

The Effects a Strength and Conditioning Coach has on the Individual
Athletic Performances of NCAA Division III Male Soccer Players

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Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Education

December 2019

Graduate Programs in Education

Goucher College

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Abstract

The purpose of this study was to determine the effects a strength and conditioning coach has on the individual athletic performances of male soccer players competing at the intercollegiate level. The researcher developed a physical examination test to measure the individual athletic performances of twenty NCAA Division III male soccer players. The study used a single group pre-experimental, pretest-posttest design to measure data collected from the administered test. Improvements in test scores did occur across the board once a strength and conditioning coach was implemented. Research in this area should continue as there is little being done to promote the need for such a resource, especially at the intercollegiate level.

CHAPTER I

INTRODUCTION

Overview

Today, especially at the lower levels of the NCAA, student-athletes are too often limited in the amount of resources made available to improve their individual athletic performances during the off-season. The implementation of a strength and conditioning coach in a collegiate athletics program is something that is crucial for such athletic development to occur (Boyd, 2017). Unfortunately, in Division II and III athletic programs especially, the strength and conditioning program is an area often deprived of adequate supervision and/or support staff (Roozen, 1996). By providing such a resource and helping improve the individual athletic performance of the student-athletes, it becomes more likely that the individual players, teams and athletics program experience greater on-field success.

As a student-athlete, indulging oneself in the continuous development of one's athletic abilities is one of the most important and controllable entities for a collegiate student-athlete to take part in when wanting to reach his/her maximum on-field potential. Studies show that working with a professional strength and conditioning coach is the key to accomplishing this growth most efficiently and effectively (Powers, 2008). While there are many intercollegiate athletic programs that provide a strength and conditioning coach to their teams, there are still many programs out there that remain without such a crucial resource (Haggerty, 2005). Evidence must continue to be provided and made readily available to such institutions in order to get to a point where all student-athletes are being provided with this important intervention, regardless of division or level.

In specific reference to intercollegiate-level soccer, the game is characterized as a high-intensity, intermittent contact team sport that requires a number of proficient physical and physiological capabilities to perform successfully. Especially in NCAA soccer today, the calendar created to carry out a season requires players to retain high levels of aerobic and anaerobic conditioning, speed, agility, strength, and power (Turner & Stewart, 2014). It is recommended that these qualities are developed and measured using endurance, speed, and strength as the three main units of measurement.

The researcher's experience as a former student-athlete and current intercollegiate men's soccer coach are what sparked his interest, as well as because the current college the researcher is coaching at recently hired the school's first ever full-time strength and conditioning coach for the department of athletics. The researcher hopes to support this hiring and provide support as to why such a position must continue to exist within the department. Literature related to strength and conditioning suggests and supports the claim that an athletics program providing a strength and conditioning coach to their student-athletes is an absolute necessity when looking to experience consistent growth and success throughout the teams and program (Boyd, 2017).

Statement of Problem

The purpose of this study was to determine the effect a strength and conditioning coach has on the individual athletic performances of intercollegiate male soccer players. With the physical demand that the current intercollegiate athletics calendar calls for from its student-athletes, the development of an intercollegiate male soccer player's individual athletic performance becomes a key part in helping such a student-athlete experience continuous success and growth throughout his four-year career. Effective strength and conditioning programs are mandatory for athletic success, especially at levels beyond high school. Research clearly shows

the benefits of effective strength and weight training programs as they relate to increases in strength, power, speed, endurance, and flexibility (Boyd, 2017). Without having access to a strength and conditioning coach, it becomes much more difficult to effectively improve this individual athletic performance due to a lack of structure and support. This may ultimately hold back both the student-athlete and team from reaching its full potential.

Hypothesis

The null hypothesis states that there is no relationship between an intercollegiate men's soccer program working with a strength and conditioning coach and these student-athletes experiencing improved individual athletic performances.

