99.1% responded they pre-organize or pre-structure

training activities prior to each practice. This information would be very helpful in establishing intensity and duration pertaining to soccer specific activities that distinguish training variations among schools.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

Due to the nature of pre-season soccer training at the collegiate level, further investigation is warranted to determine possible benefits or negative outcomes related to this type of training. The survey results indicate collegiate soccer programs do not commonly adhere to the principles of sport training, thereby placing athletes at risk for injury and stifling player's full competitive potential. Injury prevalence during and immediately following pre-season training should be investigated to establish if there is a significant risk of injury associated with collegiate pre-season training programs. Collegiate soccer coaches should be informed about proper training techniques and physiological principles of training before administering a pre-season program. Further investigation is needed to determine if NCAA regulations should be questioned or disputed, as they are clearly not consistent with the safety and well being of the athletes.

TABLE 1. NUMBER AND PERCENTAGE OF SURVEYS MAILED AND RETURNED BY TEAM GENDER

TEAM GENDER	# Surveys Mailed/Total NCAA Programs	% Surveys Mailed of Total NCAA Programs	# Surveys Returned/ # Surveys Mailed	% Surveys Returned
Combined	420/1519	27.6%	116/116 116/420	100% 27.6%
Women	210/793	26.5%	61/116 61/210	52.6% 29.0%
Men	210/726	28.9%	55/116 55/210	47.4% 26.2%

TABLE 2. NCAA DEMOGRAPHICS: TOTAL NUMBER AND PERCENTAGE OF NCAA PROGRAMS BY TEAM GENDER.

TEAM GENDER	Total #NCAA Programs	% Total NCAA Programs
Combined	1519/1519	100%
Women	793/1519	52.2%
Men	726/1519	47.8%

TABLE 3. NUMBER AND PERCENTAGE OF SURVEYS RETURNED BY COACH'S GENDER.

COACHES GENDER	# Surveys Returned	% Surveys Returned
Combined	*115	99.1%
Female Coaches	22	19.1%
Male Coaches	93	80.9%

*One missing variable from survey

TABLE 4. NUMBER AND PERCENTAGE OF SURVEYS RETURNED BY REGION.

REGION	# Surveys Returned per Region/Total Surveys Returned	% Surveys Returned per Region	Total # NCAA Programs per Region	% Surveys Returned per Region/Total NCAA Programs
TOTAL$^{\phi}$	116/420	27.6%	116/*1419	8.2%
R1-New England	18/116	15.5%	18/100	18.0%
R2-Middle Atlantic	17/116	14.7%	17/345	4.9%
R3-East North Central	16/116	13.8%	16/250	6.4%
R4-West North Central	11/116	9.5%	11/116	9.5%
R5-South Atlantic	23/116	19.8%	23/284	8.1%
R6-East South Central	8/116	6.9%	8/67	12.0%
R7-West South Central	8/116	6.9%	8/83	9.6%
R8-Mountain	8/116	6.9%	8/45	17.8%
R9-Pacific	7/116	6.0%	7/129	5.4%

ϕ TOTAL column represents total # and percentage of surveys returned out of total surveys mailed; total # and percentage of surveys returned out of total NCAA programs*

* 100 of the total 1519 NCAA programs are missing, thus unable to determine regional status.

TABLE 5. NUMBER AND PERCENTAGE OF SURVEYS RETURNED COMPARED TO THE NUMBER AND PERCENTAGE OF TOTAL NCAA PROGRAMS BY DIVISION.

DIVISION	# Surveys Returned	% Surveys Returned	% Surveys Returned per Division	Total NCAA Programs	% Total NCAA Programs	% Total Of Division
Total NCAA Programs	116	100%		1519	100%	
Total Women's Programs	61	52.6%		793	52.2%	
Total Men's Programs	55	47.4%		726	47.8%	
Total NCAA Div. I	35	30.2%	100%	442	29.1%	100%
NCAA Div. I Women	25	21.6%	71.4%	250	16.5%	56.6%
NCAA Div. I Men	10	8.6%	28.6%	192	12.6%	43.4%
Total NCAA Div. II	24	20.7%	100%	350	23.0%	100%
NCAA Div. II Women	10	8.6%	41.7%	180	11.8%	51.4%
NCAA Div. II Men	14	12.1%	58.3%	170	11.2%	48.6%
Total NCAA Div. III	55	47.4%	100%	727	47.9%	100%
NCAA Div. III Women	24	20.7%	43.6%	363	23.9%	50%
NCAA Div. III Men	31	26.7%	56.4%	364	24.0%	50%

TABLE 6. CHI-SQUARE ANALYSIS OF PRE-SEASON VARIABLES.

VARIABLES	CHI-SQUARE VALUES	df	NOMINAL/NOMINAL CONTINGENCY COEFFICIENT VALUE	APPROXIMATE SIGNIFICANCE
Division/ Risk of Injury N=113	4.886[a]	6	.204	.559
Coach's Gender/Risk of Injury N=112	1.392[b]	3	.111	.707
Division/Overall Intensity of Pre-season Training N=115	3.042	2	.161	.218
Coach's Gender/Overall Intensity of Pre-season Training N=114	.224	1	.044	.636 *Fisher's Exact Test* 2-sided=.779 1-sided=.440

a-5 cells (41.7%) have expected count less than 5. The min. expected count is .42.

b-3 cells (37.5%) have expected count less than 5. The min. expected count is .39.

TABLE 7. ONE-WAY ANOVA RESULTS FOR PRE-SEASON VARIABLES.

VARIABLES	df	F VALUE	SIGNIFICANCE
Total Hrs. Spent Training/Coach's Gender N=110	1	8.189	.005*
Total Days Spent Training/Coach's Gender N=110	1	.002	.965
Total Hrs. Spent Training/Division N=111	2	6.713	.002*
Total Days Spent Training/Division N=111	2	8.497	.000*
Total Hrs. Spent Training/# of Years Coaching Soccer N=110	2	1.551	.217
Total Days Spent Training/# of Years Coaching Soccer N=110	2	.177	.838
Total Hrs. Spent Training/ Regional Status of Team N=111	8	.859	.554
Total Days Spent Training/ Regional Status of Team N=111	8	1.518	.160
Perceived Risk of Injury/ Team Gender N=112	1	1.759	.187
Perceived Risk of Injury/ Coach's Gender N=111	1	.300	.585
Perceived Risk of Injury/# of Years Coaching Soccer N=111	2	1.452	.238
Perceived Risk of Injury/ Degree Held by Coach N=112	3	.719	.543
Perceived Risk of Injury/ Regional Status of Team N=112	8	.842	.568

* The mean difference is significant at the .05 level.

