

A Workout Program and its Effect on Collegiate Soccer Player's Fitness Level

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ABSTRACT

The purpose of this study was to determine if a new workout program would have an effect on the fitness level of a select group of collegiate soccer players. The goal was to help determine whether these athletes would perform better on the Cooper Test if a workout program were put into place. The null hypothesis, that the new workout program would have no effect on the fitness level of the athletes, was not supported. Research in this area should continue, as there is no clear program or test that best demonstrates the fitness level of a collegiate soccer player.

CHAPTER I

INTRODUCTION

Overview

Collegiate athletics are very competitive, especially in the sport of soccer. Soccer is different from other sports because of the intense demand for physical fitness. Soccer consists of periods of intense all out sprinting, jogging, walking and recovering. It has been estimated that an elite soccer player will run between 6-9 miles a game. Elite soccer players should be able to maintain the same performance level throughout the game (Edwards, Macfadyen & Clark, 2003). A collegiate soccer game is 90 minutes long, breaking the game into two 45-minute halves. Fitness level is key to having the best players stay on the field.

Running and being skillful at soccer are not the only things that lead to the success of a team. Fitness also has to do with the way athletes take care of their bodies. Rest and recovery along with what is put into the body can play a big role in the fitness of an athlete. The mental state of an athlete will also play a role in how physically fit they are. Athletes need to be taught about living a healthy lifestyle and the importance of taking time to rest (Liliana & Alina, 2013).

Setting goals for team fitness and motivation are also important when it comes to collegiate soccer. A team may not be the most skilled or the fastest or the biggest, but if they have heart they will compete. Becoming an elite athlete does have to do with being skillful, as most have uncanny desire, passion and the will to win. Elite athletes eat healthy and get the necessary rest their bodies need. (Schnell, Mayer, Diehl, Zipfel & Theil, 2014). These are some of the internal factors that can help bring a team to success.

In collegiate athletics there are several forms of conditioning drills or fitness drills

that coaches use to get the most out of their players. However, for soccer it is tough to perform a drill or recreate a scenario that matches the 6-9 miles of running averaged in a game. Fitness is such an integral part of the game of the soccer that the researcher wanted to see if a newly created workout program that incorporates running, lifting and rest would affect the fitness level of collegiate soccer players.

The Cooper Test has been used and trusted the most as the main fitness test that best replicates a soccer game. The focus of this study is to use an implemented workout program to determine if it has a positive effect on the fitness level of a college soccer team.

Statement of the Problem

The purpose of this research is to examine the effect of how a new workout program affects the fitness level of a college soccer team.

Hypothesis

The null hypothesis is that a workout program will have no effect on the fitness level of a college soccer team.

Operational Definitions

The independent variable is the *new workout program*. The new workout regime consists of different running and lifting exercises to help build up the team's fitness level. This included three days of running on Monday, Wednesday and Friday.

The dependent variable was the *fitness level* of the soccer team. The fitness level of the soccer team was judged by their times on the Cooper Test. The Cooper Test is a common running test used to determine the fitness level of a soccer player.

CHAPTER II

REVIEW OF THE LITERATURE

Overview

The goal of this literature review is to explore how a workout program will affect the fitness level of a collegiate soccer player. The first section will discuss the importance of setting goals and following through with them. The second section will explore why fitness is important in athletics and the various ways it is used. Section three presents information about the motivation and desire that comes along with being a college athlete and striving to meet desired goals. Lastly, section four will discuss achieving goals set by the team or by individuals and how that translates into success on the field.

Setting Goals

The concept of setting goals can be helpful in not only sports but in everyday activities as well. Goals are set to give a sense of hard work to the person who is working toward that goal and a sense of achievement when it is reached. There are two types of goals: mastery goals and performance goals (Stoeber & Crombie, 2010). Mastery goals are also known as task goals. Performance goals are also known as ego goals. However, in recent years psychologists went even further to break down goals. Performance and mastery goals have now been broken down into performance approach, performance avoidance, and mastery approach and mastery avoidance. Performance approach goals are when one is trying to do better than others. A performance avoidance goal is when a person strives not to do worse than others. A mastery approach goal is striving to master a certain task. Mastery avoidance goals are trying to avoid doing worse than someone else has done previously.