Definition of Terms

Strength and Conditioning Program- A strength and conditioning program is a fitness and physical performance improvement method or workout plan that involves a laid-out calendar of strength and power workouts, as well as exercises that are both aerobic and anaerobic in nature, that use sport-specific exercise prescription to improve the performance of competitive athletes. A strength and conditioning coach typically generates the program, monitors the athletes' progress, and provides support throughout in order for the athlete to reach their maximum athletic potential.

Athletic Performance- The holistic measurement of an athlete's athletic abilities through a variety of sport-specific physical examinations. Athletic performance will be measured in this study by the following exercises/physical fitness exams:

1. *2-mile run-* a fitness exam used to examine the endurance levels of athletes by measuring the amount of time it takes to run eight times around the track

2. *40-yard dash*- the 40-yard dash is a timed-sprint covering 40 yards (36.58 m). It is primarily run to evaluate the speed and acceleration of athletes
3. *Barbell Squat*- a weightlifting exercise in which an athlete lies a barbell on his/her shoulders and proceeds to bend at the knees and hips, stopping when a 90-degree angle is reached. This is to measure the lower body strength of an athlete, particularly the quadriceps and hamstrings

CHAPTER II

REVIEW OF THE LITERATURE

This literature review discusses the impact a strength and conditioning coach has on the individual athletic performances of male soccer players at the intercollegiate level. The first section will focus on individual athletic performance and how it is specifically defined and measured in high-level male soccer players. The second section will discuss the evidence player performance analysis provides in terms of what defines individual athletic performance in male soccer players. The third section will turn to strength and conditioning training and the role it plays in the development of individual athletic performance. The fourth section will then discuss the importance of providing college soccer players with a strength and conditioning coach when looking to effectively develop their individual athletic performances. Lastly, conclusions will be drawn about the effect a strength and conditioning coach has on the individual athletic performances of male college soccer players.

Individual Athletic Performance

Individual athletic performance is the way an athlete performs during any given fitness test. The measurement of such performance varies based on the sport (Robinson, 2013). Soccer is a high-intensity, intermittent, contact team sport that requires proficiency in a number of athletic abilities. These abilities must be developed and retained in order for male soccer players to experience growth in their athletic performances (Cronin & Sleiver, 2014). More specifically, these abilities include high levels of aerobic and anaerobic conditioning, speed, agility, strength, and power (Turner, 2014). These components are widely recognized by the soccer community as being the standard of athletic performance in male soccer players due to the commonality found

amongst performance analysis findings (Turner & Stewart, 2014). Through these findings, soccer-specific performance measurements are created and performance levels can be effectively tested.

Aerobic and Anaerobic Conditioning

By testing athletic performance, athletes and coaches are able to monitor and manipulate training methods in order to achieve maximum strength and conditioning training efficacy (Cronin & Sleiver, 2014). When testing the individual athletic performance of male soccer players, coaches and players are often limited in regards to the tools and resources necessary to comprehensively test athletic performance. In saying this, a number of simple testing methods can be used to accurately measure and examine the athletic performance of soccer players. When testing the aerobic and anaerobic conditioning levels of a soccer player, soccer coaches often turn to tests that measure the players ability to run various distances at a maximal effort level. Measuring aerobic conditioning levels requires administering longer-distanced tests due to the efficiency in which a player's aerobic capacity is absorbing and transporting oxygen during maximal exercises that require extended use out of large muscle groups (Kotzamanidis, Chatzopoulos, Michailidis, Papaiakevou, & Patikas, 2005). The quicker and more efficient a player is able to take in oxygen, the easier and better a player is able to run the total distance covered during a match. Anaerobic conditioning is geared more towards the maximal work performed during a player's involvement in a short-term exercise requiring maximal physical effort without utilizing much oxygen. Measuring this kind of conditioning level in a soccer player requires a test much shorter than any aerobic test as oxygen intake does not play a role in measuring such efforts (Stolen, Chamari, Castagna, & Wisloff, 2005). An anaerobic test typically lasts anywhere between 30 seconds and a few minutes (Kotzamanidis et al., 2005). In

soccer, a timed 2-mile is often a test administered by coaches when looking to measure a player's aerobic ability, while a timed 40-yard sprint is a common test used in soccer when measuring a player's anaerobic ability.