TABLE 8. POST HOC TESTS OF MULTIPLE COMPARISONS.
POST HOC TESTS OF MULTIPLE COMPARISONS FOR TOTAL DAYS SPENT TRAINING AND DIVISIONS
(Total Days= Dependent Variable) N=111

VARIABLES	MEAN DIFFERENCE	STD. ERROR	SIGNIFICANCE
Division I Division II	.8371	.7809	.565
Division I Division III	2.5424	.6409	.001*
Division II Division III	1.7053	.7121	.061

* The mean difference is significant at the .05 level.

POST HOC TESTS OF MULTIPLE COMPARISONS FOR TOTAL HOURS SPENT TRAINING AND DIVISIONS
(Total Hours= Dependent Variable) N=111

VARIABLES	MEAN DIFFERENCE	STD. ERROR	SIGNIFICANCE
Division I Division II	4.8049	4.0660	.500
Division I Division III	11.9591	3.3373	.002*
Division II Division III	7.1542	3.7078	.160

* The mean difference is significant at the .05 level.

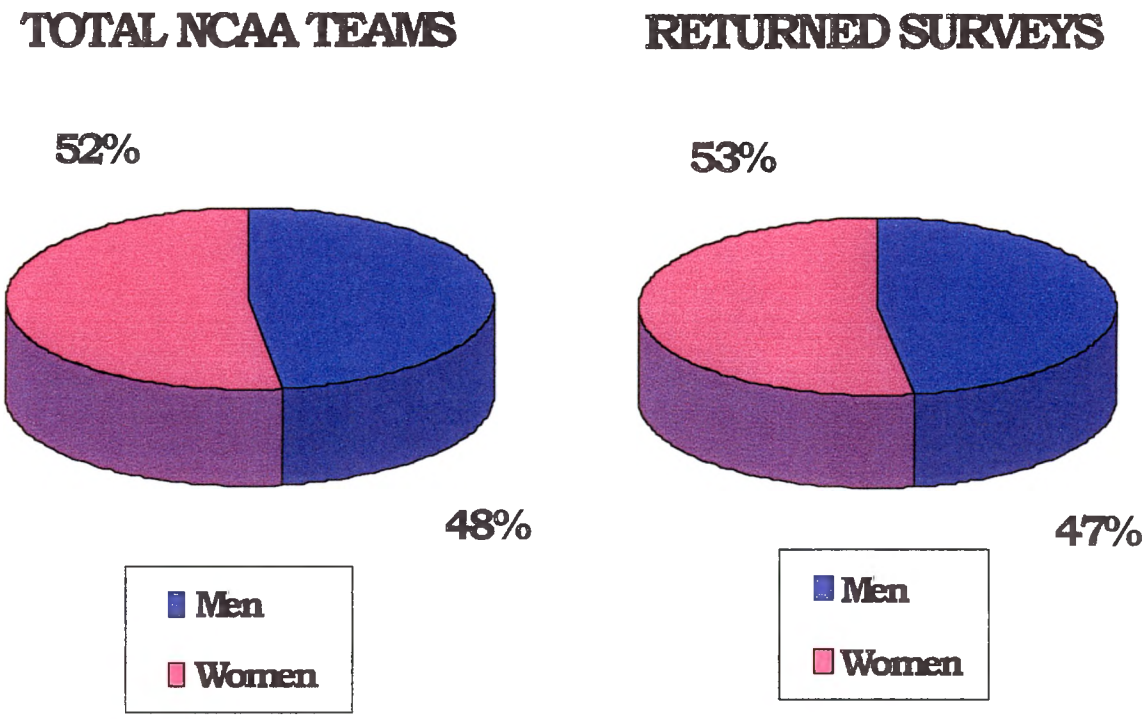

FIGURE 1. Percentages of total NCAA soccer teams and the percentages of returned surveys by team gender to determine if surveys returned represent the sample population of total NCAA soccer programs.

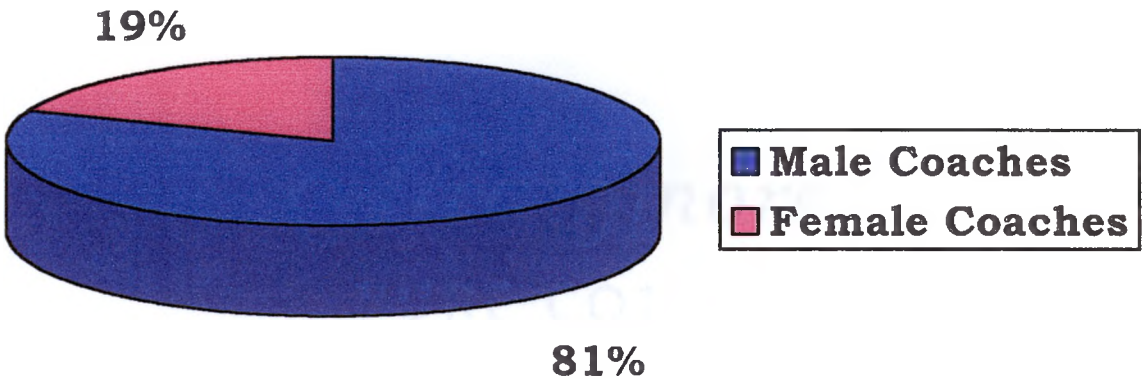

FIGURE 2. Percentages of NCAA soccer coaches by gender represented in returned surveys. Unable to determine if sample is representative of actual total population of NCAA coaches.

