

THE EFFECTS ON SOCCER DRIBBLING SKILLS WHEN TRAINING WITH TWO  
DIFFERENT SIZED SOCCER BALLS

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## ABSTRACT

The purpose of this study was to determine the effects, if any, on soccer dribbling skills in children, ages, 8-10, after practicing with different sized soccer balls during the season. The Kansas Youth Soccer Association (KYSA, 2008) and the United States Soccer Association (US Soccer, 2011) recommended that children use smaller sized soccer balls than regulation adult sized soccer balls. As indicated by the associations, the size three ball is recommended for children under 8 (U-8), the size four ball is recommended for children under 12 (U-12), and the size five ball is recommended for children older than 12. Twenty-four recreational soccer players from Kansas participated in the study. The participants were from two different teams. The children were randomly placed on the teams by the league officials, unless parents specifically requested a coach.

The Mor-Christian General Soccer Ability Skill Test Battery was used to test soccer dribbling skills (Collins & Hodges, 2001 p. 208). Both teams were timed in a pretest for soccer dribbling skills. Team one, the experimental group, was tested using the size five ball, and team two, the control group, was tested using the size four ball. The pretest was followed by six weeks of practice using their assigned size balls. Practice consisted of 1 hour practices twice a week. At the end of the six weeks program, a posttest was administered to both teams.

Data were collected and a t-test was used to analyze the data. The results of this study indicated that there was not a significant difference in dribbling skills between the children in the control group as compared to the children in the experimental group. While the size four ball revealed quicker time results, these numbers were not significant enough to rule out the effect of what would be expected by chance. Based on the finding of this study, the following

conclusions were made: 1) ball size does not offset dribbling skills in young soccer players; 2) soccer players 8 to 10 years old should continue to play with the smaller size four ball; and 3) the weight and size of the larger ball may be too cumbersome for young players to control and develop dribbling skills.

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## CHAPTER 1

### The Problem

#### *Introduction*

Dribbling the soccer ball is one of the most important skills that children need to effectively play soccer. Players in possession of the ball are subjective to a tremendous amount of pressure. To be effective, players must be able to dribble and control the soccer ball with their feet. Hargreaves (1990) stated, “the most important skill in soccer is the ability to control the ball” (p. 25). The success of the team depends on its players’ abilities to dribble and maintain possession. For soccer players to be successful, Coerver & Galustian (1995) noted, “getting possession of the ball and keeping it is an important part of soccer” (p. 4). Dribbling the ball under control and maintaining possession is essential in soccer.

According to Thomas, Fellinghan, and Vehers (2009) “dribbling appears to be the single most important skill when compared to passing, first touch, and defense” (p. 120). There are a number of important dribbling skills necessary to play soccer. Players need to be able to change speeds with the ball such as accelerating and stopping. Huijgen, Elferink-Gemser, Post, & Visscher (2010) contended, “dribbling speed is considered critical to the outcome of the game. Dribbling in soccer can be categorized into dribble actions while accelerating and dribble actions with quick changes of directions” (p. 689). Players need to be able to use the inside, outside, sole, and instep of their feet to change directions. Another important dribbling skill is shielding the ball while stationary and on the move. Players must also be able to dribble while looking up to assess the game developments. These dribbling skills are important to being an effective soccer player.

Russell, Benton, and Kingsley (2010) stated, “dribbling possession can be lost due to a lack of ball control” (p. 1406). Soccer is one of the most popular sports with youth; however many children have difficulty finding their touch and controlling the ball. Children’s dribbling skills are not yet refined and highly coordinated. As a result, the ball strays too far ahead of them for an easy interception by a defender. Many children while dribbling end up chasing the ball instead of anticipating and manipulating it in a controlled and decisive manner. As reported in the book Coaching and Playing Youth League Soccer (1988), “the age of your players will have an effect on the progressive acquisition of skills” (p. 15). Children are challenged developmentally to acquire dribbling skills necessary to play soccer.

Soccer is a game where the hands are disallowed except for the goalie. The inability to use one’s hands while dribbling adds to the difficulty to play soccer. Many infants instinctively reach to pick up objects such as a ball because since birth they have mainly relied on their hands to manipulate objects. Berk (2007) stated, “of all motor skills, reaching may play the greatest role in infant cognitive development because it opens up a whole new way of exploring the environment” (p. 139). Switching from a reliance on hands to only using ones feet to manipulate the soccer ball adds complexity to learning and acquiring new skills.

Over the years, many outdoor soccer fields for youth have reduced in size from large soccer fields possessing 11 players per team to smaller fields with fewer players. The Federation of International Football [Soccer] Association FIFA (2011-2012) and US Soccer (2012) noted the section in the Laws of the Game that “the laws may be modified in their application for matches for players of under 16 years of age. Any or all of the following modifications are permissible: size of the field of play, size, weight and material of the ball” (p. 3 ). On the large

fields, a child can dribble in space for quite some distance before encountering another defender. However, on the smaller fields, there is less room to operate and to find space when dribbling. Katis and Kellis (2009) stated, “the smaller pitch [field] results in increased pressure from the opponents and this situation requires from the players to dribble the ball more” (p. 378). Under these pressure like circumstances, skills are tested more and ball handlers are put under even more pressure. Many young players find it difficult to produce the skills quickly and efficiently enough when dribbling the ball in a confined area, especially with the limited time to respond and react.

Modified soccer games have emerged over the years which are available to soccer players of all ages. These games are Futsal and indoor soccer. Futsal is played on a basketball court. With limited friction, the smaller ball rolls very fast even with a weighted ball lining specifically designed for this game. Indoor soccer is played on artificial turf whereby a regular soccer ball is used. The height of astro turf is low and consistent which lends to the ball rolling quicker in comparison to the outdoor fields. These modified games which are played on smaller fields along with quicker rolling balls puts younger players under even more pressure to control and respond while dribbling. Katis and Kellis (2009) noted, “due to smaller pitch [field] and less number of participants during small-sided games, each player comes into contact with the ball and deals with common game situations more often” (2001 p. 374).

Russell and Kingsley (2011) reported that “the quality of technical response (skill performance) is dependent on cognitive, perceptual and motor skills, which interact in rapidly changing environments” (p. 524). Berk (2007) supported this notion by stating that, “younger children often have difficulty with skills that require rapid responding such as batting and

dribbling” (p. 295). With children’s processing rates and reaction times slower than adults, this adds to the difficulty of successfully dribbling the ball while under pressure. Schreiner (2010) stated, “the modern game of soccer puts players of all abilities under great pressure from both time and opponents” (p. 11). With these difficulties facing young players, it would make sense to offer them a slower rolling ball to accommodate their dribbling skills, coordination, processing rate, and reaction times.

Kansas Youth Soccer Association KYSA (2008) recommended that children use a smaller size soccer ball than adults. The ironic twist is that when coaches want to provide an even more difficult challenge to their players in practice, they offer them a smaller, faster rolling ball to dribble. With the size of the soccer fields shrinking over the past couple of years thus resulting in players being put under even more pressure, the question arises are these smaller balls the best size for children or would a larger slower ball improve their dribbling skills.

A new field that is emerging to promote children’s sports is called Competitive Engineering (CE). Burton, Gillham, and Hammermeister (2011) stated, “competitive engineering (CE) is a term coined . . . to promote a systematic environment change process (e.g., ball size, basket height, playing time rules) designed to enhance the competitive experiences of young athletes” (p. 201). The goal for competitive engineers is to discover methods in sports to enhance play in youth. With the lack of mastery in dribbling skills in youth soccer, finding the best size ball to improve dribbling skills is an important component of competitive engineering.

#### *Purpose*

The purpose of this study was to determine the effects, if any, on soccer dribbling skills in children, ages 8-10, after practicing with different sized soccer balls during the season.

### *Scope*

The following were delimiting factors to this study:

1. Twenty-four recreational soccer players ages 8-10 participated in the study.
2. Only size four and five balls were used.
3. The Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001 p. 208) was the only test used to evaluate the dribbling skills of the subjects.
4. The subjects were boys and girls participating in a city parks and recreation soccer program.

### *Assumptions*

The following assumptions were made:

1. All subjects were physically healthy during testing.
2. All subjects performed to the best of their ability during testing.
3. All subjects performed to the best of their ability during the training program.

### *Limitations*

The following limitations were made:

1. It was not possible to control the physical activities of the subjects beyond the practice times.
2. It was not possible to control what the other coach did in practices.

### *Significance*

Soccer is a difficult sport to master without the use of one's hands. It is even more difficult for children whose reaction times Gabbard (2004) noted are slower than adults. Many experts contend that learning is optimal in these younger years. Experts such as Berk (2007)

made reference to such theories as the “critical period” where learning can only take place in a narrow window of time, and the “sensitive period” where learning is more conducive in the younger years. The recommended ball size is smaller for these younger ages (KYSA, 2008). Children required to play with a smaller, faster soccer ball as opposed to using a larger, slower adult size ball, adds more difficulty, especially when children’s information processing rates are slower. Using a larger size ball, which rolls slower, will allow young children the time necessary to process and respond appropriately while dribbling. Instead of just chasing a ball, they can create imaginative techniques and pursue finer lines while dribbling for faster times. Providing players with the opportunity to process and problem solve their next dribbling move could be an effective method in developing highly skilled players. Children are extremely creative, and they can absorb a huge amount of knowledge. If they were able to operate and dribble at a pace that coincides with their processing capabilities, it would be interesting to see their potential.

Some coaches recommend young children using smaller sized balls because their feet and bodies are smaller. But if one examines how a smaller ball rolls faster than a larger ball, a larger and heavier ball may be more beneficial to them. Children will be able to control a larger, slower rolling ball better while dribbling. According to Kreighbaum and Barthels (1990), “a body’s weight is a measure of the force with which the earth pulls on the body’s mass. The greater the force pressing the surfaces together –called the normal or perpendicular force- the greater the resistance to sliding” (p. 115). Coerver and Galustian (1995) stated, “the more ball control these youngsters develop, the more opportunity they will have to make spontaneous and unexpected movements. It would be unfortunate for youngsters and for the sport of soccer

if they were not given the chance to develop such skills” (p 74). By dribbling a slower object, it allows the child to correct for errors in dribbling and create finer lines or more direct routes for a quicker time.