A study was conducted using physical education students as they were trying to investigate training performance goals and training performance. The students were assigned to three goal conditions, a performance approach goal condition, a performance avoidance goal condition and a mastery goal condition. Their task was a dribbling basketball exercise. The end result was that students who pursued performance approach goals performed better in the dribbling activity than those who pursued the other two goal conditions. Another study from Stoeber and Crombie (2010) showed the approach vs. avoidance orientation when it comes to a more competitive setting. Athletes who are more motivated to perform better than others rather than not performing worse than others are more likely to perform at a higher level. This researcher goes on to say that some individuals will exceed the performance of their personal best. When setting goals it seems more advantageous for the athlete to focus more on setting the performance approach goals and less on the performance avoidance goals. The fear of failing is more important than the hope of succeeding.

Setting goals can be very hard for athletes as they strive to perform at the highest level possible. Setting a goal that is believed to be vague or too easy could lead to lesser performance. Locke and Latham (1985) break down setting difficult goals. First, specific goals can help lead to better performance. Setting short-term goals can help facilitate the eventual achievement of long-term goals. Goals affect performance by effort, persistence, and direction of attention. Feedback is crucial in helping attain a goal as one can track their progress. Lastly, goals must be accepted if they are going to affect performance.

Setting specific goals has been linked to better performance as an end result. Just making the goal of “do your best” goes back to the performance avoidance approach that Stoeber and Crombie (2010) described. As goals get more sport specific, athletes can

start trying to achieve their goals or put in the work necessary to achieve the goals during practice. Locke and Latham (1985) use weight training as an example. While weight training, an individual can set a specific goal of how much weight they want to lift by a certain time and how many reps they want to lift it. In soccer, an athlete can set stamina goals to increase cardiovascular capacity. For example, running a seven-minute mile pace for the first mile and then increasing that pace for the second mile is a true test of cardio fitness.

Importance of Fitness

The importance of fitness and physical activity is instilled in today's youth at a very young age. This is done mostly by parents or physical education (PE) teachers. A quality PE program, especially a high school PE program, sets the student up for life with the knowledge for living a healthy life-style. An example of a goal from the Alliance for Health, Physical Education, Recreation and Dance – “demonstrates the knowledge and skill to achieve and maintain a health-enhancing level of physical activity and fitness” (Barney, Pleban, Wilkinson & Prusak, 2015, p. 279) - suggests that teenagers are given the tools to continue with their physical fitness after they leave high school. According to the U.S. Department of Health, which released guidelines for adults, “Current guidelines are that youth engage in 60 or more minutes of moderate-or vigorous aerobic intensity at least 3 days a week” (Barney et al., 2015, p. 279).

Knowing the proper way to treat your body and stay in shape can be very beneficial especially in intercollegiate athletics, where most teams have pre-season fitness or strength tests to see how much individuals have kept up with their workouts. Barney et al., (2015) bring up a valid point regarding social learning theory and continued fitness. Social learning theory states that humans are always learning from one another

whether it is by observing or participating in certain behaviors with those that are similar to their age. The more students are exposed to at a young age, especially in PE class, will help them learn and figure out what they like and do not like. These children will also start to develop the skills for physical fitness and the greater likelihood they will continue to live a physically fit life.