Speed and Agility

In soccer, speed is a player's acceleration combined with velocity output (Stevens et al., 2014). Both are measured using time and are combined using the term short-sprinting capabilities. Acceleration is how quickly a player can go from low levels of velocity output to maximal levels, while velocity itself is how quickly a player can get from one point to another. In soccer,

Short-sprinting performance is an important determinant of match-winning actions. The importance of sprinting is that it is utilized during key moments during a match, allowing a player to escape from an opponent or reach a free zone to shoot on the goal or to make a decisive pass. (Ferro, Villacieros, Floria, & Graupera, 2019, p. 143)

In terms of testing such abilities, a timed 40-yard sprint test is often used by coaches to assess the speed of soccer players.

Agility is a soccer player's ability to efficiently perform whole body movement with a noticeable change of direction in response to a stimulus (Goral, 2015). Many studies show very frequent variation in directional changes by players during a 90-minute match (Giovanni, Iuliano & Pistone, 2016). According to Goral (2015), agility is one of the most important factors of performance in soccer and plays a substantial role in a player's ability to move his feet and change direction both with and without the ball. In soccer, a high-level of reactive agility is the specific type of agility necessary for players to possess in order to perform at a high level of

play. Such agility is defined in soccer as “anticipating the direction and timing of the ball, without planned actions in response to the movements of the opposing player” (Giovanni et al., 2016, p. 4). Testing requires players to change direction on multiple occasions, doing so at a high level of work-rate. Many soccer coaches turn to the Illinois agility test to test such abilities (Kutlu, Yapici, Yoncalik, & Celik, 2012).

Strength and Power

Muscle strength is generally accepted to be a major factor influencing athletic performance success in soccer (Requena, 2009). Strength and power in a soccer player heavily revolves around maximal lower-body muscle output due to the nature of the sport (Nageswaran, 2012). In saying this, the strength and power of a soccer player is frequently measured using repetition maximum tests that isolate soccer-related muscle groups such as hamstring, quadricep, and knee flexor and extensor muscles (Paul, 2015). These muscles are used most frequently by soccer players. The most commonly used repetition maximum tests to measure the strength and power of a soccer player are vertical jump, horizontal broad jump, squats, and deadlifts (Paul, 2015).

Player Performance Analysis

The importance of developing the individual athletic performance of a soccer player is made evident through player performance analysis research. On average, a high-level male soccer player runs anywhere between 10 to 12 kilometers while intermittently using 80 to 90 percent of his maximal heart rate throughout a 90-minute match (Stolen et al., 2005). This heart rate level is achieved when a player is in the act of either sprinting or high intensity running. High intensity running is experienced approximately every 70 seconds, while sprinting occurs

between 10 to 20 times throughout a game. While the number of sprints per game may not seem like a lot, it can account for over 10 percent of the total distance covered by a player (Evangelos et al., 2012). The total distance covered during a match combined with the frequency of high intensity running demonstrates the correlation between aerobic ability and a soccer player's athletic performance aerobic ability; while, on the opposite end of the spectrum, the number of sprints per game, combined with technical and tactical actions in association with quick and dynamic movements, demonstrates the correlation between anaerobic ability and a soccer player's individual athletic performance. Additionally, through performance analysis, players are found to perform over 3,000 actions during a match (Orange & Smith, 2016). The most frequent of these actions are running, sprinting, jumping, turning, and decelerating. These actions can and should be developed through specific strength and power training in order for soccer players to experience improvements in their athletic performance.