Flaherty (2010) reported that, “a soccer ball that is too small can make it more difficult for individuals to perform soccer skills due to the smaller surface area presented” (para. 3). It seems that Flaherty is suggesting that coaches use a smaller soccer ball to challenge their players with more difficult conditions while dribbling. If using a smaller soccer ball results in difficult dribbling conditions and less control for skill development, then it would make sense to use a larger ball to improve control and develop dynamic dribbling skills.

#### *Definition*

The following definitions were pertinent to this study.

Cutting the Ball: This is a dribbling move used by soccer players to sharply change ball directions by using the inside and outside of the feet.

Inside of The Foot: This is a dribbling move using the inside of the foot to make contact with the ball to cut it across in front of the body.

Outside of The Foot: This is a dribbling move using the outside of the foot to make contact with the ball to push it away from the body.

Instep Dribble: This is a dribble whereby one points their toe down and pushes the ball with their shoelaces. This method is normally used for speed while dribbling straight ahead.

Speed Dribble: This is a fast dribble using the outside or instep of the foot to push the ball for speed. The toe is pointed down during this dribble.

Competitive Engineering-This is a field of study devoted to discovering and promoting new methods to enhance youth sports.

## CHAPTER 2

### Review of Related Literature

#### *Introduction*

Dribbling a soccer ball is both easy and difficult. It can be one of the easiest and most natural skills to perform. This is why young children like to play soccer so that they can run freely while kicking the soccer ball. However, the challenge comes from keeping it close when manipulating the ball to change speeds and directions in an effort to beat an opponent. According to Russell and Kingsley (2011), “a skilled dribbler is able to keep the ball close to the desired position while travelling at high speed and a lack of ball control will increase the likelihood of losing possession of the ball” (p. 527). This is challenging because the ball handler must master ball control using the inside, outside, instep, and sole of both feet. Not only must the dribbler control the ball using different parts of their feet, but they must also be able to change speeds by accelerating and stopping at a moment’s notice. Coerver and Galustian (1995) stated, “the coordination, flexibility, and touch required, under full challenge from opponents trying to win the ball, are difficult to master” (p. 18). While dribbling, a ball handler must be able to observe, collect, and process information quickly while on the move. Thomas et al. (2009) reported that, “dribbling had the highest skill importance associated with the team’s ability to create scoring opportunities” (p. 119). To play for an elite team, high school, college, or professional team, players will need to challenge themselves with the ball to acquire these highly developed skills.

Because of the popularity of soccer and the numerous skills involved, more research is being conducted to help make the sport and equipment safer and more effective. This study is

to determine the effects on dribbling skills of children ages 8 – 10, while using different sized soccer balls. A review of the literature was conducted and is organized as follows: 1) dribbling techniques, 2) teaching soccer dribbling. 3) smaller fields are putting more pressure on dribbling skills 4) how practice and repetition develop skills based on developmental theory, 5) soccer ball size recommendations for children, 6) competitive engineering, 7) human's reliance on hands, 8) experts recommend youth as the prime age to teach and learn skills, 9) cognitive processing rates for children, 10) brain regions eliciting motor skills, and 10) method of evaluation.

### *Dribbling Techniques*

Basically there are four types of dribbling techniques. They are speed dribbling, shielding, faking, and cutting. These four soccer techniques are necessary skills soccer players must acquire to beat an opponent. Open any book pertaining to soccer dribbling and these four areas will be covered in detail.

#### *Speed Dribbling*

Huijgen et al. (2010) stated, "dribbling speed is considered critical to the outcome of the game" (p. 689). Speed dribbling is one of the first dribbling techniques children learn and acquire. It is most similar to a natural step while tapping the ball at a fast speed with the instep or shoelaces. According to LaPrath (2009), "dribbling with the instep, or the top of the foot, allows a player to run at a defender at a higher speed because it is a natural forward motion" (p. 64). The main problem to master with this dribbling technique is controlling the ball with a soft touch so the player doesn't push it too far ahead for a defender to steal. Elliott, McCollum and Stuart (2004) stated that, "important cues to present during the dribbling activity include

keeping the ball close, using both feet, having soft touches, and looking ahead at a 45 degree angle” (p. 18). Many young children want to poke the ball with their toe, causing the ball to roll too far ahead of them. Coerver and Galustian (1995) stated that, “these solid skills, ‘ball feeling’ can only be acquired through repeatedly touching the ball” (p. 4). The objective of speed dribbling is to advance the ball into your opponent’s territory as quickly as possible when there is space ahead of you. Huijgen et al. stated that, “the ability to sprint and dribble at high speed is essential for performance in soccer” (p. 689).

### *Shielding*

The second type of dribbling is shielding the ball. Hamm (1999) noted, “another characteristic of the best dribblers is the person’s ability to hold the ball under pressure, or shield dribble” (p. 122). Shielding the ball can be done while standing still or while moving. When standing still, the ball handler will stand sideways and put a shoulder or forearm on the defender while protecting the ball on the outside or under the far foot (LaPrath, 2009). This is normally done when the ball handler needs help and dribbling might subject them to a trap. LaPrath (2009) also stated that, “shielding is most often used when players run out of room to dribble and are tightly marked, or when they simply cannot outrun a chasing opponent” (p. 64). When shielding the ball on the move, the ball handler will dribble the ball using the far foot from the defender so the ball is not exposed for a tackle. Skilled dribblers are able to shield the ball to maintain possession of it which increases their team’s chances of winning. LaPrath (2009) continued by saying that, “when dribbling to maintain possession, your player must shield –or protect- the ball from the opponent to make it easier to maintain possession” (p. 64). Ball handlers who are proficient at shielding are normally very confident with dribbling the ball.

## *Faking*

Soccer players must be able to effectively dribble the ball. To compete on a competitive level, players must master ball fakes. A fake is when the ball handler deceives the defender. There are two methods the dribbler can use to beat the defender. The ball handler can use his or her body to fake the defender with a shoulder lean or step fake to the side to give the impression the ball handler is going this way. Another form of deception is to actually move the ball by cutting and dribbling the ball from side to side until the ball handler sees the defender out of position or leaning. The ball handler will dribble at the defender and executes a fake or number of fakes. Hargreaves (1990) stated, “the attacker uses body feints and disguises his or her intentions so that the defender makes a wrong move and gets off balance” (p. 107). The objective is to get the defender to lean off balanced to one side. Hamm (1999) noted, “You must get a defender off balance or leaning the wrong way” (p. 117). Once the defender falls for the fake, the ball handler pushes the ball with speed to the other side past the defender to beat him before he or she can recover. In order to be a complete player in soccer, players must be proficient at dribbling the ball and executing fakes.

There are a number of fakes that are taught to soccer players which are listed in the manual Play Like a Soccer Legend (Galustian and Cooke, 1993). They are the Sir Stanley Mathews fake, the Roberto Rivelino fake, Karl-Heinz Rummenigge fake, and Geoff Hurst fake. The Sir Stanley Mathews fake is used when you are facing the defender while standing nearly still. Lean and hop to one side while dragging the ball with the inside of your foot in this direction. When the defender falls for this fake and leans to this side, quickly push the ball with the outside of your same foot in the opposite directions and go around him and beat him

(Galustian and Cooke). In the Roberto Revelino fake, Galustian and Cooke stated, “you fake kick the ball but instead step around it and plant your foot on the far side of the ball. Then turn your body slightly and take the ball in the opposite direction, using the outside of that same foot” (p. 11). In the Karl-Heinz Rummenigge fake, you swing your foot around the front of the ball and take a step to the side. This gives the defender the impression you are moving or passing the ball in this direction. Galustian and Cooke also suggested that as the defender leans in this direction, push the ball in the opposite direction using the outside of your other foot. The Geoff Hurst fake requires you to be dribbling forward then lean back while reaching your leg forward. Stretch your foot ahead of the ball and pull the ball back using the outside of your foot. Flick the ball in the opposite direction and accelerate.

One of the more popular fakes is the step-over and scissors fake. Hamm (1999) noted, “if you step over the ball from the inside to the outside, then take the ball back to the inside with the inside of your foot; we call that a scissors move” (p. 131). This fake is normally used by higher skilled soccer players. It is an extremely effective fake. Hamm also revealed that, “if you do it from the outside to the inside and then take the ball back outside with the outside of your foot, you’ve done what we call a basic step-over” (p. 131). The most common fake is the step fake to the side. Step to one side and when the defender falls this way, pull the ball back the other direction with the inside of the same foot. This is the easiest fake to execute, and all levels of ability use this fake.

### *Cutting*

Cutting the ball allows the ball handler to move the ball in their desired direction. According to LaPrath (2009), “your players also need to learn how to escape when an opponent

closes in on them by cutting the ball, or spinning to move in a new direction” (p. 65). The inside, outside, and sole of the foot are used to cut the ball. Hamm (1999) suggested, “you must be able to dribble with all surfaces of your feet-inside, and outside, soles and laces” (p. 132). A ball handler can evade a defender by cutting the ball quickly and sharply. The ball can be cut in front of the planted foot or behind it by using the inside of the foot. A ball also can be cut diagonally to the side using the outside of the foot. The sole of the foot can be placed on top of the ball to roll it backwards behind the ball handler so he or she can turn with speed and accelerate in the opposite direction. Hamm recommended that, “you should work on pullbacks-dribble, then step on the ball and pull it back in the opposite direction with enough pace so that you can break into a run” (p.132). To be effective when dribbling the ball under pressure, the ball handler must be able to cut the ball in order to escape danger.

Dribbling, as described by Hamm (1999), “is an extremely deceptive skill when facing an opponent” (p. 117). To be deceptive, a ball handler must be able to keep the ball close and change speeds at a moment’s notice. This change of pace to transition between these skills of speed dribbling, shielding, faking, and cutting is difficult. To be successful during transitions between skills, the ball must remain close. A smaller size ball such as a four ball, which rolls faster will be more difficult to control and keep close. But by dribbling a slower, bigger ball such as the size five, it will make the transition much easier to go from one speed to another and keep the ball close to execute these four dribbling skills effectively to achieve success.