Soccer consists of periods of intense all out sprinting, jogging, walking and recovering. It has been estimated that an elite soccer player will run between 6-9 miles during a game. Elite soccer players should be able to maintain the same performance level throughout the game. However, this can be affected by the player's fitness level, attitude, motivation and environment. A study has shown that the distance traveled by a soccer player from the first half to the second half of the game decreases by 9% (Edwards et al, 2003). There had been several tests to try and replicate the running period endured in a soccer game but none of has been deemed the same. These researchers conducted a study to try and see if one specific fitness test would be able to differentiate elite level soccer players from recreational level soccer players. The sample consisted of 13 elite soccer players contracted to a professional team and 10 recreational soccer players drawn for the university population. The participants went through numerous types of sprinting tests, where their heart rate and blood level was being monitored as well as their overall performance. The results concluded that the elite soccer players had significantly enhanced test performance when compared to those of the recreational soccer players.

Fitness plays a significant role in the sport of soccer. Running economy is the defined as the relationship between oxygen consumption and the velocity of running (Burgess & Lambert, 2010). This was being tested in the experiment above. Runners with good running economy have greater oxygen consumption as they are performing at a

higher level. Marathon runners typically have this running economy as they are able to run marathons at constant speed without getting overly tired. It has been shown that trained endurance runners tend to have better lung capacity than untrained endurance runners. Certain athletes can perform at the highest level for a longer period of time than an average person because their body is disciplined.

Being physically fit does not just pertain to being in good shape or being able to lift a lot or run fast. Fitness also has to do with the way athletes take care of their bodies. Rest and recovery along with what is put into the body can play a big role in the fitness of an athlete. The mental state of an athlete will also play a role into how physically fit they are. Athletes need to be taught about living a healthy lifestyle and the importance of taking time to rest. A common misconception is that the only way an individual will become more fit is if they work out every single day. The body needs recovery days and proper hydration and nutrition so that the individual is getting the most out of their body (Liliana & Alina, 2013).

Motivation and Desire

“Champions, are naturally selected. They begin at their own level, and Lance was at that level, for sure”-Dr. Michele Ferrari, commentating on the first time he conducted physiological test on a young Lance Armstrong (Brutsaert & Parra, 2006, p. 110). A lot has transpired since then as Lance Armstrong has recently come out and admitted to using performance-enhancing drugs (PEDs) during his unprecedented Tour De France title run. However, it still leaves the question, what makes a champion? Genetically gifted children can be identified at a young age and begin training to become the next super athlete.

Not all athletes are born genetically better than others as athletes are just

determined and will not accept losing as an option. Social interaction with others plays a key role in the extrinsic motivation for an athlete. Extrinsic motivation is the external factors that motivate an individual. This can be teammates, pressure or parents. Athletes who tend to have a lot of support from others, whether it is teammates, parents or coaches tend to have higher self-esteem and belief in themselves. On the contrary, those athletes who do not have a support system or anyone motivating them tend to get burned-out or feel lack of motivation.

Athlete burnout is a multidimensional psychological syndrome characterized by the emotional and physical exhaustion from the stresses of playing sports (Defreese & Smith, 2013). Praise from other teammates can be used as motivation for that athlete to keep on working hard. Competition can also serve as extrinsic motivation to an athlete as they want to do better than their teammates, which again goes back to the performance approach goals in the beginning of this review. Athletes tend to lose the focus or confidence in themselves when they do not feel any extrinsic motivation. They do not have the same feeling of desire to succeed as the individuals who are pushing themselves and not giving up.

A key to winning is making sure everyone on the team is on the same page. A team may not be the most skilled or the fastest or the biggest, but if they have heart they will compete. Becoming an elite athlete does not just have to do with being skillful, as most athletes have an uncanny desire, passion and will to win. Elite athletes rarely smoke, eat healthy and get the necessary rest that they need off the field. However, on the field these athletes lay it all on the line for the sake of winning. Some put themselves in harm's way for the sake of winning and for their teammates. That shows great passion and desire for not only their team but for their sport as well. Putting their bodies on the

line is what truly makes a great competitor and someone will always have a desire to win (Schnell, Mayer, Diehl, Zipfel, & Thiel, 2014).