Strength and Conditioning Training

Strength and conditioning training is an important practice found in all sports to some degree (Vaczi, Tollar, Meszler, Juhasz, & Karsai, 2013). The correlation between sport-specific strength and conditioning training and improving individual athletic performance is widely recognized throughout the athletic community due to the numerous studies done on the subject. More often than not, researchers have demonstrated that increases in strength and conditioning result in increases in athletic performance (Styles, 2016). Such training is approached differently depending on the sport due to the variance in what physical abilities needs to be developed for a particular sport. While most football strength and conditioning programs mainly focus on anaerobic and upper-body muscle development, a soccer strength and conditioning program

focuses more on aerobic and lower-body muscle development due to the differences in what the sports demand out of its players (Turner & Stewart, 2014).

Soccer-specific strength training is often themed around lower-body muscle groups because of what defines athletic performance in a soccer player. The actions required of a soccer player to perform throughout a match are all actions associated with leg strength and power (Nageswaran, 2012). This focus has caused a majority of soccer strength and conditioning programs to turn to plyometric and resistance training in order to improve these important components. Plyometric training is an approach to strength development that is proven to improve vertical jump performance, acceleration, leg strength, muscular power, joint awareness and other sport-specific skills. It consists of “dynamic and rapid stretching of muscles immediately followed by a concentric of shortening action of the same muscles and connective tissues” (Wang & Zhang, 2016, p. 550). A majority of exercises used in plyometric training incorporate variations of jumping and hopping at a high-intensity, explosive rate. Aside from improving individual athletic performance, plyometric training is also proven to help prevent injuries from occurring due to the direct effect it has on the strengthening of muscles and tendons (Lehnhard, Lehnhard, Young, & Butterfield, 1996). This strengthening of muscles and tendons also contributes to improved running abilities in soccer players, specifically short-sprint running (Styles, 2016). According to Styles (2016), strong correlations have been reported between short-sprint performance and lower body strength in which increasing lower body strength through plyometric exercises can improve overall soccer performance.

Soccer-specific conditioning training improves a player’s aerobic capacity (Cronin & Sleiver, 2014). A high-level of aerobic capacity is considered to be the most important component for a soccer player to have in order to perform at a high level. The amount of

consistent running a soccer player does throughout a 90-minute match cannot be accomplished at a high level without prior proper aerobic conditioning training. The specific type of aerobic conditioning training that most efficiently increases a soccer player's aerobic capacity is interval training (Ruivo, Carita, & Pezarat-Correia, 2016). While endurance training is also an effective method, interval training allows a player to increase aerobic capacity at a greater rate due to players exerting higher, more consistent levels of energy throughout the workout. Exerting consistently high levels of energy when running increases the amount of blood a player's heart is able to pump, improving the body's ability to take in more oxygen. Interval training to increase aerobic capacity entails longer-distanced runs that incorporate sporadic increases in pace for short amounts of time throughout the run.

The Impact of a Strength and Conditioning Coach

According to Powers (2008), a strength and conditioning coach at the intercollegiate level plays an important role in enhancing the athletic performance of varsity student-athletes. The reasoning behind this not only falls on the expertise of a strength and conditioning coach, but also because of the amount of time a strength and conditioning coach spends with the athletes. "The strength and conditioning coach now spends more time with the athletes than even the individual sport coaches because of NCAA rules" (Powers, 2008, p. 5). Current NCAA rules and regulations prevent college coaches of a specific sport from working directly with their players outside of their actual seasons. These rules and regulations do not apply to strength and conditioning coaches, making them very valuable assets to athletic programs seeking to improve the athletic performance of student-athletes. Although a student-athlete cannot be forced to take action in bettering himself during the offseason, providing a strength and conditioning coach as a resource drastically increases the likelihood of that athlete voluntarily taking such action

(Pensgaard & Roberts, 2002). This is due to the structure a strength and conditioning coach provides during the offseason as well as the influence a coach has on an athlete's motivation. While college coaches provide structure by giving their athletes off-season workout packets at the conclusion of a season, the rest is on the athletes to take action. A strength and conditioning coach has the ability to enhance this structure by being present at the workouts, setting and tracking individual goals, and providing athletes with necessary guidance and support. According to Pensgaard and Roberts (2002), a strength coach plays a very key part in athletes remaining on-task, motivated, and continuously striving to be better during the offseason. Often times, athletes at the intercollegiate level become distracted during the offseason and lose the motivation to improve themselves athletically. A strength and conditioning coach is able to diminish these distractions and reignite, as well as maintain both the intrinsic and extrinsic motivations of an athlete.

