ATHLETE PERCEPTION ON IMPORTANCE AND IMPROVEMENT

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Introduction

There are many studies that support the need for proper training programs within athletic endeavors, as well as, studies that focus on performance improvements amongst athletes. Like in any sport there are specific trainings that need to be done in order to have the fitness level and athletic ability to play that sport. For soccer, this is a mixture of many athletic abilities, such as endurance, speed, agility, strength, and power. This paper, however, is not looking at the scientific evidence behind the workouts but the actual people who are enduring these workouts and their perceptions of these workouts. This study will look at the players preparedness for competition, after going through the off-season training programs, which include weight training, running, and field sessions. The main questions at hand are, does weight training, endurance running, and speed/agility training contribute to better performance? Also, do athletes believe that weight training, endurance running, and speed/agility training are all important to the sport of soccer?

For the purpose of this paper, athletic performance is broken down into aspects relating to soccer players. This paper is not looking at the statistical data of improvement but the athletes perceived improvement and importance in these areas of training. Athletic performance for soccer consists of speed, agility/quickness, endurance, strength, and technical skill. Speed meaning their top speed over 15 or more yards. Agility/quickness means any lateral or explosive movement under 15 yards. Endurance is prolonged running for 10 or more minutes. The strength portion is looking at the weight that they lift and the added weight as training goes on. Lastly, is their technical skill, such as passing, dribbling, receiving, and individual possession of the ball.

Since the research was done at an NCAA sanctioned school there are certain rules that each college must adhere to in their off-season. All NCAA Division II programs are held to specific guidelines of when and how much they can train. This includes what kind of trainings are allowed and how many hours they are allotted each week. The NCAA 2017-18 Division II manual defines the following trainings in section 17.1.6.3.1 (c) as such:

> *"In fall championship sports, from the beginning of the institution's second term of the academic year (e.g., winter quarter, spring semester) through the day before the institution's declared start date of the non-championship segment, a student-athlete's participation in weight training, conditioning, team activities and/or skill instruction shall be limited to a maximum of eight hours per week, of which not more than two hours per week may be spent on team activities and/or skill instruction"(p. 206)*

This clearly outlines the specific trainings that are allowed for each team, along with the specific hours they can train each week for the first portion of their spring semester. During the Nonchampionship Segment Activities in section 17.9.8 (b):

> "*During the nonchampionship segment in which the NCAA championship does not occur, student-athletes may participate in any practice or competition activity as permitted by other legislation provided such activity is restricted to a period of 45-consecutive calendar days"(p. 228)*

During this portion of the spring season players are able to train three days a week on the field and the other two days a week can be used for any other activity chosen by the coaches.

I have particular interest in this research because I was a collegiate athlete and I am pursuing coaching at the collegiate level after my schooling. I was a soccer player for 20 years, five of those years being at the collegiate level. Soccer, for me, was only based off playing and training as much as possible with the ball, however, once at the college level there was a lot more behind the scenes then just playing soccer. I was introduced to weight training, fitness tests, running programs, and short periods of playing during particular parts of the year. I did not understand why I was doing these activities at first; it was not until I was older and in my last years of college that I realized the benefits of these trainings. This realization of benefits I contribute to my major, which was Kinesiology, the study of human movement. I knew the evidence behind programs like weight training and running because I learned about these areas in my major classes, however, many of my teammates had a hard time connecting these trainings to the actual game. As a future coach, I want to know the reasoning behind this disconnect, why do soccer players feel that these trainings do not relate to the game? Is it a lack of evidence and understanding, or is it that they feel it is a waste of time because they should be on the field training? How can I, as a coach, bridge the gap between the players and the importance of these activities?

Literature Review

Characteristics of Soccer

Soccer is a sport that is a combination of two systems of fitness, aerobic, which is endurance based, and anaerobic, which is short lasting high intensity activity. According to Meylan et al. (2010) “soccer is characterized by repetitive intermittent bursts of activities during which forceful and explosive actions, such as sprinting, jumping,

tackling, turning and changing pace are occurring". As Bradley et al. (2009) state, soccer also includes "periodic bouts of repeated high intensity runs (HIR) and sprints occur causing temporary fatigue and reduced performance, and may be crucial in the final minutes of soccer matches" (as cited in Nedrehagen and Saeterbakken, 2015). The two quotes above represent the anaerobic system, for soccer the "anaerobic performance can be broken down into its various components that include muscle strength, speed, power, anaerobic capacity and 'repeated sprint ability'" (Carling, 2009). The aerobic system is also prevalent within soccer, as soccer games run for 90 minutes in total, and in college games if there is a tie there could be an additional 30 minutes of play. For soccer, this means a "high level of aerobic fitness helps to sustain the work rates associated with team play, supporting teammates, running off the ball, and chasing opponents to regain possession" (Carling, 2009). This clearly illustrates that the game is made up of much more than technical skill, especially even more so for the college game, where the season only runs for three months in the Fall. This grueling season includes two games a week with one day of rest in between, which increases the chance of injury and muscle fatigue. How do these areas, strength training, endurance running, speed/agility training, fit into the soccer program and help the athlete with their performance?