Achieving Goals

College athletics have been growing every year; now there are over 250,000 student athletes competing in intercollegiate sports. With the increase in intercollegiate athletics, also comes the increase in the pressure to win. Division I and Division III teams have different standards as Division III is more focused on the overall college athletic experience while Division I is focused on winning. More and more schools are putting greater amounts of money into athletics including, weight training and physical fitness. The common theme for all the money being spent in athletics is the hope that end result will be winning (Matuszczak, 1990).

When taking on any task in life, the more confident a person is the more likely they are to get a grasp on that task. The same can be said when talking about sports as confidence helps players distinguish themselves. In a study conducted by Heper, Yolacan and Kocaeski, (2014) the researchers tried to find out if the confidence level of soccer player's change depending on what level soccer they play. The results did indeed show that the higher the level of soccer the more self-confidence the specific player will have. When it comes to fitness, players that play at a higher level of soccer tend to have higher self-esteem and therefore will most likely perform better. This is in contrast to those players who play at a lower level of soccer and tend to have a lower level of self-esteem. Confidence will put a team in a better position to win, which is the main goal of completion.

Mental imagery is the "process of imaging the performance of a skill with no related overt actions" (Jones & Stuth, 1997, p. 101). Many athletes use mental imagery as

a relaxing way to help calm themselves before a big game. An athlete can build a routine of mental imagery that will help rest their nerves. For the athletes who set performance approach goals, mental imagery can help them cognitively picture their goal. Mental imagery allows the athlete to step away from all the distractions and envision the specific activity or goal that they are trying to achieve. After achieving their goal through mental imagery, they start to have the belief they can attain this goal in reality.

Conclusion

In summary, fitness is very important when it comes to sports. There are different types of fitness tests to see how physically fit a player is, but the only way to really find out is to see how quick they get tired during a game. One can draw a conclusion that a player that is fit will be able to stay in the game longer and perform at a higher level for longer. If an entire team has that type of fitness level, they should be able to outlast the opposing team with their fitness. To stay physically fit, it is not only about working out. There are several other factors that come into play such as motivation, desire, diet and the mental toughness of the player. All in all, elite athletes will be defined by how they perform when it matters most.

CHAPTER III

METHODS

The purpose of this study is to examine the effect of how a new workout program affects the fitness level of a college soccer team. This research rejected the null hypothesis.

Design

The study used a quasi-experimental pre/post-test design to compare the fitness level from last year's Cooper Test of the players with this year's fitness level, after going through a new fitness regimen. This program was implemented over a period of about six weeks. The dependent variable was the fitness level of the men's soccer team, and the independent variable was the new workout program, which consisted of different running and lifting exercises to help build up their fitness level.

Participants

There were twenty-three total participants from a convenience sample. They were team members of the men's soccer team at a Division III institution in a suburban area in the mid-Atlantic region of the United States. These athletes were sophomores, juniors and seniors.

Instruments

The instrument in this study was the times for each player in the Cooper Test. There are records of the results of the Cooper Test from last year for each member of the

team. The Cooper Test is a common running test used to determine the fitness level of a soccer player. The test consists of each player running two consecutive miles in under twelve minutes. Each player's time will be documented by using a stopwatch and then writing down their time in a notebook and immediately copying it into the already created excel file. The test may be reliable but not necessarily valid. A soccer player may be able to run two miles in under twelve minutes but can still get tired throughout the course of the game. However, the test may not be reliable necessarily to college soccer teams as a whole because there may be different results with different teams.

Procedure

The new fitness program was administered to the team on Tuesday January 26th and was conducted for six weeks. Every Monday and Wednesday the athletes have a specific running assignment that they can perform on the treadmill. The speed for which they ran on the treadmill and the length of time is provided for them. Tuesday and Thursday will be circuit workouts, where the athletes will perform different lifting exercises at a high tempo without much rest in between. Lastly, on Friday, the athletes have to go for a 30-35 minute run at their own pace as a recovery for the week.

Each week the workouts would become harder, whether it was raising the amount of weight they are lifting or increasing the speed on the treadmill all in preparation for the Cooper Test. The fitness program was designed to build the endurance and stamina of the team and each individual player.