### *Teaching Soccer Dribbling*

There are a number of effective ways to teach dribbling to players. In the book, Coaching and Playing Youth League Soccer (1988), under the heading “progressive acquisition

of essential skills” it notes: “the practices in this manual are progressive, that is, they are arranged in order of increasing difficulty . . . progressing to situations demanding a higher degree of skill” (p. 13). Here the whole practice would emphasize one skill such as dribbling and then progress slowly from basic skill’s development to advanced team play. Siedentop & Tannehill (2000) stated, “in active teaching, the teacher (or coach) chooses the content and arranges the progressions, which are typically sequenced in small steps” (p. 283). At the beginning of practice, the players would be taught the skills and they would work on it individually without competition. The practice would then progress to one on one play with limited pressure from opponents then advance to one-on-one play with competition. After this, players would work in small group activities competing to develop their skills. The practice would progress to full field play similar to a game situation. Hopefully by progressing in difficulty and complexity through these dribbling steps the players would become proficient and competent in their games to execute these difficult skills. A full field scrimmage played at the end of practice allows players to transfer what was learned individually and in small groups to a larger scale with more players and complexity similar to a real game. Hargreaves (1990) revealed that in progressive practices “the ability to start with a simple practice and gradually develop it into a realistic game situation is one of the hallmarks of a good coach. Drills must be progressed (and sometimes this means simplified) according to how the players respond” (p.10). Many coaches recommend a progressive practice method from simple to complex when teaching soccer dribbling skills.

### *Smaller Fields are Putting More Pressure on Dribbling Skills*

Over the years, many outdoor soccer fields for youth have reduced in size from large soccer fields possessing 11 players per team to smaller fields with fewer players. Many leagues have discovered that younger children on large fields competing with 22 players were not provided with enough opportunity to touch the ball regularly and develop their dribbling skills. They found by modifying the number of players and size of the field, children were more involved, and they had more opportunity to develop their dribbling skills. Fleck and Cossaboon (1992) suggested, “these games will challenge the player . . . to improve a variety of the needed skills. It also gives players the opportunity to touch the ball more often” (p. 1).

Implementing these changes at the youngest age division requires these players to play with three a side, no goalies, miniature goals, and smaller fields. As players advance through the league, more players are slowly added and the fields and goals increase in size. As players reach the U-14 age division, they start playing with the maximum number of players of 11 versus 11 on full field dimensions. This concept of youth playing on micro soccer fields with less players is a wonderful coaching concept to increase the amount of play and participation by each player. However, the smaller fields put players under more pressure with less room to dribble. Many soccer organizers interested in advancing and developing soccer would argue in support of micro soccer; however, children with slower coordination, processing rates, and reaction times than adults are put under more pressure to perform on these smaller fields. One positive aspect of the larger fields for younger children is that they can dribble in space for distance and experience some success before encountering a defender. However, many league directors and coaches argue that for the youth of today to be successful at the professional or

international level they must experience this intensity and acquire the skills under these conditions.

#### *How Practice and Repetition Develop Skills Based on Developmental Theory*

It has been assumed that practicing the skills repetitively will cause improvement. Coerver and Galustian (1995) stated, “it is only by regular and purposeful practice with the ball that ball feeling and control can be acquired” (p. 6). To become proficient at dribbling skills one needs to practice these drills until they are ingrained and mastered. Huijgen et al. (2010) noted, “it has also been shown that practice is a major feature for the development of soccer skills” (p. 690). As reported by Berk (2007), Piaget’s “cognitive – development theory – children construct knowledge as they manipulate and explore their worlds” (p. 19). Players, by practicing with a soccer ball, are able to explore and develop their dribbling skills. Because learning new dribbling skills is similar to infants exploring their worlds for the first time, soccer dribbling can be thought of in terms of Piaget’s Cognitive Developmental Theory (Berk, 2007). In Piaget’s theory, children like players use schemes where they experiment with their environment to make sense of their experiences. Infants will drop a spoon or throw their bottle to experiment and learn how physical properties react (Berk, 2007). Just like infants, many young players unfamiliar to the effects of dribbling will react in similar ways by trying new and different methods of tapping the ball to learn the effects of dribbling. Piaget’s theory on “adaption” is where infants, like soccer players, attempt a skill or habit continuously over and over to discover interesting effects (Berk, 2007). As a result of these effects, conclusions can be drawn on how to dribble or how physical properties react. This is known as Piaget theory of assimilation (Berk, 2007). Through practice or continuous actions “accommodations” will also be determined when

previously discovered thoughts or assumptions do not conform or support to new experiments or trials (Berk, 2007). Separovic, & Uzicanin (2009) reported, “in sports, training is a process of repeating, work that improves potential to achieve optimal performance” (p. 44). Practice and repetition through experimental play is a key element to improving ones soccer dribbling skills.

### *Soccer Ball Size Recommendations for Children*

FIFA goes to great lengths to ensure that the soccer balls meet rigid standards for competition. FIFA stated, “the size of a football [soccer ball] must meet defined standards. This is crucial for players to make accurate passes and go on thrilling dribbles. Could you imagine everyone playing with different sized footballs” (Consistent Circumference, 2011, para. 1). The standards are extremely rigid because any questions regarding a ball and fair play could spark controversy leading to dire consequences from riots to violence. As a reputable governing body, FIFA wants to promote fair play and not have its authority and management capabilities brought into question.

FIFA is so concerned with a reputable and reliable ball that they subject them to a minimum of six tests. The tests are consistent circumference, permanent roundness, uniform rebound, water absorption, perfect weight, minimal pressure loss, and shape and size relation.

A ball must pass six tests to earn the ‘FIFA inspected quality mark.’ To gain the top ‘FIFA approved quality mark,’ a ball must pass these six tests under even more demanding conditions, as well as a seventh test (shape and size retention) to ensure that the ball also retains its shape and size for the duration of a match (FIFA, The Concept. How does a Ball Receive FIFA marks? 2011, para. 5 & 6)

The United States Soccer Federation or US Soccer (2011) noted in their Laws of the Game permitting modifications, “the Laws may be modified in their application for matches for players of under 16-years of age” (Laws of the Game, Modifications, para.1 ). As a result, the

Kansas Youth Soccer Association KYSA (2008) enacted league rule changes for players under the age of 16 regarding length of the field, time allowances per game, size and weight of ball, and circumference of the ball as listed below.

With studies showing a supporting trend toward developing athletes when they are young, it is important to develop dribbling skills so youth players can acquire the necessary skills to compete at a higher level of play. KYSA (2008) recommended that children use smaller sized balls than the regular adult size five balls. For ages 8 to 12, they recommended a medium size four soccer ball. Below is a chart listed in the Policy section in KYSA’s website (p. 1).

Table 2.1

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KYSA Chapter 4. Policies 1.3 BALL SPECIFICATIONS.

A. The ball sizes, ball weights, and ball dimensions for each age group shall be as follows:

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Group Game	Size	Circumference	Weight
Under 18	SIZE 5	27-28	14-16 ozs.
Under 17	SIZE 5	27-28	14-16 ozs.
Under 16	SIZE 5	27-28	14-16 ozs.
Under 15	SIZE 5	27-28	14-16 ozs.
Under 14	SIZE 5	27-28	14-16 ozs.
Under 12	SIZE 4	25-26	11-13 ozs.
Under 10	SIZE 4	25-26	11-13 ozs.
Under 8	SIZE 3	23-24	11-12 ozs.
Under 6	SIZE 3	23-24	11-12 ozs.

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US Youth Soccer (2007) stated regarding a frequently asked question about ball size recommendations that, “under-8s and younger play with a No. 3. Under-10 through Under-12 play with a No. 4. Players Under-14 through adult use a No. 5.” FIFA the international governing body for soccer, tests balls for quality assurance on size four and five balls (Footballs, Test Criteria for Outdoor Footballs). They do not mention the smallest ball used in the United

States a size three ball. An assumption could be made that FIFA does not promote the smallest size three ball and instead prefers children to start with a larger size four ball.

### Competitive Engineering

The goal of competitive engineering is to discover new ways to enhance youth sports. Burton et. al (2011) stated “competitive engineering is [sic] new term for an old concept that involves the process of making modifications to the competitive environment by changing sport structure, rules, facilities, and equipment in order to enhance a variety of desired cognitive, affective, and behavioral outcomes” (p. 202). Finding the best size ball to improve soccer dribbling skills would be an important question posed by competitive engineers. Burton et. al (2011) stated, “balls can be modified by: a) increasing or decreasing their size and weight” (p. 209). With the popularity of soccer in the United States, discovering which size soccer ball improves children’s soccer dribbling skills is an important question to test especially when KYSA (2008), FIFA, and US Soccer (2011) have all stated in supports of a smaller ball for younger players. However, Burton et. al (2011) stated, “regardless of what outcomes are desired, assessment of their attainment is seldom conducted and almost no information is available about how to best implement CE to enhance athletes’ competitive experiences” (p. 202). Without evidence-based assessments one could question the validity of their recommendations. The Mor-Christian soccer dribbling test was used in this study to answer this question by using evidence-based assessments (Collins & Hodges, 2001). Burton et. al (2011) stated, “CE utilizes a conceptual framework that targets more global enhancement of athletes’ intrinsic motivation by better meeting basic needs for competency, autonomy and relatedness among young athletes” (p. 202). The most important aspect of competitive engineering is their

commendable effort to pursue areas of improvements to positively affect youth sports around the world. The goals and recommendations by competitive engineers are extremely important; however, evidence-based studies need to be conducted to validate suggestions made pertaining to youth sports.

### *Humans' Reliance on Hands*

The hand is the most developed appendage the body possesses. Hands are the chief organs for physically manipulating the environment, used for both body gross motor skills (such as grasping a large object) and fine motor skills (such as picking up a small pebble) (Wikipedia, 2011). The sensitivity in the hands is one of the most highly innervated appendages on the body. The feedback to the brain is tremendous and denied use of one's most highly sensitive and developed organ is unfathomable. "The finger tips contain some of the densest area of nerve endings on the body, are the richest source of tactile feedback, and have the greatest positioning capability of the body; thus the sense of touch is intimately associated with hands" (Wikipedia, 2011 para. 1). However, for one to play soccer, this sense of touch refined since birth, must now be developed in the feet and other body parts adding a significant challenge.