Purpose of Strength and Conditioning

Karsten et al. (2016) found that including a 6-week upper and lower body strength training program with soccer trainings increased the athletes performance in 30-m sprint tests and in interval running tests. Strength training is essential for soccer performance, as Spiteri (2014) states "enhanced lower body strength has … excellent

transference to agility performance, vertical jump height, and the ability to accelerate" (as cited in Swinnen, 2016). Along with this, "stronger players have also a greater ability to maintain a high level of force production and power output toward the final stages of the game due to the positive relation between strength and muscular endurance" (Silva as cited by Swinnen, 2016). Strength training does help with muscular endurance, sprint and agility, and power, however, this can not be the main emphasis as there also needs to be conditioning added to trainings throughout the week. The purpose of conditioning in soccer is to help players with their aerobic capacity, especially since there is an increase in "aerobic contribution during repeated sprint activities" (Spencer et al., 2005, cited in Carling, 2009). Jimmy H. Ishee and Boyd Foster (2003) did a research study on aerobic endurance and its importance to training for soccer. Ishee and Foster focused on the VO2max (maximal oxygen consumption) of players and found that a "player with an improved VO2max has enhanced potential to cover longer running distance at a higher intensity" (p.8). They also discovered that "during a match, the training group also increased the distance covered by 20 percent, doubled their number of sprints, and increased their number of involvements with the ball by 24 percent" (Ishee and Foster, 2003, p. 8). This research does not state how many times matches were observed and recorded, however, it does show that aerobic endurance training can contribute to better athletic performance. Due to the restrictive rules of NCAA, outlined in the introduction, coaches are forced to use long distance running routines that require 3-5 miles of running around a track. Hoff et al. (2002) found that "High intensity, aerobic, endurance, interval training can be carried out in a more soccer specific way than plain running", which supports a more soccer specific

workout, but also shows that the endurance/aerobic capacity is important to involve in a training program. Training high intensity on the field may also appeal more to the athlete as opposed to track running. While all the research supports the need for strength training and a combination of endurance and sprint training, do the athletes believe that these trainings have an overall affect to their performance?

Athletes Perception

Obviously, there is no doubt about the importance of strength training, endurance training, and sprint training to the game of soccer. Performance tests are necessary for helping coaches evaluate their players and programs but also player perception on trainings will help coaches evaluate their program and show the effectiveness of their trainings. The most crucial question is, how does the athlete rank these areas as important to their sport? Unfortunately, there are not many studies that cover this area of athlete perception; there were only two studies done so far, one in 2003, which was not available, and one in 2017, titled *Perceptions of NCAA Division I Athletes on Strength Training* by Joni M. Boyd, Ashley M. Andrews, Janet R. Wojcik, and Charles J. Bowers. Joni M. Boyd et. al. (2017) surveyed seven different teams, with a total of 123 student athletes, at a Division I program to determine the "student athletes' perception on the importance of strength training in relation to sport-specific training". Boyd et al. (2017) found that "Men's soccer was significantly more likely to disagree with 'strength training is essential to my overall development as an athlete' and 'strength training has beneficial effects on my performance". According to Boyd et. al. (2017) "Men's soccer and women's softball seem less convinced of the effectiveness of their strength training program" and they did not perceive many positive outcomes as related to their

sport performance. Since there is limited research done in this area, it is important to find out what the student athlete thinks of the program they are in. This information will better inform coaches as to what their players need and how effective their program is. Another important outcome from this research (if athletes do not view these training areas as important to their sport) would be that coaches could use this information to inform athletes the benefits of strength training, endurance running, and speed/agility training to their sport.