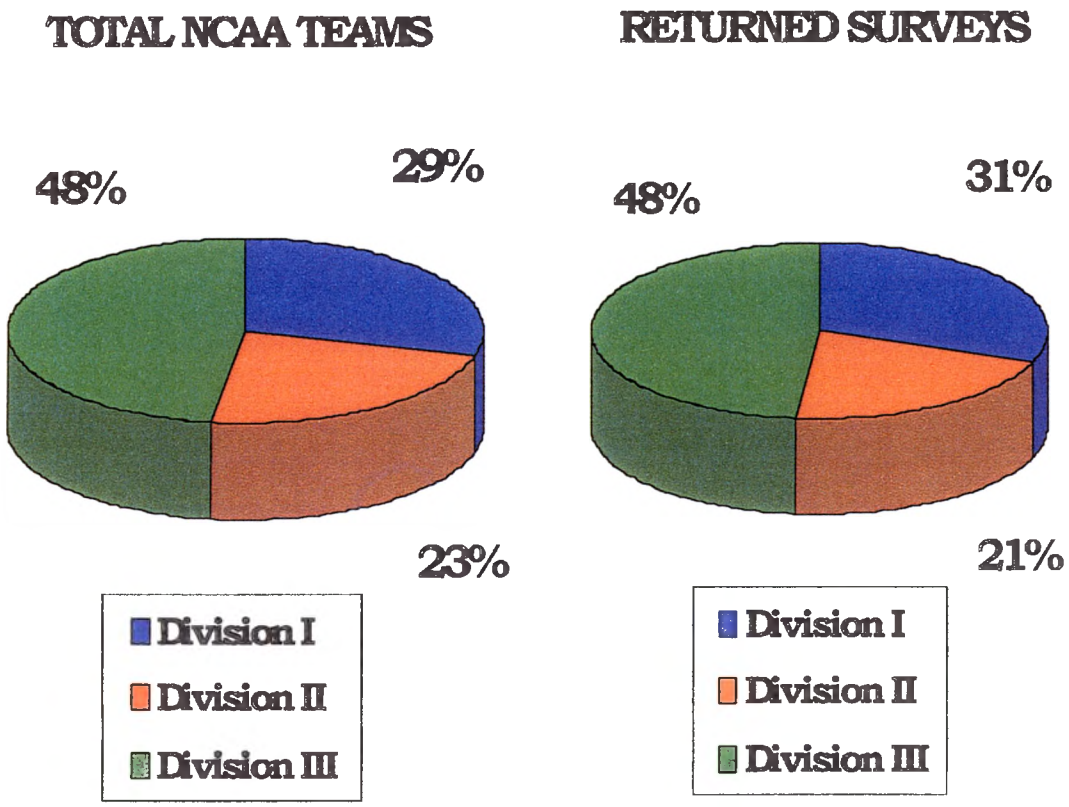

FIGURE 3. Percentages of total NCAA soccer teams and the percentages of returned surveys by Division to determine if surveys returned represent the sample population of total NCAA soccer programs.

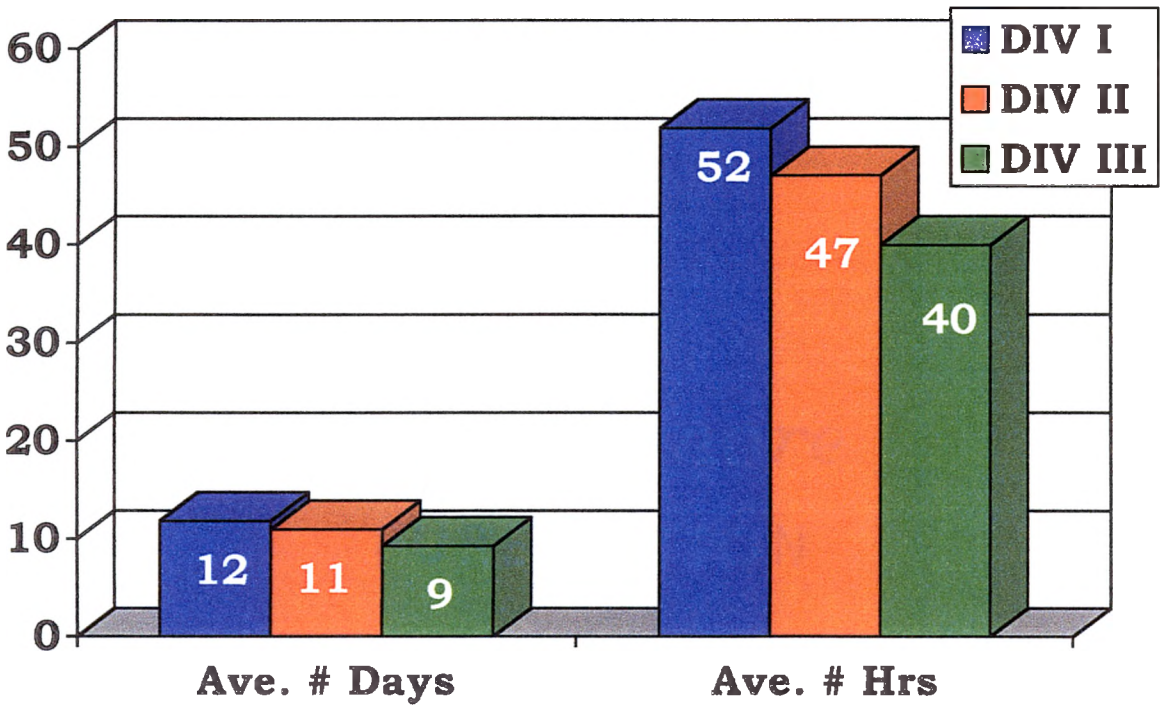

FIGURE 4. One-way ANOVA results representing time spent training, in average number of days and hours, in NCAA soccer Divisions I, II, and III. The mean number of training hours and training days between Division I and Division III NCAA programs differed significantly ($P < .05$).