The fact that one must manipulate the ball using every other appendages and body part other than the arms and hands requires soccer players to develop new highly developed neuromuscular pathways in conjunction with the central nervous system to master skills. Fox, Bowers, and Foss (1993) described, "connections are made from the CNS to the motor portion of the nervous system. It is here that muscles receive their incoming signals and execute the desired motor event, whether it be kicking a football or throwing a baseball" (p. 136). Many people start playing soccer around the age of four and continue up into adulthood. These

players will need to rely heavily on the premotor area of the brain to learn the soccer skills necessary for the game. The area just forward to the motor area, the premotor area, is probably the “sports skills area” of the brain. It is believed that this area is especially concerned with the acquisition of specialized motor skills (Fox, Bowers, & Foss, 1993).

#### *Experts Recommend Youth as the Prime Age to Teach and Learn Skills*

As reported by Galustian & Cooke (1993), “practicing with the ball is the top priority for all young players” (p. 4). Many experts in the field of development and motor skills contend that learning skills early in life are most advantageous. Separovic, & Uzicanin (2009) stated, “top-quality results in sports today can only be achieved by athletes who are selected at the right age” (p. 43). Piaget surmised from his studies that children after adolescence did not achieve any major cognitive milestones (Berk, 2007). Bad habits can be changed in young soccer players but are almost impossible to remove as they grow (Howe & Waiters, 1993).

There are two theories regarding developmental learning. One is called the “critical period” where there is a limited window of opportunity for the child to achieve and learn. The theory maintains that skills must be learned within this time frame or the opportunity to learn is lost forever (Berk 2007). Another theory is a “sensitive period” where optimum periods of learning are present and the individual is especially receptive to influences in the environment during these ages. However, individuals who miss this window of opportunity can still learn and develop later in years, but with more effort (Berk). Coerver & Galustian (1995) noted that, “the movement and techniques with the ball can also be learned at a later age, although this will require more hours of training, and it is more difficult to achieve as the years go by. The earlier a technique is learned, the more spontaneous will be its use in game situations” (p. 186).

Pangrazi (2007) reported that motor learning is optimum during the elementary years when growth is slow. He supported this idea with the results of a study on strength gains that indicated children were able to gain strength not by muscle atrophy as acquired by adults but through developing more highly developed motor pattern recruitments.

According to Coerver & Galustian (1995), “most of the world’s greatest players develop their skills as children, by constantly playing soccer and by being in contact with the ball for hours” (p. 4). The experts are aware of the importance in training athletes while they are young. Coerver & Galustian stated, “in order to produce exciting, skillful players who are attack-minded, skills and attitudes must be learned at a young age through constant repetition” (p. 4). The data from this research supports the importance of training and teaching young soccer players in order to optimize learning.

Children are at a prime age for learning and developing new skills (Pangrazi 2007). Fox et al. (1993) reported that, “the cerebral cortex and the cerebellum are the centers employed in learning new skills” (p. 151). A synapse is at the end of a neuron which releases chemical nureo-transmitters enabling it to talk to the other nerves and initiate a response. According to Berk (2007), Webb, Monk, & Nelson stated, “in all, about 40 percent of synapses are pruned during childhood and adolescence to reach adult level” (p. 122). Pruning is when neurons that are not being used or stimulated are cut similar to dead flowers on roses being trimmed to make way for new growth and learning. Berk states, “as neurons form connections, stimulation becomes vital to their survival. Neurons that are stimulated by input from the surrounding environment continue to establish synapses, forming increasingly elaborate systems” (p. 122). For children to flourish at dribbling the soccer ball, they must be stimulated in challenging

dribbling exercises. Berk reported (2007), Huttenlocher stated, “for this process to go forward, appropriate stimulation of the child’s brain is vital during periods in which the formation of synapses is at its peak” (p. 122). Providing children with the best size ball during this highly developmental period will improve their learning of new dribbling skills (Burton, Gillham, & Hammermeister (2011).

### *Cognitive Processing Rates for Children*

A study conducted in 1994 by Cerella and Hale examined information on cognitive processing rates (Gabbard, 2004 p. 223). Their study concluded that single reaction times tasks (meaning the time from a stimulus to the time movement commences) took 10-year olds twice as long as young adults. The study revealed 12-year olds took approximately 1.5 times as long, and 15-year olds were comparable in times to young adults. With this data, they concluded a 5-year old would take 3 times as long as a person in their late teens. When comparing a young child to an adult in dribbling, the child requires much more time to respond. The child needs time to think and process what is transpiring. This raises the question of why a coach would want to recommend a smaller, faster ball to a child, when they can suggest a bigger, slower ball that gives a child more time to react and make appropriate decisions. Ironically, a study which compared children to adults while competing in chess matches found that children had a better recall memory (Gabbard, 2004 p. 223). However, it was revealed that the children were seasoned players and the adults were novice players. Regardless, when children are given the time necessary to process the information and react, they can compete on an adult level.

### *Brain Regions Eliciting Motor Skills*

There are two important motor areas in the brain located in the cortex (Fox et al., 1993). One is the motor area located in the frontal lobe and the other is the sensory area located in the cerebellum. Both of these areas control the feet, legs, thighs, arms, hands, neck, etc. along with many other muscles. The motor area and sensory area utilize a process called servomechanism which acts as a correction factor after muscle movement has been initiated. This system continuously sends information to the brain so corrections and adjustments can be elicited throughout the movement (Fox et al.).

Pangrazi (2007) states, when manipulative “objects move slowly, there is ample time for students to learn” (p. 355). When a ball rolls slowly, players are able to tap into an important motor recall system in their brains. Engrams are defined as memorized motor patterns that have been practiced over time and can be recalled at later dates such as remembering how to ride a bike (Fox et al., 1993). They are like computer programs available for access to recall how to perform a movement. Engrams stored in the motor cortex or motor area are used to recall fast movements. Fox et al. states, “engrams stored in the sensory portion of the brain, which record slower motor acts, operate through the feedback servomechanism” (p. 154). Soccer is a game that requires the use of touch which is derived from the senses or sensory portion of the brain. Hamm (1999) noted, “this is what you strive for, dribbling by feel, with only short glances at the ball, like Maradona with the ball attached to his laces” (p. 130). Since only slow movements can be recorded in sensory engrams, using a slower ball would allow players to tap into their sensory engrams to replicate dribbling with touch. Maybe this is what top athletes mean when talking about being in the zone and seeing the game in slow motion. Soccer

dribbling objectives are to develop ball sensitivity, coordination, flexibility, agility, body control, in short, confidence in keeping possession of the soccer ball (Dewazien, 2001).

Practicing with a slower ball and tapping into these motor engrams is important because it helps children develop skills to compete in games.

Manipulative skills come into play when children handle an object. Most of these skills involve the hands and feet. The manipulative of objects leads to better hand-eye and foot-eye coordination, which are particularly important for tracking items in space. Manipulative skills form the foundation for many game skills. (Pangrazi 2007, p. 354)

With the objective of developing children's dribbling skills to their highest potential, offering them a soccer ball that allows them to dribble slowly and develop motor engrams is beneficial. The slower ball allows children to learn dribbling patterns by initiating their motor engrams to recall the memorized motor movements later.

#### *Method of Evaluation*

Using a larger heavier ball could help children ages 8 to 10 years old improve their dribbling skills. A slower rolling ball would allow them time to process and react to the ball's movement to make sound decisions. An evaluation method was used to compare and produce reliable and valid data to reveal which size soccer ball would best develop the skills of young soccer players. The test evaluations were based on timed trials. Timed soccer dribbling tests are the best determination of soccer skills. Young players dribbled through the Mor-Christian General Soccer Ability Skill Test (Collins & Hodges, 2001) where cones were arranged in a circle. This test challenged soccer players' dribbling speed and cutting abilities. These two dribbling techniques are used most by soccer players.

### *Summary*

Dribbling the soccer ball is a natural skill children can perform by just running and kicking it; however, the ability to beat an opponent under pressure is one of the most difficult skills to acquire. The ball handler must be able to control the ball with all surfaces of their feet such as the inside, outside, instep, and sole. Hours of practice must be devoted to learning touch and control while changing speeds. Players must master the four techniques of cutting, faking, shielding, and speed dribbling. To execute these properly the ball handler must practice these moves for years to become proficient. Players who want to become highly competitive will need to spend excessive amounts of time practicing with the ball to develop these essential dribbling skills.

Soccer players have to transfer from hand-eye coordination to foot-eye coordination. Children are more prone to using their hands because they've been developing these fine-motor and gross-motor skills since birth. But when they start playing soccer, they must develop these same neuro-pathways in their feet and other parts of their body. It is extremely challenging since players are not able to use their most highly developed senses, the hands, to manipulate the soccer ball.

Some experts have recommended teaching skills to youth players and starting them young because they are at a prime age to learn and develop these skills. The side effects to this are that their body size is smaller and research indicates that their processing rates are slower than adults. As a means to compensate for ball size the KYSA (2008) recommended that youth players use smaller sized balls than adult sized balls. This sounds good in theory until one considers a smaller sized ball to be more challenging because it rolls faster. This added speed

does not help the youth players whose cognitive processing rates are slower than adults. Many coaches recommend a smaller ball to their players when they want to add more dribbling challenge. Why not provide children with a bigger ball that rolls slower? Here the children can evaluate and process their next move with a slower rolling ball rather than just reacting to a runaway ball. More time to react and cognitively process will result in finer dribbling lines for faster speeds.

## CHAPTER 3

### Methods

#### *Research Design*

The purpose of this study was to determine the effects, if any, on soccer dribbling skills in children, ages 8-10, after practicing with different sized soccer balls during the season. The subjects were participating in a city parks and recreation soccer program. It seems that the experts in the field of physical education, sports, and psychology believe that children in their youth are of prime age to develop skills (Pangrazi, 2007). This is the reason participants selected for the study were between the ages of 8 and 10 years old. The KYSA (2008) recommended smaller sized soccer balls for this age group in comparison to adults. These young subjects were tested using the Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001). Two different sized soccer balls were used during the test for comparative purposes. The tests were to determine which size soccer ball was best suited for this age group to develop their dribbling skills. This study consisted of pretests and posttests independent group design (Slavin, 2007).