Methods

This research was conducted at a Northern California State University, Sonoma State University, and with the Sonoma State Men's Soccer program, who is a NCAA Division II program and a part of the California Collegiate Athletic Association. The participants were 13 male soccer players, whose ages range from 18 to 22. The majority of players have been through a running and strength program before under Sonoma State coaches, with only three freshman players and three transfers who have not. The players went through three different phases within the off-season training program, which were developed by the soccer coaches and the strength and conditioning coach. Phase 1 includes weight training that focuses on form and specific lifts for lower body muscle groups; along with endurance running on the track. Phase 2 consists of weight training, again more specific to lower body muscle groups, but adding in a combination of lighter weight days and heavier weight days; along with sprint and agility/quickness training on the track. Phase 3 includes weight training that focuses on lighter weights with more full body workouts that utilizes mostly body weight, along with more recovery trainings in

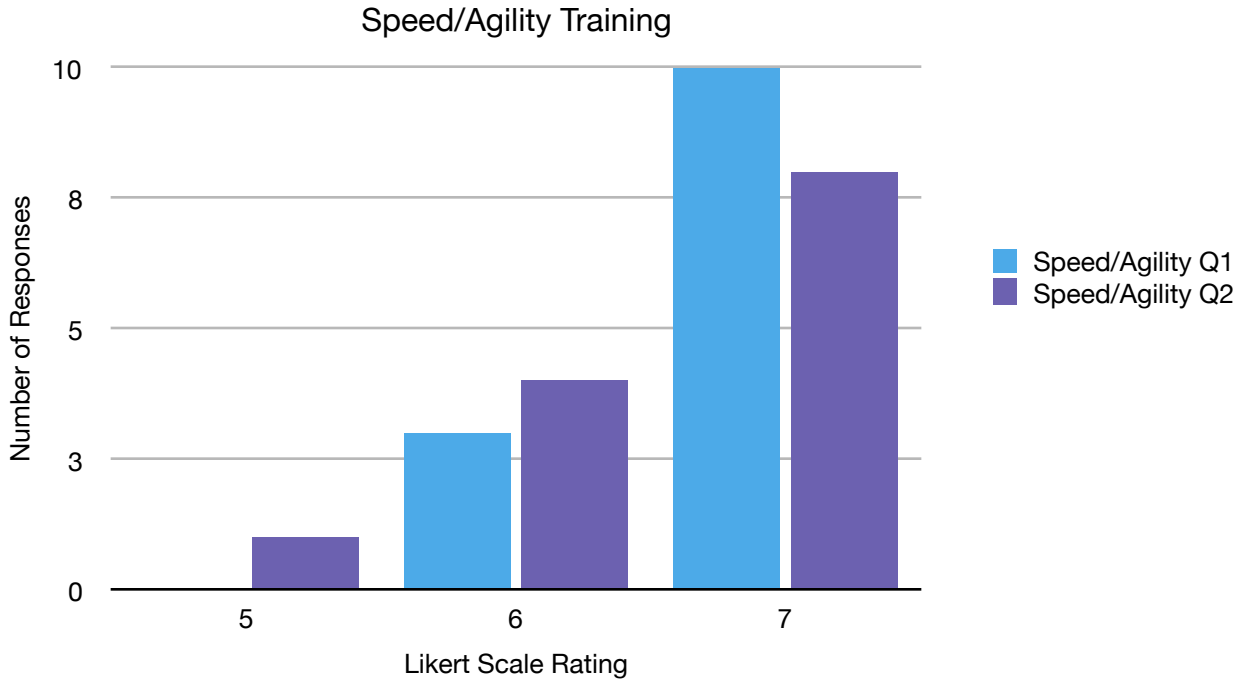
the weight room; field days were also present in place of running, which includes running and playing during games and drills.

The data for this study was collected through a questionnaire, that was given to the players in a classroom. Each player answered questions on a number based scale from one to seven; one being strongly disagree and seven being strongly agree. They were asked about their perceived improvement and perceived importance based on weight training, endurance running, and speed/agility training. The players also had hand-written responses to questions that focused on ranking trainings (weight training, endurance running, field day, speed/agility, mental training) from one, most important, to five, least important. The players were also asked about the endurance and weight training programs they went through this spring; the players were questioned about the organization of these programs, as well as, the pros/cons of each program. Lastly, the players were asked about past trainings and past athletic ability and if the spring workouts helped improve their performance now.