Conclusion

Soccer at the intercollegiate level and beyond requires that a high level of athletic performance be continually developed in order for a player to experience success in the sport. The specificity involved in such development needs to be recognized and applied in order to effectively increase the individual athletic performance of a soccer player. Strength and conditioning training play a large role in doing just this, and an even greater emphasis should be placed on providing college soccer players, and student-athletes in general, with a strength and conditioning coach who will be able to not only provide expertise, but also greater offseason structure and motivation to players who need it the most.

CHAPTER III

METHODS

The study used a single group pre-experimental, pretest-posttest design. Participants were studied both before and after the intervention. The intervention was providing a team of intercollegiate male soccer players with a full-time strength and conditioning coach for a minimum of 5 months. All players worked with the performance coach directly, doing so three times a week. The following study tested the impact the strength and conditioning coach had on their individual athletic performances by taking physical examination results of the players prior to the arrival of the strength and conditioning coach and comparing them to the results after the strength and conditioning coach was able to work with the players on a full-time basis.

Design

The treatment was based on the assumption from the literature review that working with a strength and conditioning coach improves an intercollegiate male soccer player's individual athletic performance. As indicated in the chart below, O_1 represents the results without the implementation of a strength and conditioning coach, X represents the implementation of the treatment and O_2 represents the results after the implementation of a strength and conditioning coach.

$O_1 | X | O_2$

The independent variable in this study is Goucher's strength and conditioning coach and her methods while the dependent variable is the Goucher men's soccer players and their measured athletic performances. The following 3 exercises were administered, measured, and recorded to test and compare the athletic abilities of the athletes:

1. Max Barbell Squat: xxx pounds
2. 40-yard dash: xx seconds
3. 2-mile: xx minutes

Participants

For this study, 20 Division III soccer players participated. Of those 20 soccer players, all were male. Two of the subjects had asthma. All subjects were of college age, between 17 and 23. The researcher selected these subjects because they are on the team that he coaches on a full-time basis. The weekly strength and conditioning training plan for these athletes consisted of team workouts every Monday, Wednesday, and Friday from 1:30-2:30pm. The workouts were designed and administered completely by the strength and conditioning coach and consisted of soccer-specific exercises that sought to improve all identified components of individual athletic performance in a male soccer player.

Instrument

From the literature review, there were nine different tools most commonly identified as tools to use when looking to effectively measure the individual athletic performances of the intercollegiate male soccer players involved in the study. The researcher decided to take these nine tools and combine them into one athletic performance examination. The identified components of individual athletic performance in a male soccer player were taken into account and incorporated in the exam. To measure strength and power, a max barbell squat was administered and recorded. To measure speed, along with agility and anaerobic conditioning levels, a timed 40-yard dash was administered and recorded. To measure endurance or aerobic conditioning levels, a timed 2-mile was administered and recorded.

Procedure

In looking to be as thorough and accurate as possible, four total tests were administered throughout the study to the participants. This study occurred in a 1.5-year timespan. Two of the tests served as pretest to collect data prior to the implementation of a strength and conditioning coach. One test was administered at the beginning of last year's off-season while the other was administered at the end. The posttests were administered in the same format, except at the beginning and end of *this* year's off-season. The pretests occurred during a time when players were not provided a strength and conditioning coach prior to participating in the exams. The posttest took place after players were able to work with the performance coach for a minimum of 5 months. The results of both pretests and posttests were organized and compared to determine whether working with the strength and conditioning coach had a clear impact on the players' athletic performances.