TIME SPENT TRAINING BY COACH'S GENDER

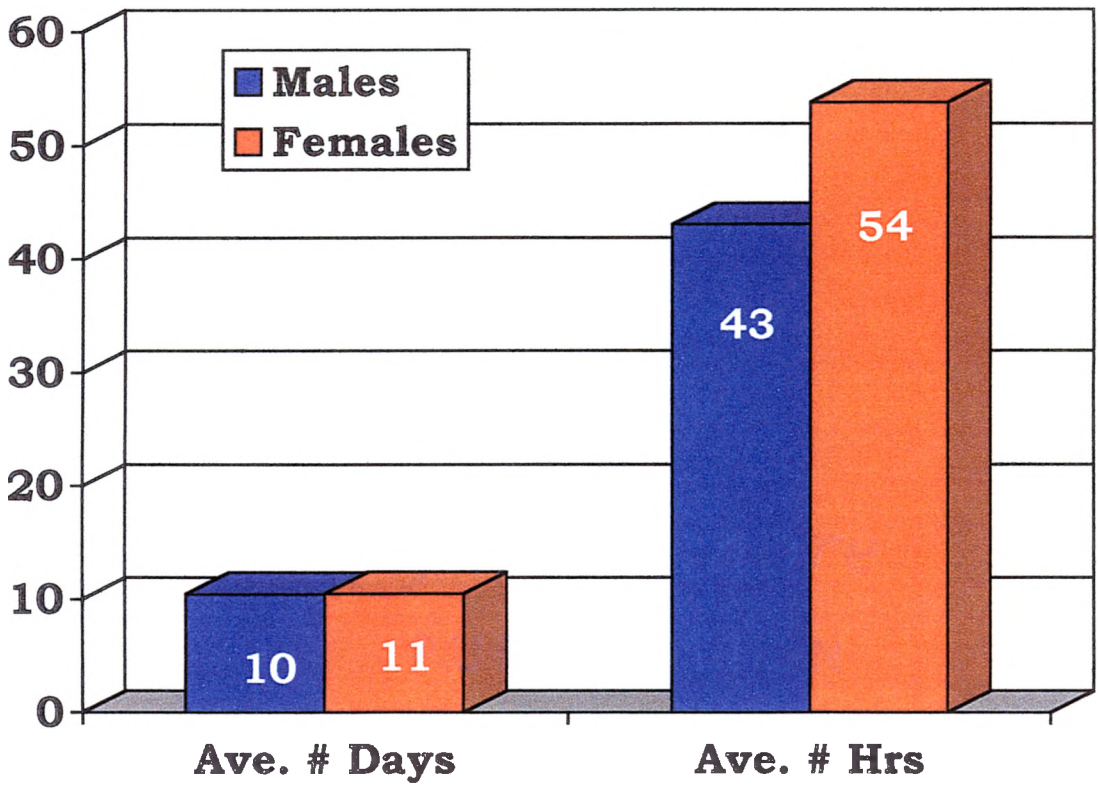

FIGURE 5. One-way ANOVA results representing time spent training, in average number of days and hours, in NCAA soccer coaches by gender. The mean number of hours spent training differed significantly between male and female coaches (P<.05). Female coaches spent more hours on average training while the mean number of days spent training remained similar.

APPENDIX A

WHAT IS PRE-SEASON SOCCER TRAINING? A COACH'S PERSPECTIVE AT THE COLLEGIATE LEVEL

Questionnaire

INSTRUCTIONS: *Please, complete the following questionnaire.* This questionnaire is not specific to your current *pre-season*; it is relevant to *pre-season* in general past or present.

Sex: M F Age:_____ Date:_____

Years ***participating*** in soccer: _____
(***experience*** playing, not coaching)

Years coaching soccer: _____
(***collegiate*** level only)

Years coaching soccer: _____
(***all other levels combined***)

What is your current or highest level of education?
_____High School Diploma/GED _____
_____Associates Degree (specify)_____
_____Bachelors Degree (specify)_____
_____Masters Degree (specify)_____
_____Doctorate (specify)_____
_____MD, DO (specify)_____
_____Other (specify)_____

What **additional** certifications/licensures do you currently hold? (please list all that apply)
_____
_____

How many ***scholarship athletes*** do you currently have on your squad?
Total #_____
Full _____
Partial____

Does your soccer team participate in a *pre-season* program?
_____Yes
_____No

***IF THE ANSWER TO THE ABOVE QUESTION IS **NO** PLEASE STOP--DO NOT RESPOND TO ADDITIONAL QUESTIONS-Please RETURN in postage-paid return envelope provided*

If YES, when does your *pre-season* ***start***_____ and ***end***_____?

Within this date range, what is the approximate total number of ***days***_____, ***hours***_____***hours per day***_____ spent training?

Within the *pre-season* time frame how many **times per day** do you train_____?
If number varies (please explain)_____
_____

Is each *pre-season* training session ***pre-organized*** or ***pre-structured***?
(Meaning, do you have each activity for each session planned ***before*** each session begins)
_____Yes
_____No (please explain)_____
_____

Do you establish ***minimum fitness*** requirements ***before*** *pre-season* starts?
_____Yes
_____No (please explain)_____
_____

If YES, what ***components of fitness*** do you ***measure***?
(please mark all that apply)
_____Body Fat Composition
_____Strength (ex. max. reps-bench press, leg press, crunches)
_____Endurance (ex. long distance runs 1-4 mi., VO^2 Max., HR)
_____Agility (ex. obstacle course, shuttle run, "doggies, horses")
_____Speed (ex. 40, 100, 200 yd/meter dash)
_____Flexibility (ex. sit-n-reach, hamstring, quads, etc.)
_____Other (specify)_____

If YES, ***when*** do you measure the components of fitness?
(please mark all that apply)
_____Before *pre-season* starts
_____During *pre-season* (specify when)_____
_____*After pre-season* ***but*** *before* regular season
_____During regular season
_____After regular season
_____Other

Why did you choose these *components of fitness* to ***measure***? (how do you use this information?)
_____Baseline fitness measurements for *individual* players
_____Overall perception of *team* fitness level
_____Pre-established protocol followed
_____Other (please explain)_____
_____

How important are the ***components of fitness*** to you as a coach?
_____Very important
_____Somewhat important
_____Not important

How important is ***pre-season training*** to you as a coach?
_____Very important
_____Somewhat important
_____Not important

Do you consider your ***overall*** *pre-season training* protocol to be of _____ intensity?
_____High
_____Medium
_____Low

How would you ***compare*** *pre-season training* to *off-season training* with respect to intensity?
_____Higher intensity
_____Same intensity
_____Lower intensity
_____No off-season training