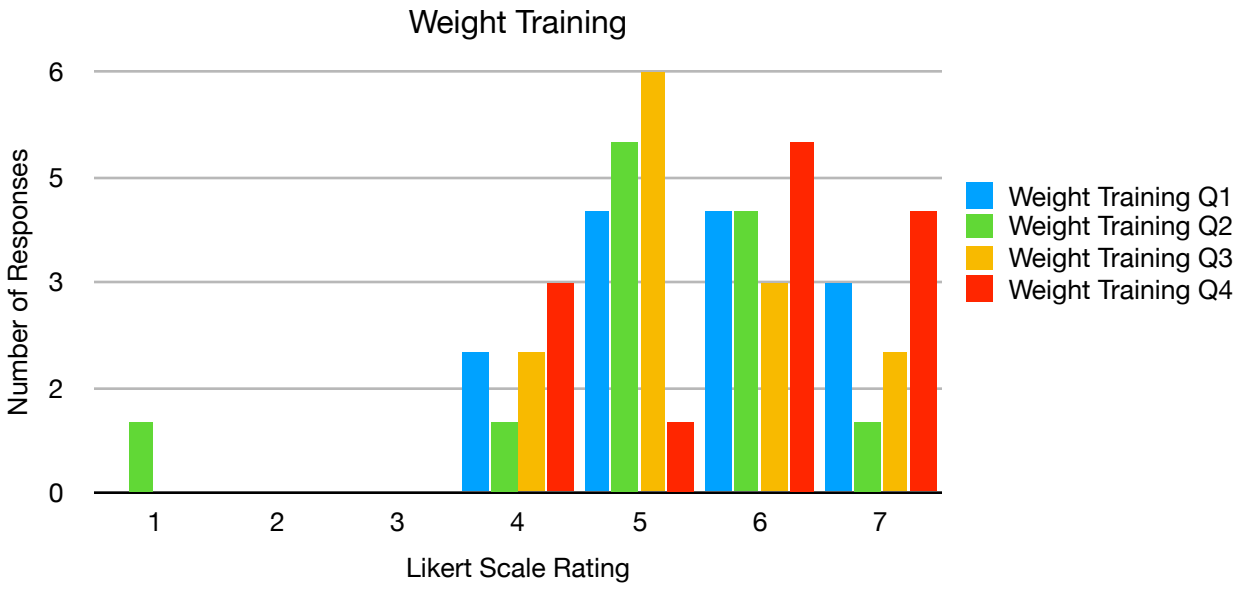
Findings

Out of an 18 player spring roster for Sonoma State Men's soccer team, 13 players completed the questionnaire in person. After receiving the data, I put the questions into categories depending on training types; for all scale based questions they were split into groups and graphed separately: two endurance training questions (endurance Q1, Q2), two speed/agility questions (speed/agility Q1, Q2), and four weight training questions (weight training Q1, Q2, Q3, Q4). After graphing the Likert scale questions, I analyzed the written questions particularly question one, which was ranking trainings in order of importance to the sport. I also looked at question two and question three,

which asked if the endurance running and weight training programs were well organized and what the pros/cons of each program were; from question two and three I looked for commonalities in answers relating to pros/cons.