The dates of the study are as follows:

Month 1: April 1-30- During this baseline period, players proceeded to work out as a group twice a week under the instruction and guidance of the soccer coaching staff due to being in-season. Coaches and incoming players kept a record of pretest #1 after it was administered on April 30, at the conclusion of the Spring season.

Month 2-5: May 1-August 15- In the same baseline period, spring season and group lifts concluded May 2. Players were given a thorough summer workout packet that they were expected to follow on their own. Coaches could not make/force players to take part in any of the workouts due to NCAA regulations.

Month 6: August 15-30- The end of the summer off-season. Players were administered pretest #2 and proceeded to lift twice a week on their own under the instruction of the soccer coaching staff due to being in-season.

Month 7-9: September 1-November 10-The season concluded and a strength and conditioning coach had officially been implemented into the men's soccer team. The players immediately began to work directly with the strength and conditioning coach a minimum of three times a week.

Month 9-14: November 10-April 30-The group worked with the strength and conditioning coach three times a week consistently. Posttest #1 was administered at the conclusion of the Spring season, May 2.

Month 15-18: May 2-August 19-The group was given a thorough summer workout packet to follow designed by the strength and conditioning coach. The players were given the resource of being able to work out with the strength and conditioning coach throughout the summer. Posttest #2 was administered at the conclusion of the off-season, August 19.

On April 1, 2018, players were told they would take part in an administered physical fitness exam to test their individual athletic performances. The players were also told that because of the Spring season, team lifts every Tuesday and Thursday were expected. These lifts were run by the soccer coaching staff. The physical fitness test, pretest #1, was administered on April 30, 2018 and data was collected and organized. The players were given a summer workout packet to follow throughout the summer to get in shape for the Fall season. Participation in this was optional due to NCAA regulations. A second physical fitness exam, pretest #2, was administered during the beginning of preseason in August. Data was collected and organized.

Players participated in team lifts twice a week throughout the Fall season. At the conclusion of the season, the players were given a full-time strength and conditioning coach to work with. Players were expected by the strength and conditioning coach to work with her a minimum of three times a week. The third physical fitness exam was administered at the conclusion of the Spring season, or May 2nd. Data was collected and organized. The fourth and final physical fitness exam was administered during preseason of the Fall 2019 season.

CHAPTER IV

RESULTS

This study examined the impact a strength and conditioning coach has on intercollegiate male soccer players. A physical examination test was both generated and administered to current male soccer players at the NCAA Division III level in order to measure the individual athletic performance of these players. The three chosen measurements within this test were determined based off of the research done and discussed in Chapter II. Included in the test was a measured max barbell squat, a timed 40-yard dash, and a timed 2-mile run. The original hypothesis in this experiment states that the implementation of a strength and conditioning coach will improve the athletic performance of such athletes. A summary of the results can be found in the table below.

Table 1. Means and Standard Deviations of the Measures

Measure	Pre-Test Mean (Standard Deviation)	Post-Test Mean (Standard Deviation)
Barbell Squat	149.50 (34.101)	170.25 (24.946)
40 Yard Dash	5.575 (.4541)	5.405 (.3748)
2 Mile Run	12.91 (.8309)	12.33 (.3446)

Dependent t-tests were run to determine if there was impact of strength and conditioning program on athletic performance. Mean and standard deviations of the measures are shown in Table 1. Results showed a significant difference for barbell squat [$t(19) = -5.575, p < .01$], 40 yard dash [$t(19) = 3.451, p < .05$], and 2 mile run [$t(19) = 4.167, p < .05$]. The null hypothesis was rejected for all three measures of athletic performance. These results and their implications will be discussed in the next chapter.

CHAPTER V

DISCUSSION

This study was designed to determine whether there is a relationship between intercollegiate male soccer players working with a strength and conditioning coach and these student-athletes experiencing improved individual athletic performances. The null hypothesis in this study was rejected, as all 20 participants experienced significantly improved scores in each of the three administered exercises used to measure their individual athletic performances.