How would you ***compare*** *pre-season training* to *competitive season training (practices)* with respect to ***intensity***?
_____Higher intensity
_____Same intensity
_____Lower intensity

Do you as a coach perceive a relatively _____***risk of injury*** associated with *pre-season training*?
_____High
_____Medium
_____Low
_____No

What ***GOALS*** do you ***hope*** *to accomplish* with *pre-season training* and what goals do you feel ***are*** *generally being accomplished* with *pre-season training*? (↑= increase)

HOPE to meet	**ARE** met	
_____	_____	Injury prevention
_____	_____	↑ Strength
_____	_____	↑ Endurance
_____	_____	↑ Flexibility
_____	_____	↑ Agility
_____	_____	↑ Ball skills
_____	_____	↑ Tactical skills
_____	_____	↑ Team motivation (bonding)
_____	_____	↑ Overall fitness level of *team*
_____	_____	↑ Overall fitness level of *individual* players

If there are GOALS ***other than*** these listed that you ***hope*** *to accomplish* OR **are** being accomplished with *pre-season training,* please explain

_____

_____

Do you as a coach perceive *pre-season training* to be _____ influential on ***individual*** player performance?

_____Very
_____Somewhat
_____Not

Do you as a coach perceive *pre-season training* to be _____ influential on ***team*** performance?

_____Very
_____Somewhat
_____Not

Do you as a coach utilize ***other*** staff members with backgrounds related to fitness training, strength, or conditioning to assist you in ***establishing*** *pre-season training* sessions?

_____No
_____Yes (please explain)_____

_____

Do you as a coach utilize ***other*** staff members with backgrounds related to fitness training, strength, or conditioning to assist you in ***measuring*** components of fitness for *pre-season training* sessions?

_____No
_____Yes (please explain)_____

_____ ♣

APPENDIX B

A COACHES PERSPECTIVE
Questionnaire

INSTRUCTIONS: *Please, complete the following questionnaire.*

SEX: M F DATE:_____

AGE: _____

YEARS ***PARTICIPATING*** IN SOCCER: _____
(Experience playing, not coaching)

YEARS COACHING SOCCER: _____
(***collegiate*** level)

YEARS COACHING SOCCER: _____
(***all other levels combined***)

DO YOU CURRENTLY COACH AT THE COLLEGIATE LEVEL:
(**please mark only one, if you coach *BOTH*, please choose *ONE* program to answer remaining questions)
_____FEMALES
_____MALES

WHAT IS YOUR CURRENT OR HIGHEST LEVEL OF EDUCATION?
_____High School Diploma/GED
_____Associates Degree (specify)_____
_____Bachelors Degree (specify)_____
_____Masters Degree (specify)_____
_____Doctorate (specify)_____
_____MD, DO (specify)_____
_____Other (specify)_____

WHAT ***ADDITIONAL*** CERTIFICATIONS/LICENSURES DO YOU CURRENTLY HOLD? (please list all that apply)
_____
_____

HOW MANY ***SCHOLARSHIP ATHLETES*** DO YOU CURRENTLY HAVE ON YOUR SQUAD?
Total #_____
Full _____
Partial_____

DOES YOUR SOCCER TEAM PARTICIPATE IN A ***PRE-SEASON*** PROGRAM?
_____YES
_____NO

***IF THE ANSWER TO THE ABOVE QUESTION IS **NO** PLEASE TURN IN **IMMEDIATELY**--DO NOT RESPOND TO ADDITIONAL QUESTIONS*

IF YES, WHEN DOES YOUR *PRE-SEASON* ***START***_____ AND ***END***?_____

WITHIN THIS DATE RANGE, WHAT ARE THE TOTAL NUMBER OF _____***DAYS***,_____***HOURS***,_____***HOURS PER DAY*** SPENT TRAINING?

WITHIN THE ***PRE-SEASON*** TIME FRAME DO YOU TRAIN
_____1,_____2,_____3 TIMES PER DAY?
IF TIMES VARY (please explain)_____

IS EACH *PRE-SEASON TRAINING* SESSION ***PRE-ORGANIZED*** OR ***PRE-STRUCTURED***? (meaning, do you have each activity for each session planned ***before*** each session begins)
_____YES
_____NO (please explain)_____
_____

DO YOU ESTABLISH ***MINIMUM FITNESS*** REQUIREMENTS ***BEFORE*** *PRE-SEASON* OCCURS?
_____YES
_____NO(please explain)_____

IF YES, WHAT ***COMPONENTS OF FITNESS*** DO YOU ***MEASURE***?
(please mark all that apply)
_____BF% (body fat composition)
_____STRENGTH (ex. max. reps-bench press, leg press, crunches)
_____ENDURANCE (ex. long distance runs 1-4 mi., VO^2 Max., HR)
_____AGILITY (ex. obstacle course, shuttle run, "doggies, horses")
_____SPEED (ex. 40, 100, 200 yd/meter dash)
_____FLEXIBILITY (ex. sit-n-reach, hamstring, quads, etc.)
_____OTHER (specify)_____

IF YES, ***WHEN*** DO YOU MEASURE THE *COMPONENTS OF FITNESS*?
(please mark all that apply)
_____BEFORE PRE-SEASON
_____DURING PRE-SEASON (specify when)_____
_____*AFTER* PRE-SEASON ***BUT*** *BEFORE* REGULAR SEASON
_____DURING REGULAR SEASON
_____AFTER REGULAR SEASON

WHY DID YOU CHOOSE THESE *COMPONENTS OF FITNESS* TO ***MEASURE***? (how do you use this information?)
_____BASELINE FITNESS MEASUREMENTS FOR INDIVIDUAL PLAYERS
_____OVERALL PERCEPTION OF *TEAM* FITNESS LEVEL
_____PRE-ESTABLISHED PROTOCOL FOLLOWED
_____OTHER (please explain)_____
_____

HOW IMPORTANT ARE THE ***COMPONENTS OF FITNESS*** TO YOU AS A COACH?
_____VERY IMPORTANT
_____SOMEWHAT IMPORTANT
_____NOT IMPORTANT

HOW IMPORTANT IS ***PRE-SEASON TRAINING*** TO YOU AS A COACH?
_____VERY IMPORTANT
_____SOMEWHAT IMPORTANT
_____NOT IMPORTANT

DO YOU CONSIDER YOUR ***OVERALL*** *PRE-SEASON TRAINING* PROTOCOL TO BE OF _____ INTENSITY.

