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SPECIFIC MEDICINE BALL TRAINING FOR THE SOCCER GOALKEEPER

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Kinesiology

by
Ted Edward Armstrong

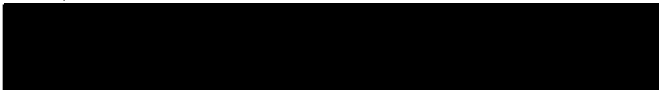
December 2002

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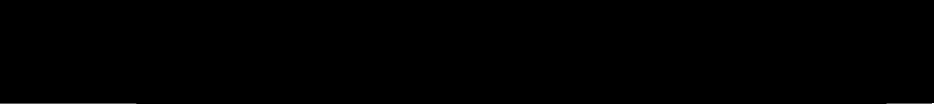
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December 2002

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ABSTRACT

Medicine balls have traditionally been used to develop upper body strength through catching and throwing exercises. Medicine ball training is also designed to enhance power, strength, flexibility and agility. In addition, they are used for abdominal strength gains and rehabilitation exercises for various injuries to the upper torso. The purpose of this project is to design a medicine ball program specifically for soccer goalkeepers using the specificity and progression principles of exercise physiology. This program will develop overall strength through a progression of a warm-up, specific goalkeeping maneuvers, plyometrics and general fitness using the medicine ball for optimal performance during training sessions.

The overall findings of the project were viewed as a significant gain in upper body strength and more confidence in catching a regulation ball. Other findings included a stronger core and improved leg strength for vertical and horizontal movements from the ground.

ACKNOWLEDGMENTS

Thank you to the goalkeepers who were patient enough to allow photos of them while training with the soccer medicine ball. As well as, the coaches who gave me the flexibility to train their goalkeepers using this unique method of training. Special thanks goes to the professors and various coaches who critiqued and guided my project from their professional perspective and specialization. This project would have never been possible without all the information gained from youth coaches and the various coaching clinics that enhanced my vision of the ideal training method for soccer goalkeepers.

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CHAPTER ONE

INTRODUCTION

Training for most sports involves increased physical demands that the regulation ball cannot always offer. A medicine ball designed for a particular sport can enhance the dynamics of technical skills and strengthen the body to heightened levels of performance. Athletes today have been able to increase their potential because of proper training techniques. A soccer goalkeeper is one of those athletes who must develop a solid core (midsection), maintain a higher level of upper body strength and total body flexibility to allow for quality defensive attributes. A medicine ball can allow for the specific training needed to increase the strength in the body as a whole, while training for the game-like experiences. The soccer medicine ball will also allow the increased ability of functional movements, reaction time, movement time, neuromuscular coordination, core, overall strength and flexibility (Jespersen, 2001).

The goalkeeper's fitness needs to differ from those of teammates (Herbst, 1999). The soccer goalkeeper movements are more explosive at a given moment against the force of the ball (Phillips, 1996). Recent trends indicate that the demands of the game have changed from past years; the goalkeeper is now an integral part of the game and the team due to rule changes, new techniques of training and the various systems of play. For instance, the goalkeeper's main concern was the prevention of goals. Now the goalkeeper is also responsible for starting the attack on the opposing goal.

Purpose of the Project

The purpose of this project was to design a simple to complex progressive training program for goalkeepers using a medicine ball as the primary strength-conditioning tool. This will enable the goalkeeper to reach higher performance and skill levels. Preparing goalkeepers by training them with the team is beneficial for their foot skills, but it does not prepare them for the majority of what their position requires: defensive skills, diving for low

and high balls, distributing to teammates through various throws, challenging oppositions for high balls and making the difficult saves. This project will consist of developing specific goalkeeper training regimens to assist the coaches while conditioning the rest of the team for their various positions on the field.

The medicine ball has changed much in the past 2 years. Old medicine balls were made of leather materials and after several months of use they would soften up and lose shape. New medicine balls are made of polyurethane(rubber), offering many colors. The shapes range from an oversized basketball to a volleyball, and the weight ranges are from 1 to 10 kg. The buoyancy can also vary due to what type of substance the ball is filled with (air, water or solid core). The development of a ball that is specific to the sport of soccer has enhanced the ability of coaches who train the goalkeepers to reach their performance objectives during various training sessions and to meet the physical demands of the game.

This project is intended to assist coaches who do not understand the value of goalkeeping strength

programs with a medicine ball and demonstrate how to implement the program with their goalkeeper's. The medicine ball program is not designed to act as the sole strengthening program for the goalkeeper. It is designed to be integrated into a training session 2 to 3 times a week for additional strength gains in preseason, season and postseason training sessions. The size 5 ball is the only ball in the program, but other medicine ball sizes can be used to supplement the program for various ages and different strength objectives.

Significance of the Project

This project is significant to the game of soccer and to the individuals who dedicate themselves to coaching goalkeepers of various ages, skill levels and the physical demands. The soccer medicine ball was designed in 1990 by Kwik goal, and the actual selling of the ball has only been recent, within the past 2 years. The soccer-specific medicine ball use is a beneficial tool for many training purposes because it weighs only 2 lbs, which is twice the weight of a

regulation ball. F.I.F.A. approved balls range from 14 to 16 ounces in weight (U.S.S.F., 2000).