Table 3.1  
Mor-Christian General Soccer Ability Skill Test Battery

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	<u>Pretest</u>		<u>Posttest</u>	
Ball Size:	4	5	4	5
Team	T2	T1	T2	T1

---

T1 practiced with the size 5 ball during the season

T2 practiced with the size 4 ball during the season

### *Selection of Sample*

Permission was requested from the city parks and recreation department for the study (Appendix A). After review, permission for the study was granted by the city parks and recreation department; whereby, a formal request was submitted to the University of Kansas Advisory Committee on Human Experimentation (Appendix B). A letter proclaiming the information statement (Appendix C), the parental consent form (Appendix D), and the child assent form (Appendix E) were presented to the families of the participants. Only participants with returned consent forms were allowed to participate in the study. This study was approved by the Human Subjects Committee, University of Kansas, Lawrence Campus HSCL #19377.

All of the players on both teams in the Under 10 (U-10) year old division volunteered to participate in the study. Players were randomly placed on the soccer teams by the city parks and recreation department unless they specifically requested a coach on their registration forms.

The test subjects consisted of 13 girls and 11 boys representing the two teams. On team one there were two 9-year olds and ten 8-year olds. On team two there were six 9-year olds and six 8-year olds. Pangrazi (2007) stated, "boys and girls can participate on somewhat even terms in activities demanding leg strength, particularly if their size and mass are similar" (p.29). Children in this age group are fairly similar in height and weight until adolescence (Pangrazi, 2009). Team one participants served as the experimental group. Team two participants served as the control group.

The parks and recreation U-10 league consisted of third and fourth graders who were 8 and 9-years old. This age group played with a size four ball. In regards to soccer experience, on

team one, one player had played for 1 year, three players had played for 2 years, four players had played for 3 years, one player had played for 4 years, and two players had played for 5 years totaling 11 years of experience. On team two, one player had played for 1 year, three players had played for 2 years, three players had played for 3 years, three players had played for 4 years, and two players had played for 5 years totaling 12 years of experience. Team two has 1 more year of experience than team one.

Some of the dynamics on the experimental group was that 9 out of the 12 players moved up in age divisions this season and had only used a size three ball in the league. These players were assigned the size five ball this year with no progression to enable them to use the middle size four ball which is recommended for this age group. Two of the players on team one had already played a year in this age group and had the experience of using the size four ball during the previous year before being assigned the size five ball in the current year. The control group had five players move up in age divisions. These players went from a size three ball last year to a size four ball this year. Six players in the control group had played in this division last year and had the experience of using a size four ball.

#### *Instrumentation*

There were a number of soccer tests available but the Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) was selected because it represented two important elements of dribbling. This test allowed the participants to dribble somewhat straight to build speed because the circle was large enough but it also allowed cutting the ball back and forth between cones. Russel et al. (2010) reported that, “timed dribbling tasks have been used

previously to assess soccer-skills responses to interventions” (p. 1400). The investigator administered the pretest and posttest.

The Mor-Christian General Soccer Ability Skill Test (Collins & Hodges, 2001) called for placing 12 cones in a circle with a radius of 10 yards and 5 yards between each cone. The test called for participants to weave in and out of the cones while dribbling as fast as they could under control. However, this circle was too big for the young children to dribble through. For more accurate test results, the circle and cones were reduced. The new dimension was a 20 foot radius with 11 cones positioned in a circle. There were 4 yards between cones. Should the children have been required to dribble through such a large circle, the data may not have reflected their true dribbling abilities because fatigue may have set in, giving inaccurate test results. Stone and Oliver (2009) found that evidence exists to show that fatigue can impair dribbling technical performance during exercise.

The modified test consisted of placing 11 cones in a circle. A test run consisted of a player completing a full circle, while dribbling in and out of cones from start to finish. A stop watch started upon the first touch of the ball and ended when their body broke the plane of the white line that was spray painted on the field at the first and last cone. The first and last cone was designated red while the other cones were alternated with dark blue and light blue cones to help participants navigate through them. The cones were placed by staking an 8 inch nail in the center and running a tape measure out 20 feet. A tape measure was used to measure 4 yards between cones. If subjects missed a cone, they were required to go back through that cone. However, if participants missed the first cone, they were stopped and allowed to restart with only the new run counting. At the beginning of the season, the whole team was given

instructions on how to dribble through the Mor-Christian General Soccer Ability Skill Test (Collins & Hodges, 2001). The team ran through one test demonstration as a group. They dribbled their balls and followed the test administrator who led throughout the cones. Students were instructed to start on the outside of the red start cone and weave in and out of the cones until they came across the finish line spray painted on the inside of the same red cone.

The tests were administered during regularly scheduled practices. Two players at a time were called over from practice. They would alternate each test run to prevent fatigue. The first test run was clockwise, the second test run was counter-clockwise, and the third test run was the direction of the player's choice. One player waited while the other was being tested. This allowed players to rest between runs so they could catch their breath. The pretest was administered the last week of August and the posttest was administered the third week of October.

The test instructions given to each subject before each pretest and posttest session were as noted:

1. "Weave in and out of the cones. When approaching the next to last cone, come around on the outside. Then finish on the inside of the red cone across the finish line."
2. "The tester after the start will step forward and point to the inside of the red cone to encourage dribblers to finish on the inside of the red cone."
3. "If a cone is missed, go back through that cone."
4. "Go fast, but under control."
5. "The words "ready, go" will be said at the start."

The cones were large so the children could quickly find and locate them while dribbling the soccer ball. With 11 cones, the participant started on the outside of the red cone and finished on the inside of the same red cone. Other than the red cone, the subjects dribbled alternating through light blue and dark blue cones. Some children during pre-trial test runs would try to come around on the outside of the last cone instead of the inside. To help alleviate this problem, a dot was sprayed where the ball was set to start the test on the outside of the red cone and a finish line was sprayed on the inside of the same red cone for players to dribble across to finish. This visual helped the pre-trial test run subjects. It was necessary for the test administrator to step forward up against the red cone and point to the inside of the cone to encourage the subjects to dribble to the inside of the red cone when finishing. This forward position served as a reference point for the finish line when they came around the last couple of cones. The reason 11 cones were chosen for the modification was because it replicated the dribbling sequence prescribed by the Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) of speed and cutting.

#### *Reliability and Validity*

The Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) is a reliable test used to evaluate dribbling skills. Collins and Hodges stated, “utilizing a rating scale developed and used by three soccer experts as the criterion measure, validity coefficients of .73 . . . were reported for dribbling” (p. 208). The result improved when reliability coefficients, using the test-retest approach were .80 (Collins & Hodges).

In this study, a stop watch was used to record the participant’s dribbling times. The authors of the test recommended there be three test runs- a 1) clockwise, 2) counter-clockwise,

and 3) direction of participant's choice. The two best time trials in these three test runs were added for the final time score. Probability runs for the time scores could be two clockwise runs, two counter-clockwise runs, or one clockwise run and one counter-clockwise run.

The Mor-Christian General Soccer Ability Skill Test Battery was designed for high school and college players (Collins & Hodges, 2001). With modifications made to the tests to accommodate the younger subjects, such as reducing the size of the dribbling area and the number of cones, a correlation co-efficient test was run using five players from another team who were in the same league and age group. These five players had never experienced this dribbling test. On day one, these players were tested and 3 days later they were tested again to determine the relationship between the two test times. Each participant dribbled clockwise, counter-clockwise, and the direction of their choice. The two best times trials were added together to determine the participant's test time. Slavin (2007) stated "a correlation coefficient expresses the degree to which two variables vary in the same (or opposite) direction" (p. 281). The calculated correlation co-efficient for the tests runs were .65. The correlation result of .60 indicated a moderate positive relationship result (Slavin).

#### *Measurement of Instrumentation*

A dribbling pretest was administered at the beginning of the season, and a dribbling posttest was administered 6 weeks later. The test used was the Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001). This test was chosen because it assessed two important dribbling skills needed in soccer of speed and cutting. The test consisted of placing 11 cones in a circle with subjects weaving in and out of the cones. The subjects were tested dribbling the soccer balls they practiced with during the season to allow a comparison of soccer

skills. The test called for a clockwise run, a counter-clockwise run, and their choice of direction. The test was scored by combining the two best times for a final score (Collins & Hodges, 2001). Pretest and posttest timed scores were recorded and compared. The Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) was to measure soccer dribbling skills.

### *Intervention*

The intervention phase which was administered between the pretest and posttest had team one practicing with size five balls and team two practicing with the recommended size four balls. The pretest was administered the last week of August and the posttest was administered the third week of October. There were 6 weeks of practice between the pretest and posttest. Both teams practiced twice a week with practices lasting approximately 60 minutes. Coaches from both teams discussed a practice regimen for the season. One fourth or 15 minutes of the practice was devoted to individual dribbling to help improve dribbling speed and cutting skills. Each practice session, players were required to dribble around the field 1 time. One day a week players were required to dribble through four cones placed in a straight line, up and back, 5 times, and the other day players were required to dribble through two cones in a figure-eight, 3 yards apart, 5 times. One fourth or 15 minutes of practice was dedicated to dribbling games such as sharks and minnows, stuck in the mud (a dribbling tag game), world cup, and three versus three small sided games. One fourth or 15 minutes of practice was to be dedicated to shooting on goal and passing. The final 15 minutes of practice was spent scrimmaging on a full field.

### *Collection of Data*

A pretest was administered prior to the start of the intervention program and 6 weeks later a posttest was administered to allow for data comparison. Each team had a data time sheet with pretest timed scores as well as a data time sheet with posttest timed scores. Data were collected for team one using a size five ball which they practiced with during the season. Data were collected for team two using a size four ball which they practiced with during the season. Each subject was timed on an individual basis. In the tests, participants were required to execute three runs with their ball. Time scores were recorded on the recording data sheet under each participant's name. The scores were recorded under clockwise, counter-clockwise, and the direction of their choice. The two best times were added on the data sheet to indicate their test score. The data sheets consisted of players' names, coach's name, test run scores, the age of the participant, ball size they practiced with, gender, date, ball size used for the test, ball pressure, and the number of years they played.

### *Analysis of the Data*

The null hypothesis stated that the mean time values for ball size four and five are equal thus resulting in no improvement of ball skills when practicing with one ball versus the other. After collection of the pretest and posttest data, the raw scores were calculated to determine whether the null hypothesis should be accepted or rejected. The mean and standard deviation were calculated for pretest and posttest scores. The t-test was used to analyze the difference in independent group means from pretest and posttest. Slavin (2007) stated, "the primary statistic used to determine whether means from two different samples are different beyond what would be expected due to sample-to-sample variations is called a t-test" (p. 263). These tests

were used to determine if there was a significant difference between team one who used the size five balls during the season and team two who used the size four balls during the season.