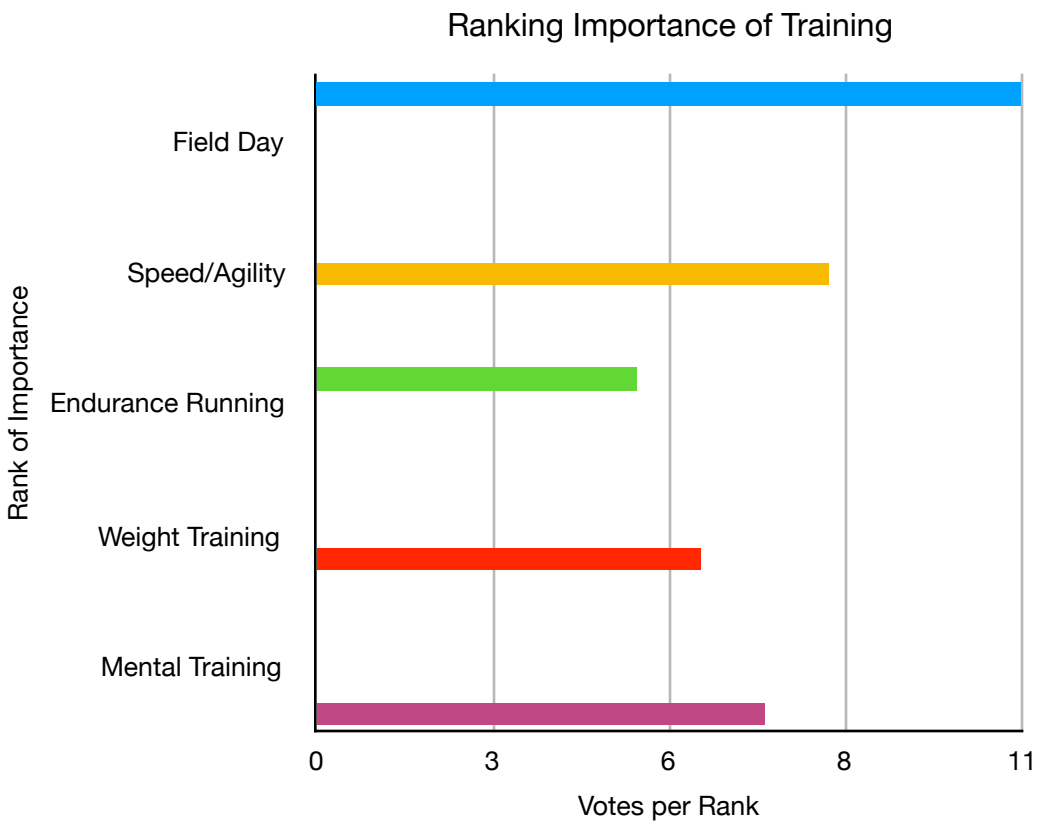


The graphs above represent the endurance training and speed/agility training data. Question one for both graphs (Endurance Q1 and Speed/Agility Q1) asked if these trainings were “important for my sport”; the majority of players felt that these trainings were very prevalent to the sport and all responses were above a five, with the majority of votes landing in the seven “strongly agreed” category. The second question (Endurance Q2 and Speed/Agility Q2) asked the players if these trainings “helped me with my performance; again majority of players felt that these two categories were very beneficial to performance.



For the questions pertaining to weight training there were four questions in total that the payers were asked. The first question (Weight Training Q1) asked if “Weight training was important for my sport”; the question received varied responses between a rating from four to seven. Some players felt that weight training was not that important for the sport ranking it as either “neither agree nor disagree”, while some players “strongly agreed” with the importance of weight training. Question two (Weight Training Q2) asked if “Weight training helped me prevent injuries”; again varied responses

amongst this question, but the majority ranking a five or six. Question three (Weight Training Q3) asked players if “The weight training was specific to my sport”; majority “agreed” with this question, ranking it a five out seven. Question four (Weight training Q4) asked if “The weight training helped me with my performance”; majority of players ranking a six or seven for improvement to their performance due to weight training.



On the written portion players were asked to “Rank the following types of training in order of importance to your sport’s performance”. The graph above show the votes per category and ranks the activities from most important to least important based on the players responses.

Pros:

- Endurance:
  - Increase in endurance
  - Feel healthier
  - Able to play longer in games
- Weight Training:
  - Increase in strength
  - Increase in quickness/ agility
  - More confidence

Cons:

- Endurance:
  - Not directly correlated all the time
  - Injury / Bad track
- Weight Training:
  - Easy to get injured due to schedule
  - Early mornings (6:30am)
  - Increase in soreness / injury

When looking at question two and three from the written portion of the questionnaire players were asked to give a written response about the pros/cons of endurance running and weight lifting. There were commonalities between many players for both pros/cons in endurance running. Under the pro category, players stated that they had an increase in endurance, which allowed them to play longer minutes for games, and they felt healthier. Some of the drawbacks for the endurance category were that not all of the endurance running related to the sport directly and that they were possibly more susceptible to injury. For the weights portion, under the pro category, players stated that there was an increase in strength and quickness and they felt more confident. The cons were that they felt it was easier to get injured due to a busy schedule and early morning trainings. They also felt an increase in soreness and possible injury.

Discussion

The purpose of this study was to find out the athletes perception on the trainings they are going through. The two main questions are; does weight training, en-

durance running, and speed/agility training contribute to better performance? As well as, do athletes believe that weight training, endurance running, and speed/agility training are all important to the sport of soccer? The study was done at Sonoma State University with the Men's soccer program during their spring training season. Hoff et. al. (2002) describes the scientific characteristic of a soccer game as such; "Because of the length of a soccer match, at least 90% of the energy release must be aerobic (1); during a 90 minute match, players run about 10 km (2 3) at an intensity close to anaerobic threshold or 80-90% of maximal heart rate.". When looking at the 13 responses on perceived importance and improvement from endurance training and speed/agility training the majority of players would "agree"/"strongly agree" with the statements for these two categories of training as important and necessary for soccer performance. When looking at the pros/cons of endurance running, majority of players felt that they had an increase in endurance, which directly correlated to being able to play longer minutes during games. Players, however, did not always feel that all endurance trainings were related to the sport and that some of these trainings could contribute to injury.