_____HIGH
_____MEDIUM
_____LOW

HOW WOULD YOU ***COMPARE*** *PRE-SEASON TRAINING* TO *OFF-SEASON TRAINING* WITH RESPECT TO ***INTENSITY***?

_____HIGHER INTENSITY
_____SAME INTENSITY
_____LOWER INTENSITY

HOW WOULD YOU ***COMPARE*** *PRE-SEASON TRAINING* TO *COMPETATIVE SEASON TRAINING (PRACTICES)* WITH RESPECT TO ***INTENSITY***?

_____HIGHER INTENSITY
_____SAME INTENSITY
_____LOWER INTENSITY

WHAT ***GOALS*** DO YOU ***HOPE*** *TO ACCOMPLISH* WITH *PRE-SEASON TRAINING* AND WHAT GOALS ***ARE*** *BEING ACCOMPLISHED* WITH *PRE-SEASON TRAINING*? (↑= increase)

HOPE TO MEET	**ARE** MET	
_____	_____	INJURY PREVENTION
_____	_____	↑ STRENGTH
_____	_____	↑ ENDURANCE
_____	_____	↑ FLEXIBILITY
_____	_____	↑ AGILITY
_____	_____	↑ BALL SKILLS
_____	_____	↑ TACTICAL SKILLS
_____	_____	↑ TEAM MOTIVATION (bonding)
_____	_____	↑ OVERALL FITNESS LEVEL OF TEAM
_____	_____	↑ OVERALL FITNESS LEVEL OF INDIVIDUAL PLAYERS

IF THERE ARE GOALS ***OTHER THAN*** THESE LISTED THAT YOU **HOPE** TO ACCOMPLISH OR **ARE** BEING ACCOMPLISHED WITH *PRE-SEASON TRAINING,* PLEASE EXPLAIN

_____

_____

DO YOU AS A COACH PERCEIVE A RELATIVELY _____***RISK OF INJURY*** ASSOCIATED WITH *PRE-SEASON TRAINING*?
_____HIGH
_____MEDIUM
_____LOW
_____NO

DO YOU AS COACH PERCEIVE *PRE-SEASON TRAINING* TO BE _____ INFLUENTIAL ON ***INDIVIDUAL*** PLAYER PERFORMANCE?
_____VERY
_____SOMEWHAT
_____NOT

DO YOU AS COACH PERCEIVE *PRE-SEASON TRAINING* TO BE _____ INFLUENTIAL ON ***TEAM*** PERFORMANCE?
_____VERY
_____SOMEWHAT
_____NOT

DO YOU AS A COACH UTLIZE ***OTHER*** STAFF MEMBERS WITH BACKGROUNDS RELATED TO FITNESS TRAINING, STRENGTH, OR CONDITIONING TO ASSIST YOU IN ***ESTABLISHING*** *PRE-SEASON TRAINING* SESSIONS?
_____NO
_____YES (please explain)_____
_____

DO YOU AS A COACH UTLIZE ***OTHER*** STAFF MEMBERS WITH BACKGROUNDS RELATED TO FITNESS TRAINING, STRENGTH, OR CONDITIONING TO ASSIST YOU IN ***MEASURING*** *COMPONENTS OF FITNESS* FOR *PRE-SEASON TRAINING* SESSIONS?
_____NO
_____YES (please explain)_____
_____

DO YOU AS A COACH ***REQUIRE*** INDIVIDUAL OR TEAM PARTICIPATION IN AN ***OFF-SEASON*** PROGRAM?
_____YES
_____NO

PLEASE, MARK WHETHER YOU WOULD LIKE TO RECEIVE A COPY OF THE RESULTS OF THIS STUDY?
_____YES
_____NO

__*OPTIONAL*__- THIS IS THE FIRST STEP TO AN ON-GOING RESEARCH PROJECT. IF AVAILABLE, PLEASE INCLUDE YOUR PRE-SEASON PROTOCOL INCLUDING YOUR DAILY WORKOUT PLAN OR ACTIVITY REGIMEN WITH SPECIFIC ACTIVITIES PLANNED. ***CONFIDENTIALITY IS ASSURED!*** ANY INFORMATION YOU PROVIDE FOR THE BENEFIT OF THIS PROJECT WILL ***NOT*** BE SHARED WITH ANY PERSON NOT DIRECTLY INVOLVED WITH THIS RESEARCH PROJECT. ***ANONYMITY IS ASSURED*** IN THE REPORT OF RESULTS FROM THIS STUDY.

THANK YOU FOR YOUR COOPERATION AND PARTICIPATION IN THIS QUESTIONNAIRE. PLEASE RETURN THE QUESTIONNAIRE AND ANY ADDITIONAL INFORMATION BY _____
IN THE ENCLOSED BUSINESS REPLY ENVELOPE TO:
_____

APPENDIX C

WHAT IS SOCCER PRE-SEASON TRAINING? A COACH'S PERSPECTIVE AT THE COLLEGIATE LEVEL

Dear Coach:

You are invited to participate in a study of pre-season soccer training at the collegiate level including NCAA Division I, II, and III men's and women's soccer programs. I am a graduate student at Southwest Texas State University at San Marcos, Texas in the Master's Physical Therapy Program. We hope to *define* pre-season training and establish general goals and outcomes from a coach's perspective at the collegiate level to determine risks and benefits of types of training programs. You were selected as a possible participant in this study because you coach men's soccer, women's soccer, or possibly both at the collegiate level within the NCAA Divisions I, II, or III. You will be one of approximately four hundred subjects asked to participate in this study.

Your participation in this study will involve completing and returning the attached questionnaire by **OCTOBER 10, 2000.** Included in this study we are requesting additional pre-season training protocols or pre-season activity regimens you utilize during pre-season training. This is an *optional* portion of the study but will help provide a general guideline for specific pre-season training activities. This is the first step in an on-going research project; any information you provide will be greatly appreciated. Any information you provide will be **confidential**. *Anonymity is assured* in reporting the results of this study.