### *Reporting*

The information of the study will be reported back to the city parks and recreation department. The parks and recreation department may use this data in making decisions about the use of soccer ball sizes in the future relative to the youth soccer programs.

## CHAPTER 4

### Results

#### *Introduction*

The purpose of this study was to determine the effects, if any, on soccer dribbling skills in children, ages 8-10, after practicing with different sized soccer balls during the season. Twenty-four recreational soccer players participated in the study. The control group consisted of 12 soccer players who practiced with a size four ball throughout the season. The experimental group consisted of 12 players who practiced with a size five ball throughout the season. The subjects volunteered to participate in the study. Players were randomly placed on teams by the city parks and recreation department unless they requested a coach.

The Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) was administered as a pretest to determine a baseline for the teams. Each group then participated in a 6 week training session. Both teams during practice time planned to work a fourth on individual dribbling skills, a fourth on small group games, a fourth on shooting and passing, and a fourth on full field scrimmage. At the end of the 6 week intervention program, the groups were administered a posttest. The mean time values for the pretest and posttest are compared in Table 4.1.

#### *Findings*

##### *Mor-Christian General Soccer Ability Skill Test Battery*

The mean and standard deviation for the Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) were computed for the pretest and posttest for both groups. The results are presented in Table 4.1. The mean scores for both groups showed an

improvement in dribbling test results. Team one who practiced with size five balls showed an improvement of 0.4 seconds from pretest to posttest. Team two who practiced with size four balls showed an improvement of 2.4 seconds from pretest to posttest.

Table 4.1  
Mean Performance Scores for the Mor-Christian General Soccer Ability Skill Test

Group	<u>n</u>	<u>Time in Seconds</u>				<u>Mean diff.</u>
		Pretest <u>M</u>	Posttest <u>M</u>	Pretest <u>SD</u>	Posttest <u>SD</u>	
Team 1 (5 size ball)	12	51.10	50.69	8.12	9.36	0.41
Team 2 (4 size ball)	12	52.43	50.03	10.09	8.87	2.40

After analyzing the difference between the means, it can be concluded that the size four ball which showed an improvement of 2.4 seconds (80%) was superior to the size five ball which only showed an improvement of 0.41 seconds (20%) in dribbling skills. However, a t-test was calculated to determine whether means from two different samples were significantly different beyond what would be expected due to sample-to-sample variations ( Slavin, 2007). The alpha level was established at .05. The critical value indicated the minimum value of t needed for statistical significance at that level (Slavin). The degree of freedom was 22 which resulted in a critical value of 2.0738. With a t-test result of 0.76, it was determined that the difference was not statistically significant at the .05 level.

Table 4.2

Teams' t-test results for the Mor-Christian General Soccer Ability Skill Test Battery

	<u>p</u>	<u>df</u>	<u>t</u>	<u>cv</u>
Both Teams	.45	22	0.76	2.07

0.76  $t < 2.07$  critical value

\*p < .05.

### *Discussion*

The results of this study indicated no significant difference between ball skills as a result of using different size soccer balls at this age. During the course of the season, both groups improved in their dribbling skills as indicated from their timed tests from pretest to posttest. The size four ball resulted in faster dribbling times than the size five ball; however, the difference was not great enough to rule out the effects of what would be expected by chance alone.

The null hypothesis stated that the mean time values for ball size four and five are equal, thus resulting in no improvement of ball skills when practicing with one ball versus the other. The data analysis in this study failed to reject the null hypothesis. More research is necessary with a larger sample population to determine more conclusively whether one size ball improves dribbling skills over the other. Slavin (2007) stated, "the larger the number of individuals on whom variables are measured, the smaller the correlation needed to be statistically significant" (p. 86). With a larger population, the results may have revealed one size ball to be superior in developing skills.

Research has shown that cognitive processing rates are slower in children than adults at this age (Gabbard, 2004). Numerous dribbling techniques are taught to this age group in

practice such as the step fake but rarely are these faking skills transferred and performed in games at this age. This may be due to their slower processing rates. Regardless of what size ball is used, children at this age may possess too slow of processing rates to show an advantage using one size soccer ball over the other.

With the study revealing no advantage in using one size ball over the other, the experimental size five ball may need to be reexamined. Additional studies using an even heavier ball may need to be conducted to show any real benefits and gains in skill development. A heavier ball may allow it to roll even slower at speeds more in line with children's slower cognitive processing rates (Gabbard, 2004). Here they could manipulate a slower rolling ball with anticipated moves rather than just chasing after a quicker rolling ball.

Fatigue has been shown in research studies to affect performance. The Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) was modified during the experiment in an attempt to prevent fatigue in the children while testing. Even though a correlation coefficient was conducted to determine "the degree to which two variables are related" (Slavin, 2007 p. 84), it is possible the test circle radius may need to be increased back to its prescribed dimensions or reduced in size even more to reveal a true advantage in dribbling skills using one size ball over the other. Possibly experimenting with different sized test circles would reveal results of one size soccer ball superior to the other.

The soccer fields have reduced in size over the years. It has been reported that practice and repetition are the keys to improvement (Coerver & Galustian, 1995). Piaget's Cognitive Development Theory revealed that children construct learning by practicing and experimenting with their environment such as dribbling a soccer ball (Berk, 2007). With the limited space on

the soccer field and the increased pressure on the ball, children may not have adequate time to dribble over distance and experiment with the ball to build new skills and confidence. Their dribbling skills may not have shown a significant improvement in one size ball over the other because of the lack of dribbling time in practice and games. These smaller fields may result in more rushed touches on the ball by players producing quantity, but not quality touches such as by dribbling the ball over longer distances to develop solid dribbling skills.

Berk (2007) noted that the most popular method for children to manipulate their environment and learn is by using their hands. Unfortunately, children 8 and 9 year olds are still inclined to picking up their soccer balls between drills when they are not required to dribble them. They still have more control with their hands than their feet. America has a fascination with sports that require the use of their hands. This young age group may still prefer to use their hands to manipulate objects. As a result, children are not challenging themselves enough to develop their dribbling skills to reveal one ball has an advantage over the other ball.

Although the results showed no statistical significance of indicating that one size ball was superior to the other size ball when performing dribbling skills, the test results still showed a slight improvement in dribbling times with the size four ball as compared to the size five ball. The size five ball probably posed a problem for children dribbling the ball due to its larger size in relations to their smaller feet. However, a ball that rolls slower may be more beneficial for these young children to manipulate when dribbling, especially with studies indicating their processing rates are slower than adults (Gabbard, 2004). But the larger, heavier size ball even with its benefits of rolling slower, do not offset the difficulty encountered by young children dribbling it. A ball that possesses both qualities of being smaller and rolling slower would

probably be more beneficial to these younger aged children when considering their smaller feet and slower processing rates. A ball that meets children's needs, would allow them to take advantage of experts' opinion that younger aged children are of prime age for learning and acquiring new skills (Pangrazi, 2007).

Organizations such as KYSA (2008), FIFA, and US Soccer (2011) who recommended the use of smaller sized balls for youth are influenced by competitive engineers. Burton et. al (2011) stated, "competitive engineering-type strategies have been used extensively in the United States, particularly in youth sport programs" (p. 201). Competitive engineers in their effort to find new ways to improve youth sports, will need more research based studies to validate their recommendations. One frequently asked question in soccer is which size soccer ball to recommend to youth. Without data based studies to back up their claims, recommendations can only be taken for face value. More studies in this area of soccer ball sizes and weights are needed to determine the effects on skill development.

Pangrazi (2007) seemed to think that motor learning is optimum during the elementary years. However, as a result of this study, children may not be as coordinated and mature with their feet at this age to elicit the precise ball skills needed to cut the ball. Possibly manipulating the ball is too hard for them at this age. Rather, children may prefer to respond with what comes naturally to them such as running and kicking the ball regardless of ball size.

## CHAPTER 5

### Summary, Conclusions, and Recommendations

#### *Summary*

The purpose of this study was to determine the effects, if any, on soccer dribbling skills in children, ages 8-10, after practicing with different sized soccer balls during the season. Two recreational soccer teams participated in the experiment. The control group consisted of 12 players who practiced with a size four ball throughout the season, and the experimental group consisted of 12 players who practiced with a size five ball throughout the season.

In soccer, dribbling the soccer ball is one of the most important skills to master for success. One of the biggest problems is that players lose control of the soccer ball when dribbling. Children from birth naturally develop skills using their hands. But as they start to play soccer, they must learn distinct and highly developed motor skills using their feet. Soccer requires players to manipulate the ball in a number of ways. Players need to be able to change speeds by accelerating and stopping at a moment's notice. They need to be able to change directions while on the move. In an effort to beat an opponent, they must be able to read, collect, and process information and respond with the ball proficiently.

Experts in the field of development reference such theories as the "critical period" where learning can only take place in a narrow window of time normally when children are young, and the "sensitive period" where learning is more conducive in the younger years (Berk, 2007). This is why training younger players in the skills of soccer is important. However, research has shown that children's processing rates are slower than teenagers and adults. The KYSA (2008) recommended ball size for 8 – 10 year olds is a smaller size four ball than an

adolescent and adult size five ball (p. 1). When coaches want to challenge their players, they provide them with a smaller, faster ball. However this may not be the best method to train young player whose processing rates are slower. By providing a larger, heavier size ball which rolls slower, it may allow these youth time to process and respond appropriately while dribbling instead of chasing a smaller, faster ball. This study was designed to compare two teams using different size balls to determine which size ball can best improve the players' skills.

The test subjects were 8 to 10 year old recreational soccer players. The control group consisted of 12 soccer players, six boys and six girls. The experimental group consisted of 12 soccer players, five boys and seven girls. The groups practiced 2 days a week for 6 weeks. A timed Mor-Christian General Soccer Ability Skill Test Battery (Collins & Hodges, 2001) was administered as a pretest during the first week of practice and a posttest was administered 6 weeks later. Each player was timed during the dribbling tests, and the results were recorded. A t-test was calculated to determine if differences were found between the pretest and posttest timed scores. Both teams improved in speed from the beginning of the season to the end of the season.