When players were asked of the importance and improvement in performance from weight training to the sport of soccer there were more varied responses from "neither agree nor disagree" to "strongly agree". Boyd et. al. (2017) had similar findings, with Men's soccer disagreeing with the statement that "strength training is essential to my overall development as an athlete". Contradictory to the Boyd et. al. article was the players perceived effect of weight training on performance; Boyd et. al. (2017) found that Men's soccer was more likely to disagree with "strength training has beneficial ef-

fects on my performance", however, in this study 9 out of 13 players said they "agree" or "strongly agree" with the statement "The weight training helped me with my performance". When looking at the pros/cons for the weight training program, the commonalties that occurred were; increase in strength, increase in quickness/agility, and more confidence. Where as, Boyd et. al. (2017) found that Men's soccer were "much more likely to disagree with almost all of the positive outcomes of strength training as they relate to sport performance". Both studies found that Men's soccer did not strongly see the relevance of weight training for soccer. In this study, on Sonoma State Men's program, the players did agree with the benefits on performance in weight training, which raises the question, why do these players see the benefits as compared to the Boyd et. al. study? Is it due to the coaching staff instruction and information on weight training?

Implications

After reviewing the data, it is apparent that players realize the importance and improvement in performance from endurance training and speed/agility training for soccer. Endurance and speed/agility seem easy to relate to the game because they are built in to aerobic and anaerobic definitions of the game. The weight training seems to be the most difficult to relate for soccer players to the game. This data can help coaches and strength and conditioning trainers in three ways. First, coaches can gain insight from their athletes on what activities are beneficial for them as a player and what activities the players want to see more of during training. Second, this data can help coaches evaluate their training activities and make sure they are setting their players up for the most success in their sport. The third area this data is beneficial in is helping the players understand the purpose of these trainings. This can help coaches bridge the

gap for players who do not see endurance running, speed/agility training, and weight training as important. Coaches and strength and conditioning trainers can provide information to the athletes as to why these activities will help them perform better and how these activities will help prevent injuries.

Limitations

Due to the low number of responses and only using one team for the study the information in this study can not be generalized for all programs, sports, and athletes. In order to get a better idea of perceived importance and perceived improvement to the sport there would need to more players involved and potentially more programs from other universities to get an overall consensus for the sport. There was also a time restraint that the information had to be obtained within, which meant that the players had to take the questionnaire after only competing in two spring league games. Ideally, the questionnaire would be given out at the end of the spring season, when they had more game time and practice time to compete in.

Resources

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Appendix A

Athlete Perception Questionnaire

Please respond to the following statements below based on your perceptions of the SSU Men's soccer Off-Season weight lifting and running program.

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

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1. Endurance training is important for my sport.

1	2	3	4	5	6	7

2. Speed/agility training is important for my sport.

1	2	3	4	5	6	7

3. Weight training is important for my sport.

1	2	3	4	5	6	7

4. The endurance running helped me with my performance.

1	2	3	4	5	6	7

5. The speed/agility training helped me with my performance.

1	2	3	4	5	6	7

6. Weight training helped me prevent injuries.

1	2	3	4	5	6	7

7. The weight training was specific to my sport.

1	2	3	4	5	6	7

8. The weight training helped me with my performance.

1	2	3	4	5	6	7

9. The overall Off-Season helped me for my sport performance.

1	2	3	4	5	6	7

Please answer the following questions as they relate to your current season and trainings.

1. Rank the following types of training in order of importance to your sport's performance:
   (Endurance Running, Weight Training, Field Day, Speed/Agility Training, and Mental Training)
   1.
   2.
   3.
   4.
   5.

2. Do you think the endurance running was organized and effective for your sport? Give some pros and cons for the endurance running.

3. Do you think the weight training program was organized and effective for your sport? Give some pros and cons for the weight training program.

4. What are some of the specific benefits you think you are getting from weight training?

5. Compared to the Fall season, give a percentage for how much your performance has improved this Spring.

6. What would you like to see more of in your Off-season training program? (Ex. Endurance Running, Speed/Agility, Weight Training)

7. What would you like to see more of in your In-season program? (Ex. Endurance Running, Speed/Agility, Weight Training)