You are under no obligation to participate in this study. Your decision whether or not to participate will not prejudice your future relations with Southwest Texas State University. If you decide to participate, you are free to discontinue participation at any time without prejudice. Your completing and returning the questionnaire will be taken as evidence of your willingness to participate and your consent to the information used for purposes of the study.

You may retain this cover letter and explanation about the nature of your participation and the handling of the information you supply. If you have any questions, please contact me, Christie Powell, at 512-245-3949 or e-mail me at Ceep03@hotmail.com.

Please return ONLY the survey by mail in the enclosed postage-paid envelope and please fax any additional pre-season information to me at fax #512-258-5378 or attach to the above listed e-mail address. THANK YOU FOR YOUR TIME. ♣

APPENDIX D

WHAT IS SOCCER PRE-SEASON TRAINING? A COACH'S PERSPECTIVE AT THE COLLEGIATE LEVEL

6-30-00

Dear Coach:

You are invited to participate in a pilot study of pre-season soccer training at the collegiate level including NCAA Division I, II, and III men's and women's soccer programs. I am a graduate student at Southwest Texas State University at San Marcos, Texas in the Master's Physical Therapy Program. We hope to *define* pre-season training and determine general goals and outcomes from a coach's perspective at the collegiate level to determine risks and benefits of types of training programs. You were selected as a possible participant in this study because you coach men's soccer, women's soccer, or possibly both at the collegiate level within the NCAA Divisions I, II, or III. You will be one of approximately twenty subjects asked to pilot and participate in this study. Once the pilot study is complete and necessary changes are made, approximately four hundred subjects will be asked to participate in this study.

Your participation will involve completing and returning the attached questionnaire. On this questionnaire, please provide any written feedback on concerns, criticisms, or clarifications pertaining to the questionnaire, including its format or content. Any feedback is appreciated.

An *optional* portion of this study will be to provide any pre-season training protocols or pre-season activity regimens you utilize during pre-season training. This material will be separate from the survey, but will provide a general guideline for pre-season training activities. This is the first step in an on-going research project; any information you provide will be greatly appreciated. Any information you provide will be **confidential.**

Please return the questionnaire and any feedback to me by **JULY 21, 2000.** You are under no obligation to participate in this study. Your decision whether or not to participate will not prejudice your future relations with Southwest Texas State University. If you decide to participate, you are free to discontinue participation at any time without prejudice. Completing and returning the questionnaire will be taken as evidence of your willingness to participate and your consent to the information used for purposes of the study.

You may retain this cover letter and explanation about the nature of your participation and the handling of the information you supply. If you have any questions, please contact me, Christie Powell, at 512-892-9286 or e-mail me at ceep03@hotmail.com.

Please return the survey by mail in the enclosed postage-paid envelope. You may fax any additional pre-season information to me at fax #512-258-5378 or via e-mail.

APPENDIX E

APPENDIX E. SURVEY PROFILE OF A NCAA SOCCER COACH (N=116).

Gender	Female 19.1% Males 80.9%
Average Age	Combined 36.73±8.78 Females 31.14±6.33 Males 38.19±8.79
Average # Years Participating In Soccer	Combined 20.56±8.62 Females 17.32±6.88 Males 21.32±8.89
Average # Years Coaching College Soccer	Combined 10.48±7.81 Females 7.91±4.96 Males 11.13±8.28
Highest Level of Education	Females: 18.2% M. of Management/Soc. of Sport 13.6% M. of Education 9.1% B. of Business/Fin./Economics 9.1% B. of PE/Kinesiology Males: 11.8% B. non-specific 9.7% M. of Education 9.7% M. of PE/Kinesiology 6.5% M. of Athletic Administration 5.4% M. of Management/Soc. of Sport 5.4% B. of Business/Fin./Economics * Not all degrees listed here- largest percentages listed for females and males

APPENDIX F

APPENDIX F. TOTAL SURVEY RESULTS (N=116).

Survey Completion Date Range	7/5/00—10/12/00
Coach's Gender	89.9% Males 19.1% Females
Average Age of Coaches	Combined 36.73±8.78 Males 38.19±8.79 Females 31.14±6.33
Coach's Playing Experience- Average # of Years Participating in Soccer	Combined 20.6±8.62 Males 21.32±8.89 Females 17.32±6.88
Coach's Collegiate Level Coaching Experience- Average # of Years Coaching College Soccer	Combined 10.48±7.81 Males 11.13±8.28 Females 7.91±4.96
Additional Coaching Experience Excluding Collegiate Level- Average # of Years Coaching All Other Levels	Combined 8.90±7.12 Males 9.3±7.55 Female 7.45±4.88
Coach's Current or Highest Level of Education	Combined HS Diploma/GED- 0.9% Bachelors- 38.9% Masters- 55.2% Doctorate- 5.2% Males HS Diploma/GED- 0% Bachelors- 40.1% Masters- 54.0% Doctorate- 6.5% Females HS Diploma/GED- 4.5% Bachelors- 36.2% Masters- 58.8% Doctorate- 0%
Do coaches hold additional licensures or certifications for coaching?	Yes 100% No 0%
The Average # of Scholarship Athletes On the Soccer Team	Division I Total- 15.58±5.6 Full- 2.66±3.25 Partial- 12.97±6.5 Division II Total- 11.31±6.33 Full- .26±.62 Partial- 11.64±6.11 Division III Total- no scholarships available for Division III schools
Do the soccer teams participate in Pre-season Training Programs?	Yes 100% No 0%