The data were analyzed and it was determined that there was not a significant difference between (.05) the control and experimental groups. While the size four ball showed an improvement in time over the size five ball, when comparing data, the results were not significant enough to rule out the effects of what could be expected by chance alone. The data did not provide enough evidence to support the fact that one ball size was better than the other in the development of soccer dribbling skills.

### *Conclusions*

Based on the literature and results obtained in this study, the following conclusions were drawn:

1. Ball sizes do not affect dribbling skills in young soccer players.
2. Soccer players 8 to 10 years old should continue to play with the smaller size four ball.
3. The weight and size of the larger ball may be too cumbersome for these young players to control and develop dribbling skills.

### *Recommendations*

The following recommendations were based on the findings and conclusions of this study.

1. Duplicate this study and use a larger number of subjects, both males and females, which would increase the chances of having a significant difference between the groups.
2. All participating teams should conduct the same practice regimen in order to assure that the subjects receive the same amount of time for practicing dribbling skills.
3. Test children who are the same age so they have the same amount of experience with the different size soccer balls.
4. Test different age groups and different size soccer balls over a longer period of time for the intervention.
5. Instead of using a larger heavier size five ball, further testing is recommended for a smaller heavier ball such as a size four Futsal ball. (Futsal balls are weighted indoor soccer balls.) A smaller weighted Futsal ball would fit a child's foot better, as well as roll

slower to coincide with their slower cognitive processing rates. The advantage of these balls is that they come in all of the recommended youth sizes.

## REFERENCES

- Berk, L. (2007). *Development through the Lifespan* (4<sup>th</sup> ed.). Boston: Pearson Allyn and Bacon.
- Burton, D., Gillham, A. D., & Hammermeister, J. (2011). Competitive Engineering: Structural Climate Modifications to Enhance Youth Athletes' Competitive Experience. *International Journal of Sports Science & Coaching*, 6(2), 201-217.
- Coaching and Playing Youth League Soccer*. (1988). United States of America. Master Press.
- Coerver, W., & Galustian, A. (1995). *Score! Soccer Tactics & Techniques for a Better Offense*. New York. Sterling Publishing Company.
- Collins, R. D., & Hodges, P. B. (2001). *A Comprehensive Guide to Sports Skills Tests and Measurement* (2<sup>nd</sup> ed.). Lanham, Maryland.
- Dewazien, K. (2001). *Fundamental Soccer Practice of Champions*. Fresno, CA: Fun Soccer Enterprises.
- Elliott, S., McCollum, S. & Stuart, A., (2004, September). Six Days of Soccer for Your Elementary Physical Education Classes. Ready-to-Use Developmentally Appropriate Activities. *Teaching Elementary Physical Education*. (Vol.15, Issue 5, pp.17-22).
- Flaherty, S. (2010, March 3). *How does the size of a Soccer Ball affect the Game of Soccer?* Retrieved June 24, 2011, from <http://www.livestrong.com/article/89252-size-soccer-ball-affect-game/soccer>.
- Fleck, T., & Cossaboon, J. (1992) *US Youth Soccer Assistant Coach Series U10 Activity Aids for the Parent/Coach*. United States Youth Soccer Association, Inc.
- FIFA. *Laws of the Game 2010/2012*. Retrieved January 28, 2012, from [http://www.fifa.com/mm/document/affederation/generic/81/42/36/lawsofthegame\\_2011\\_12\\_en.pdf](http://www.fifa.com/mm/document/affederation/generic/81/42/36/lawsofthegame_2011_12_en.pdf).
- FIFA Quality Concept For Footballs. Consistent Circumference*. Retrieved August 18<sup>th</sup>, 2011 from <http://footballs.fifa.com/Football-Tests/CIRCUMFERENCE>
- FIFA Quality Concept For Footballs. The Concept. How does a ball receive the FIFA marks?* Retrieved August 14<sup>th</sup>, 2011, from <http://footballs.fifa.com/Quality-Concept>.
- FIFA Quality Concept For Footballs* (PDF). Retrieved October 4, 2011, from [http://www.fifa.com/mm/document/afdeveloping/pitchequip/fqc\\_sales\\_doc\\_05\\_2007\\_13409.pdf](http://www.fifa.com/mm/document/afdeveloping/pitchequip/fqc_sales_doc_05_2007_13409.pdf).
- Fox, E., Bowers, R., & Foss, M. (1993) *The Physiological Basis for Exercise and Sport* (5<sup>th</sup> ed.). Madison, WI: WCB Brown & Benchmark Publishers.
- Gabbard, C. (2004). *Lifelong Motor Development* (4<sup>th</sup> ed.). San Francisco: Pearson Education, Inc.

- Galustian, A., & Cooke, C. (1993). *Play Like a Soccer Legend. Coerver Coaching*. (pp. 1-43). Sports Method, Inc.
- Hamm, M. (1999). *Go for the Goal. United States of America*. Harper Collins Publisher.
- Hargreaves, A. (1990). *Skills and Strategies for Coaching Soccer*. United States of America: Leisure Press. Human Kinetics.
- Howe, B., & Waiters, T. (1993). *Coaching 9, 10 and 11 Year Olds*. Vancouver: World of Soccer.
- Huijgen, B., Elferink-Gemser, M., Post, W., & Visscher, C. (2010, May 28). Development of Dribbling in Talented Youth Soccer Players Aged 12-19 Years: A Longitudinal Study. *Journal of Sports Science*, 28, 689-698.
- Katis, A., & Kellis, E. (2009). Effects of Small-Sided Games on Physical Conditioning and Performance in Young Soccer Players. *Journal of Sports Science and Medicine*. 8, 374-380.
- Kansas Youth Soccer Association KYSA (2008, July 20). *Kansas Youth Soccer Chapter 4: Policies*. Retrieved July 20, 2011, from [http://www.kansasyouthsoccer.org/UserFiles/file/KSYSA\\_Policies\\_07-20-08.pdf](http://www.kansasyouthsoccer.org/UserFiles/file/KSYSA_Policies_07-20-08.pdf).
- Kreighbaum, E., & Barthels, K. (1990). *Biomechanics* (3<sup>rd</sup> ed.). New York: MacMillan Publishing Company.
- LaPrath, D. (2009). *Coaching Girls' Soccer Successfully*. United States of America: Human Kinetics.
- Pangrazi, R. (2007). *Dynamic Physical Education for Elementary School Children* (15<sup>th</sup> ed.). San Francisco: Pearson Benjamin Cummings.
- Russel, M., & Kingsley, M. (2011). Influence of Exercise on Skill Proficiency in Soccer. *Sports Med*. 41, 523-539.
- Russell, M., Benton, D., & Kingsley M. (2011). The Effects of Fatigue on Soccer Skills Performed During a Soccer Match Simulation. *International Journal of Sports Physiology and Performance*, 6, 221-233.
- Russell, M., Benton, D., & Kingsley, M. (2010). Reliability and Construct Validity of Soccer Skills Tests that Measure Passing, Shooting, and Dribbling. *Journal of Sports Sciences*, 28(13), 1399-1408.
- Schreiner, P. (2010). *Perfect Ball Control*. Toronto. Meyer & Meyer Sport.
- Separovic, V. & Uzicanin E. (2009). Situational Tests in Tennis Players in U-12 Age Category (10-12 Year Olds). *Sport SPA*, 6, 43-49.
- Siedentop, D. & Tannehill, D. (2000). *Developing Teaching Skills in Physical Education* (4<sup>th</sup> ed.). Mountain View, CA.
- Slavin, R. E. (2007) *Educational Research in an Age of Accountability*. Boston: Pearson.

Stone, K. J., & Oliver, J. L. (2009). The Effects of 45 Minutes of Soccer-Specific Exercise on the Performance of Soccer Skills. *International of Journal of Sports Physiology and Performance*, 4, 163-175.

Thomas, C., Felliingham, G., & Vehrs P. (2009). Development of a Notational Analysis System for Selected Soccer Skills of a Women's College Team. *Management in Physical Education and Exercise Science*, 13, 108-121.

*US Soccer USSF: Notes on the Laws of the Game*. Retrieved September 2, 2011, from <http://www.ussoccer.com/Referees/Laws-of-the-Game.aspx>.

*US Youth Soccer. (2007). US Youth Soccer FAQ*. Retrieved October 5, 2011, from <http://www.usyouthsoccer.org/aboutus/FAQ.asp>.

*Wikipedia. Hand*. Retrieved August 25<sup>th</sup>, 2011, from <http://en.wikipedia.org/wiki/Hand>.

APPENDIX A

Permission for Study

To the Parks and Recreation Director,

I am writing my master's thesis in physical education at the University of Kansas. I would like to conduct an experiment using the Mor-Christian General Soccer Ability Test Battery to complete my thesis. The test will consist of placing 12 cones in a circle on the grass and timing the kids dribbling the soccer ball through the cones. I will use size 3, 4, and 5 balls and make a comparison. I will perform the test at the beginning of the season and at the end of the season. I have attached a copy of the experiment. I will only test for dribbling not passing or shooting. My experiment is confidential and my paper and presentation will not contain any names of the participants. This test is only to determine if one size soccer ball is better at developing dribbling skills for this age.

If you have any questions, please don't hesitate to call or e-mail me.

Thank You,  
Karen Miller

APPENDIX B

Approval for Research

6/8/11  
HSCL #19377

Karen Miller  
605 Willow Ct.  
Lansing, KS 66043

The Human Subjects Committee Lawrence has received your response to its full IRB review of your research project,

19377 Miller/Greene (HSES) Assessing the Impact on Soccer Skills when Dribbling Different Sized Soccer Balls

and found that it complied with policies established by the University for protection of human subjects in research. The subjects will be at minimal risk. Unless renewed, approval lapses one year after approval date.

The Office for Human Research Protections requires that your consent forms must include the note of HSCL approval and expiration date, which has been entered on the consent forms sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at [http://www.rcr.ku.edu/h scl/hsp\\_tutorial/000.shtml](http://www.rcr.ku.edu/h scl/hsp_tutorial/000.shtml)
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,



Jan Butin  
Associate Coordinator  
Human Subjects Committee - Lawrence

cc: Jerry Greene

APPENDIX C

Letter to Parents

## Information Statement

Dear Parents,

This season I will be conducting a research study involving U-10 division soccer recreation teams. I am completing my work on my Master's degree in physical education at the University of Kansas.