Implications of Findings

The findings in this study were strong enough to reject the null hypothesis in which all 20 participants involved in the study experienced significantly improved scores in all three physical examination exercises administered after working with the provided strength and conditioning coach. These results indicate that intercollegiate male soccer players should work with a strength and conditioning coach in order to experience growth in individual athletic performance. Such results can, and should, be used to inform intercollegiate athletics programs and teams about the importance in providing student-athletes, particularly collegiate male soccer players, with a strength and conditioning coach in order to help such athletes develop and reach their maximum athletic potential.

Theoretical Consequences

The results of this study support multiple theories discussed in Chapter II. As Styles (2016) claims, more often than not, researchers have demonstrated that increases in strength and conditioning result in increases in athletic performance. The evidence that this study has demonstrated only further supports this theory. Every single participant involved in the study

experienced an increase in their individual athletic performance due to the strength and conditioning coach they were provided. The importance of providing student-athletes with a strength and conditioning coach that Powers (2008) expresses through his own research is something that this study has also further validated through its findings. The reasoning behind this correlates with the participants being provided more structure and motivation to take part in such a regime during the offseason. Prior to the implementation of a strength and conditioning coach, participants would often skip out on lifts or not push themselves to the levels necessary to experience substantial growth from a physical standpoint. Current NCAA rules and regulations prevent college coaches of a specific sport from working directly with their players outside of their actual seasons so nothing could really be done to prevent this from occurring. As Pensgaard and Roberts (2002) claim in their research, providing a strength and conditioning coach as a resource drastically increases the likelihood of an athlete voluntarily taking such action. This was clearly shown through the findings of this study. By supporting these theories, this research done on the impact a strength and conditioning has on the individual athletic performances of intercollegiate student-athletes will hopefully positively impact the decisions other colleges or universities make when it comes to deciding whether or not to provide their own student-athletes with such a resource.

Threats to Validity

The main threat to validity that the researcher concluded was the sample size used in the study. In comparison to the total number of intercollegiate male soccer players in the United States, the sample size used in the study is miniscule (>5%). According to data collected from the 2016-2017 school year, just under 40,000 males participated in intercollegiate soccer across all divisions (“Men’s College Soccer Scholarships Requirements and Facts,” 2017).

A second threat to validity that the researcher concluded was maturation. The group involved in the study consisted of active males between the ages of 18-21 who are still experiencing natural and normal physical growth. Some of the changes from pre- to post-data may be due to these natural and normal changes typically experienced by such a group. It is very much a possibility that some, or even many, of the participants experienced improved individual athletic performance measurements because of this.

Similarities/Differences

The results of the study support Powers (2008) claim that a strength and conditioning coach at the intercollegiate level plays an important role in enhancing the athletic performance of varsity student-athletes. There were no other previous related studies found that directly involved intercollegiate student-athletes nor were there any studies found that made the claim strength and conditioning coaches do not help improve individual athletic performance to some degree.

Implications for Future Research

The results of this study suggest that providing intercollegiate male soccer players with a strength and conditioning coach results in improved individual athletic performances. The study was conducted without a control group in which doing so in future research could either further validate the conclusions drawn from the study or put into question whether an actual strength and conditioning coach is necessary for student-athletes to experience the same growth that the participants within the study experienced. To be more specific, including a control group that is given a strength and conditioning program but not an actual strength and conditioning coach would be a way to do this. As previously mentioned, a larger sample size involving multiple or

many intercollegiate male soccer players and/or teams would be another way to further back the conclusions made during this study.

Conclusion

This study was conducted to determine the impact a strength and conditioning coach has on the individual athletic performances of intercollegiate male soccer players. The results showed that providing intercollegiate male soccer players with such a resource does improve these student-athletes individual athletic performances. Future research should be conducted in order to continue to validate the importance of providing intercollegiate student-athletes with a strength and conditioning coach.

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