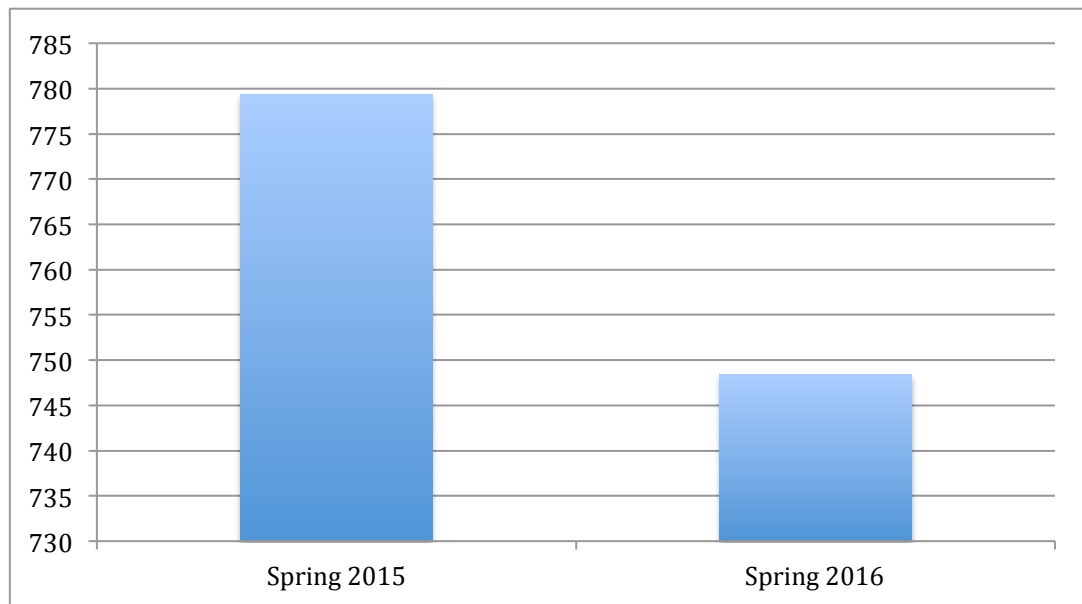
CHAPTER IV

RESULTS

The purpose of this study was to examine the effect of a new workout program on athletes' fitness level determined by the Cooper Test. The times of the Cooper Test were analyzed based on comparing the times from the spring 2015 semester to the times in the spring 2016 semester. The Cooper Test times in minutes were broken down into seconds for analysis. The mean score for spring 2015 was 779.4 (SD=62.7), which decreased in spring 2016 to 748.4 (SD=51.1). The spring 2016 Cooper Test times were better than the spring 2015 Cooper Test times, $t(13)= 3.68$, $p < .05$.

Figure 1.

Mean Cooper Test Results for Spring 2015 and 2016



CHAPTER V

DISCUSSION

The results for this study failed to support the null hypothesis that proposed that the new workout program would have no effect on the athlete's fitness level. The results showed there was a significant difference between the spring 2015 and spring 2016 semester Cooper Test results.

Implications of the Results

The results demonstrate that the sample athletes were positively affected by the new workout program. There was an increase in some of the athlete's Cooper Test results; those increases were statistically significant. As far as implications of the Cooper Test, it is safe to say that the findings from this study supported the Cooper Test. In spring 2015 only two athletes passed the Cooper Test with their final times under twelve minutes. In spring 2016 five players passed the Cooper Test with their final times under twelve minutes. As seen in the Figure 1 (presented in Chapter IV), the majority of the athlete's times decreased, which implies that the team as a whole was more fit than in spring 2015.