The Department of Health, Sport, and Exercise Sciences at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish for your child to participate in the study. You should be aware that even if you agree to have your child participate, you are free to withdraw your child at any time.

The purpose of the study is to determine which size soccer ball improves this age group's dribbling skills. In order to assess any changes in soccer skill, I would like to perform the Mor-Christian Soccer Ability Skill Test for dribbling. The dribbling test consists of placing 11 cones in a circle on the grass and timing the participants weaving through the cones. The cones are placed 4 yards apart. The diameter of the circle is 40 feet with a radius of 20 feet from the center. There are three sessions. In each session, a different size soccer ball will be used. Each session will consist of three runs. The first run is clockwise. The second run is counter-clockwise, and the third run is the participant's choice of direction. The time trial is determined by taking the two best runs for each session. I will administer this test at the beginning of the season and at the end of the season in an effort to draw conclusions regarding their skill level due to the different ball sizes. The tests will be administered during regular practice times.

All procedures have been approved by an advisor of the Department of Health, Physical Education, and Recreation at the University of Kansas.

This experiment will be conducted by myself. Your child's name will not be associated in any publication or presentation with the information collected from this study. A study number will be assigned instead of your child's name.

The tests will be performed during the fall 2011 soccer season which is projected from August to October. Do not hesitate to ask any questions about the study at anytime.

### BENEFITS

The benefit of this study is to determine which size ball is best suited for this age group to improve skills.

### RISKS

The risk involved in performing this test is falling on the grass and suffering minor skin abrasions or scrapes.

The success of the study depends upon the cooperation of the parents and players. I greatly appreciate your help.

Thank you, Karen Miller

APPENDIX D

Parental Consent Form

## Parental Consent Form

### TITLE OF THE RESEARCH STUDY

Assessing the impact on soccer skills when dribbling different sized soccer balls.

### INVITATION TO PARTICIPATE

As a graduate student at the University of Kansas I am pursuing my master's degree and writing a thesis paper. The Department of Health, Sport, and Exercises Sciences Department at the University of Kansas support the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish your child to participate in this study. You should be aware that even if you agree to allow your child to participate, you are free to withdraw at any time. If you do withdraw your child from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Kansas.

### PURPOSE OF THE STUDY

The purpose of this project is to assess any change in soccer dribbling skills when children in division's Under-8 and Under-10 dribble different sized soccer balls. FIFA (Federal International Football Association) and the U.S. Soccer Federation recommends size 3 balls for U-6 and U-8 aged players, size 4 balls for U-10 and U-12 aged players, and size 5 balls for U-14 and older players. How will U-8 and U-10 aged players perform when subjected to the same soccer test using a size 3, 4, and 5 soccer ball? It may seem obvious that younger children would need to dribble a smaller ball because their feet and bodies are smaller. But with this age, coordination is less developed and they may be more vulnerable to loosing control with a smaller, quicker ball than a larger, heavier ball that travels slower. A larger ball may travel at a slower speed allowing them better control for a quicker time trial. The larger, slower ball may also enhance ball skills because children can process their next move whereby developing better skills rather than just reacting to a loose ball.

### EXPLANATION OF PROCEDURES

In order to assess any changes in soccer skills, I would like to perform the Mor-Christian Soccer Ability Skill's Test for dribbling. The dribbling test consists of placing 12 cones in a circle on the grass and timing the participants weaving through the cones. The cones are placed 5 yards apart. The diameter of the circle is 20 yards with a radius of 10 yards from the center. **My goal is to complete the tests in six practices. I will test using three different size balls. A different size soccer ball will be used each day for testing.** Each test practice session will consist of three runs. The first run is clockwise (CW). The second run is counter-clockwise (CCW), and the third run is the participant's choice of direction. The time trial is determined by taking the two best runs for each session. I will administer these tests at the beginning of the season and at the end of the season in an effort to draw conclusions regarding their skills' level due to the different size balls. **The tests will be administered during regular practice times while the soccer coach or assistant coach is conducting practice. I will call one child at a time to test. Throughout the season, the children may use whatever size soccer ball they own in practice.**

<i>Practice</i>	<b>2</b>	<b>3</b>	<b>4</b>	.....	<b>18</b>	<b>19</b>	<b>20</b>
<i>Soccer Ball Size</i>	<b>#3</b>	<b>#4</b>	<b>#5</b>	.....	<b>#3</b>	<b>#4</b>	<b>#5</b>
	CW	CW	CW		CW	CW	CW
	CCW	CCW	CCW		CCW	CCW	CCW
	CHOICE	CHOICE	CHOICE		CHOICE	CHOICE	CHOICE

## BENEFITS

The benefit of this study is to determine which size ball is best suited for **6 – 11 year olds** to improve skills.

## PARTICIPANTS PAYMENTS

**Participants will not be paid for taking part in this study.**

## CONFIDENTIALITY

Your child's name will not be associated in any publication or presentation with the information collected about your child or with the research findings from this study. Instead the researcher will use a study number rather than your child's name for the purpose of data organization. My objective is to compare dribbling times to the different size balls used.

## RISKS

The risk involved in performing this test is falling on the grass and suffering minor skin abrasions or scrapes. **We will have on hand someone trained in first aid should there be an injury it will be taken care of immediately and appropriately.**

## REFUSAL TO SIGN CONSENT AND AUTHORIZATION

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your rights to any services you are receiving or may receive from the University of Kansas and/or the city parks and recreation. **However, if you refuse to sign, your child cannot participate in the test study.**

## CANCELLING THIS CONSENT AND AUTHORIZATION

You may withdraw your consent to allow participation of your child in this study at any time. You also have the right to cancel your permission to use and disclose further information collected about your child, in writing, at any time, by sending your written request to: Karen Miller

If you cancel permission to use your child's information, the researcher will stop collecting additional information about your child. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

## QUESTIONS ABOUT PARTICIPATION

Questions about procedures should be directed to the research listed at the end of this consent form.

PAPRTICIPANT CERTIFICATION

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my child’s rights as a research participant. I may call (785) 864-7429, write to the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7568, or e-mail [mdenning@ku.edu](mailto:mdenning@ku.edu)

I agree to allow my child to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

\_\_\_\_\_  
Type/Print Participants Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Parent/Guardian Signature

Researcher Contact Information  
Karen Miller

**Photography Permission:**

**It is common practice during the thesis presentation to present photos of the experiment. Please check “YES” if you permit your child to be photographed for presentation purposes only or “NO” if you do not give consent for your child to be photographed.**

YES \_\_\_\_\_ NO \_\_\_\_\_

APPENDIX E

Child Assent Form

## CHILD ASSENT FORM

### TITLE OF THE RESEARCH STUDY:

Assessing the impact on soccer skills when dribbling different sized soccer balls.

The health, Sport, and Exercise Science Department at the University of Kansas would like to invite you to participate in this study. Please talk this over with your parents. Your parents will also need to give their permission.

### Purpose:

The purpose of the study is to see which size soccer ball you can dribble the fastest while under control.

### Explanation of Procedures:

There are things about the tests you may want to think about before you decide to do them. You do not have to do these tests. You can ask questions any time.

There are three different sized soccer balls. There is a small size 3 soccer ball, a medium size 4 soccer ball, and a large size 5 soccer ball. You will dribble each soccer ball and weave between the cones that are placed in a circle. I will time you while you are dribbling. You will dribble the size 3 soccer ball through the cones three different times. You will dribble the size 4 soccer ball through the cones three different times. And you will dribble the size 5 soccer ball through the cones three different times. Your first dribble will be in one direction. Your second dribble will be in the other direction, and your third dribble will be in the direction of your choice so you decide which way you thought you were the fastest. I will record your two fastest times for each size ball. With this information, I will be able to discover which size ball allows your age group to dribble the fastest. I will test you at the beginning of the season and at the end of the season.

When I write my paper, nobody's names will be in it.

## APPENDIX F

### Example Workout

## Sample Workout

Recreational Player – 1 hour practice

Monday

25%	Warm-up Skills	-jog around the field while dribbling the ball 1 time -dribble through four cones set in a straight line 5 times up and back
25%	Small group	-sharks and minnows, three versus three
25%	Shooting	-shooting on goal
25%	Passing	-give n go (short passes)
25%	Scrimmage	-full field

Wednesday

25%	Warm-up Skills	-jog around the field while dribbling the ball 1 time -dribble in a figure-8 around two cones, placed 3 yards apart, 5 times
25%	Small group	-stuck in the mud tag game dribbling, World Cup
25%	Shooting	-shooting on goal
25%	Passing	-crosses (long passes to a teammate)
25%	Scrimmage	-full field

## APPENDIX G

### Timed Test Scores

		GROUP	TIME 1	TIME 2
CASE	1	1	73.67	70.57
CASE	2	1	41.84	50.43
CASE	3	1	53.68	50.02
CASE	4	1	46.25	50.31
CASE	5	1	54.24	59.72
CASE	6	1	53.88	55.66
CASE	7	1	46.06	45.44
CASE	8	1	50.89	32.56
CASE	9	1	48.68	50.85
CASE	10	1	51.97	54.62
CASE	11	1	46.48	42.82
CASE	12	1	45.65	45.33
CASE	13	2	43.03	51.89
CASE	14	2	75.30	72.63
CASE	15	2	62.74	49.07
CASE	16	2	49.71	41.99
CASE	17	2	56.75	53.49
CASE	18	2	51.68	52.14
CASE	19	2	53.71	53.97
CASE	20	2	56.62	52.54
CASE	21	2	46.96	38.74
CASE	22	2	36.66	40
CASE	23	2	43.60	46
CASE	24	2	52.47	47.95

GROUP 1 = BALL # 5

GROUP 2 = BALL # 4

TIME 1 = PRETEST FOR MOR-CHRISTIAN GENERAL SOCCER ABILITY SKILL TEST

TIME 2 = POSTTEST FOR MOR-CHRISTIAN GENERAL SOCCER ABILITY SKILL TEST

Correlation coefficient results:

		Day 1	Day 3
Case	25	41.84	45.43
Case	26	40.89	32.56
Case	27	52.74	49.07
Case	28	44.96	48.78
Case	29	37.66	40.18

Correlation: .6545139