Date Ranges of Pre-season Training Programs (Regulated by NCAA Constitution Operating Bylaw 17.18.2 & 17.02.11)	7/5/00- 10/12/00
Average Total Time Spent During Pre-season Training * significant difference found by One-way ANOVA in average hours spent training between male and female coaches ** significant difference found by One-way ANOVA in average days spent training between Division I & Division III schools *** significant difference found by One-way ANOVA in average hours spent training between Division I & Division III schools	Combined Days 10.45±3.10 Hours 45.01±15.92 Hrs/Day 4.37±1.07 Times/Day 2.20±.44 Males Days 10.47±3.17 Hours 43.06±15.25* Hrs/Day 4.21±1.00 Times/Day 2.18±.42 Females Days 10.50±2.89 Hours 53.79±16.42* Hrs/Day 5.00±1.14 Times/Day 2.25±.37 Division I Days 11.88±3.05** Hours 51.91±17.69*** Hrs/Day 4.34±1.28 Times/Day 2.17±.36 Division II Days 11.04±3.70 Hours 47.10±15.94 Hrs/Day 4.32±.92 Times/Day 2.25±.39 Division III Days 9.34±2.70** Hours 39.95±13.04*** Hrs/Day 4.42±1.02 Times/Day 2.22±.51
Is pre-season training pre-organized or pre-structured before each practice?	Yes 99.1% No .9%
Are minimum fitness requirements established before pre-season starts?	Yes 92.2% No 7.8%
What components of fitness are measured and what percentage of coaches measure each component?	Body Fat Composition 19.8% Strength 41.4% Endurance 85.3% Agility 54.3% Speed 61.2% Flexibility 23.3% Others 10.3%

When are these components of fitness measured?	Before Pre-season Starts 44.3% During Pre-season 59.6% After Pre-season/Before Regular Season 89.5% During Regular Season Training34.2% After Regular Season Training 30.7% Other 1.8%
Why do coaches measure the components of fitness, how do they use this information?	Baseline fitness measurements for individual players 59.5% Overall perception of team fitness 61.3% Pre-established protocol followed 17.1% Other 10.8%
How important are the components of fitness to a coach?	Very Important 82.5% Somewhat Important 15.8% Not Important 1.8%
How important is pre-season training to a coach?	Very Important 99.1% Somewhat Important .9% Not Important 0%
What are the overall coach's perceptions of intensity for their pre-season protocol?	Combined High Intensity 78.3% Medium Intensity 21.7% Low Intensity 0% Division I High Intensity 85.7% Medium Intensity 14.3% Low Intensity 0% Division II High Intensity 66.7% Medium Intensity 33.3% Low Intensity 0% Division III High Intensity 78.6% Medium Intensity 21.4% Low Intensity 0%
What are coach's overall perceptions of intensity when comparing pre-season training to off-season training?	Combined Higher Intensity 73.0% Same Intensity 17.4% Lower Intensity 7.0% No off-season training 2.6% Division I Higher Intensity 62.9% Same Intensity 28.6% Lower Intensity 8.6% No off-season training 0% Division II Higher Intensity 83.3% Same Intensity 12.5% Lower Intensity 4.2% No off-season training 0% Division III Higher Intensity 75.0% Same Intensity 12.5% Lower Intensity 7.1% No off-season training 5.4%

What are coach's overall perceptions of intensity when comparing pre-season training to competitive season training?	Combined Higher Intensity 34.2% Same Intensity 62.3% Lower Intensity 3.5% Division I Higher Intensity 32.4% Same Intensity 64.7% Lower Intensity 2.9% Division II Higher Intensity 29.2% Same Intensity 66.7% Lower Intensity 4.2% Division III Higher Intensity 37.5% Same Intensity 58.9% Lower Intensity 3.6%
What are coach's perceptions of injury risk associated with pre-season training?	Combined High Risk 25.0% Medium Risk 59.0% Low Risk 14.3% No Risk .02% Males High Risk 26.7% Medium Risk 57.8% Low Risk 13.3% No Risk 2.2% Females High Risk 18.2% Medium Risk 63.6% Low Risk 18.2% No Risk 0% Division I High Risk 31.4% Medium Risk 54.3% Low Risk 14.3% No Risk 0% Division II High Risk 29.2% Medium Risk 62.5% Low Risk 8.3% No Risk 0% Division III High Risk 18.5% Medium Risk 61.1% Low Risk 16.7% No Risk 3.7%

What goals do coaches HOPE to accomplish with pre-season training? (percentages add up to > 100% because subjects could select multiple answers)	Injury Prevention 51.8% Increase Strength 42.1% Increase Endurance 20.4% Increase Flexibility 37.2% Increase Agility 31.9% Increase Ball Skills 20.4% Increase Tactical Skills 25.7% Increase Team Motivation 24.8% Increase Overall Team Fitness 23.0% Increase Individual Player Fitness 27.4% Other 10.6%
What goals do coaches perceive they ARE accomplishing with pre-season training?	Injury Prevention 14.0% Increase Strength 14.0% Increase Endurance 33.6% Increase Flexibility 23.9% Increase Agility 24.8% Increase Ball Skills 39.8% Increase Tactical Skills 33.6% Increase Team Motivation 33.6% Increase Overall Team Fitness 34.5% Increase Individual Player Fitness 29.2% Other 10.6%
What goals do coaches BOTH HOPE to accomplish and perceive they ARE accomplishing with pre-season training?	Injury Prevention 21.1% Increase Strength 14.9% Increase Endurance 36.3% Increase Flexibility 21.2% Increase Agility 22.1% Increase Ball Skills 31.0% Increase Tactical Skills 35.4% Increase Team Motivation 38.9% Increase Overall Team Fitness 37.2% Increase Individual Player Fitness 35.4%
What goals do coaches not address with pre-season training?	Injury Prevention 13.2% Increase Strength 28.9% Increase Endurance 9.7% Increase Flexibility 17.7% Increase Agility 21.2% Increase Ball Skills 8.8% Increase Tactical Skills 5.3% Increase Team Motivation 2.7% Increase Overall Team Fitness 5.3% Increase Individual Player Fitness 8.0%

How influential do coaches perceive pre-season training to be on individual player performance?	Very Influential 80.5% Somewhat Influential 18.6% Not Influential .9%
How influential do coaches perceive pre-season training to be on team performance?	Very Influential 91.2% Somewhat Influential 8.0% Not Influential .9%
Do coaches utilize other staff members with backgrounds related to fitness training, strength, or conditioning to assist them with establishing pre-season training programs?	Yes 67.0% Strength & Conditioning Coach 21.4% Athletic Trainer 5.4% Use more than one source 23.2% Other 17.1% No 33.0%
Do coaches utilize other staff members with backgrounds related to fitness training, strength, or conditioning to assist them with measuring components of fitness?	Yes 49.6% Strength & Conditioning Coach 17.7% Athletic Trainer 8.0% Use more than one source 14.2% Other 9.8% No 50.4%

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