Theoretical Consequences

From a theoretical standpoint, this study suggests that the new workout program has a positive effect on the fitness level of the athletes. It appears that athletes do need some sort of workout program in the off-season to help them achieve their required fitness level in collegiate soccer. It is very rare that a non-collegiate soccer player could have performed better at the Cooper Test than those the athletes that participated in this study according to the study done in the *Journal of Sports Medicine and Physical Fitness* (Edwards et al., 2003). In that study, 13 elite soccer players and 10 recreational soccer

players, which were drawn from a university, were put through various amounts of testing. These tests were fitness-based tests that measured heart rate, recovery speed and overall performance. The 13 elite soccer players scored well above the 10 recreational soccer players in every category. This shows that the elite and collegiate soccer players that were given a specific soccer fitness and strength workout and followed it can achieve better results in the Cooper Test. However, those athletes who did not follow the program did not beat their previous spring 2015 times and did not achieve their maximum fitness levels.

Threats to Validity

There were several factors in this study that could have compromised the validity of the results. First, the researcher is not an expert in the field of physical fitness or weight training. It is possible that the workout program created was not constructed properly. Another concern was that the researcher was only there for three of the five days each week of the workout program. This meant that it was the responsibility of the 17 athletes to do the required workout for that day on their own. It is possible that some of the athletes did not do the workout those days.

Another key concern for this study was that there were two athletes that did not perform the Cooper Test in spring 2015 and spring 2016 because they were injured and therefore their results could not be recorded. There were a total of 17 athletes that started the Cooper Test in spring 2015, however only 15 of those athletes finished the test. Two athletes did not finish the test because of injuries that occurred during the test and therefore their results were disqualified from the study. In spring 2016, there were a total of 17 athletes that started the Cooper Test. However one was injured during the test and did not finish; therefore, his results were not valid. The other two athletes who did not

finish in spring 2015 but did complete the test in spring 2016 also had their times disqualified as well, which could have impacted the validity of the results.

Connections to Previous Studies/Existing Literature

There haven't been many studies done on this topic specifically; however, there have been studies on the importance of fitness for a soccer player. For example, there was a study done to show how many miles an average soccer player runs during the length of a game. Soccer is a game of constant movement for 90 minutes and the study showed that an average soccer player runs anywhere from 6-9 miles during the length of a game (Edwards et al., 2003). This shows the importance of fitness of an athlete when it comes to soccer. The study also showed that the distance traveled between these players also declined 9% from the first half to the second half. This indicates that at the end of soccer games is where fitness is the most important because everyone is exhausted. Proper training can help athletes reach their maximum fitness level to succeed at the end of games.

A common misconception of athletes is that they need to work out every single day to attain their maximum fitness level. However, in this study, the researcher does give the athletes two days off to recover, as it is very important. Liliana and Alina (2013) spoke of the importance of recovery for competitive athletes. It is not beneficial to the body to work out every single day. Diet and hydration also play a huge role in an athlete achieving their maximum fitness level, as athletes need to be replenishing what they are sweating out. With a proper nutritional program as well as a workout program, it is possible that the athletes in this study could have had better Cooper Test results.

Implications for Future Research

There have been several studies on what workout programs will help athletes reach their maximum fitness level. However, there have not been many studies specifically focused on the fitness level for a collegiate soccer player.

Future studies could use a similar intervention that was used in this study; however, the sample size should be larger and the sample selection should be different. The fact that there was a limited sample size and that it was from a small liberal arts college in the Mid Atlantic could have affected the results. The workout program itself could be modified or changed as a longer program could affect the results. There also could be a different test used to verify the fitness level of the athletes instead of using the Cooper Test.

Future research should be conducted with athletes from all three divisions: Division I, II, and III. This would allow for a direct comparison between the Cooper Test results among athletes at the different collegiate soccer levels.

Conclusion/Summary

Fitness level will always play a role in the game of soccer, especially at the collegiate level. This study rejected the null hypothesis and indicated that for Division III athletes, the new workout program positively affected their fitness level. Although this study provided valuable information about the fitness level of collegiate soccer players, more research could be conducted to determine other ways or programs that can help soccer players achieve their maximum fitness level.

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