Most of the core training exercises require the use of a ball heavier than 2 pounds for increased strength gains. The core muscles are the muscles throughout the midsection which include: abdominal, oblique, hip, lower back muscles and gluteal muscles (Bartoli, 2002). Most of the upper torso exercises would have greater gains if a heavier ball were used during fitness training sessions. The upper torso muscles include: chest muscles, upper back muscles, and the upper extremity muscles. The techniques that are being used are soccer specific to fundamental skills taught and rehearsed, ground contact exercises, partner enhanced exercises for the competitive nature of sport and contact exercises for a more game-like setting.

The program is going to be designed as a progressive, simple to complex method of training over a 10 week period. The in-season program will be conducted during two practice sessions during the week. Modified competitive games will blend into the third session during the week for maximum strength

gains. If there is a game on Saturday, then Tuesday and Thursday should be medicine ball training program days. The game is to be considered the sport-specific training day because of the strenuous mental and physical nature of the competition.

Assumptions

The following assumptions were made regarding the project:

1. The athlete being trained in the program understands goalkeeping principles and has played the goalkeeper position for several years.
2. The goalkeeper performing the program is age appropriate to use a size 5 soccer ball.
3. The trainer understands the principles of goalkeeping to allow for adjustments or adaptations to the medicine ball program.
4. The technical ability of the goalkeeper is an important foundation for the development of dynamic strength exercises.
5. The stretching exercises to be performed are already known by the players and coaches.

6. The goalkeeper performing the exercises can perform the program indoors or outdoors using a wall.

Limitations of the Project

The following limitations apply to this project:

1. The medicine ball program will not be implemented on goalkeepers to measure the amount of strength gains during any season.
2. There are no size 3 or size 4 soccer-specific medicine balls that coincide with the size 3 and size 4 soccer balls.
3. There is only one medicine ball designed specifically for the soccer player, as well as only one weight (2 lbs.).
4. The soccer specific medicine ball is the only piece of equipment used in designing the program; besides the player's equipment; goalkeeper gloves, soccer cleats, sliding pants or shorts, padded goalkeeper jersey, padded shorts or pants and shin guards. Various weights of medicine balls can to be incorporated into the program.

Definition of Terms

1. Aerobic exercise refers to ability performing exercise for an extended period of time, with little rest and at a moderate intensity. (ie. jogging, biking, hiking, etc.)
2. Anaerobic exercise refers to the ability to perform exercise for short periods of time and at a high intensity.
3. Agility refers to the ability of the body to change direction quickly.
4. Balance refers to the stability produced by an even distribution of weight on each side of the vertical axis of the body.
5. Ballistic exercise refers to a bouncing and repetitive type of movement from active muscles.
6. Core refers to the center of the body or midsection.
7. Coordination refers to the harmonious functioning of the parts of the body for the most effective results.
8. Dynamic exercise refers to the flexibility and range of motion during a sport-specific movement.

9. F.I.F.A. refers to the governing body of soccer around the world, Federation Internationale de Football Association.
10. Flexibility refers to the range of motion at a particular joint.
11. Lower extremities refers to the legs and feet of the body.
12. Multi-joint exercise refers to an activity that involve two or more primary joints directly.
13. Pelvic rotation refers to the midsection movement of the body along the axis.
14. Plyometric exercise refers to a rapid, powerful movement in muscles involving a countermovement with maximal force in the shortest possible time.
15. Progressive resistance exercise refers to increasing exercise intensity over time with an increased amount of resistance.
16. Power refers to the explosive energy, force, strength and might (Force/Time).
17. Rehabilitation refers to reconditioning or repairing of a muscle or connective tissue, and overall function of the damaged area on the body.

18. Specific warm-up refers to incorporating movements similar to the movements of the athlete's sport.
19. Specificity refers to the distinct adaptations to the physiological systems that arise from the training program. The body will perform best at the specific speed type of contraction, using the muscle group and energy source it has been accustomed to in training.
20. Static exercises refer to the range of possible motion about a joint from a stationary force.
21. Stretch reflex principle refers to the muscle action of the previously stretched muscle fibers.
22. Stretch-shortening cycle refers to the eccentric-concentric muscle movements.
23. Torso refers to the upper body; upper back, chest, shoulder, arms and neck.
24. U.S.S.F. refers to the governing body of soccer in the United States, United States Soccer Federation.
25. Warm-up refers to the increase in blood flow, cardio respiratory rate and muscle temperature to prepare for exercise.

Soccer Specific Terms Defined

1. Basket-catch refers to the action of catching a ball with the arms in a cradled position. See Figure 6.
2. Distribution refers to the action of throwing a soccer ball to a teammate. See Figure 12.
3. Diving refers to the action of the goalkeeper moving the feet to get the hands to the ball by leaving the ground and landing on a lying on side prone position from a soccer ball being kicked.
4. Goal refers to the 8 foot by 24 foot connected poles that the goalkeeper stands between to deny opponents from scoring points.
5. Goalkeeper Gloves are protective gloves specifically designed for a goalkeeper's hand to be worn while playing the goalkeeper position. See Appendix A.
6. Jumping refers to the action of the goalkeeper using his legs to jump into the air with the technique in Figure 4.
7. Ready Stance refers to the positioning of the entire body before a reaction is made.

8. Penalty Spot refers to the painted white dot inside the penalty area centered 12 yards away from the goal line.
9. Scooping refers to the action of picking up the soccer ball from the ground. See Figure 5.
10. Shin Guards refers to the protective padding designed to be worn on both legs (shins) of the soccer player. See Appendix A.
11. Shot stopping refers to the goalkeeper's ability to stop a soccer ball shot from the opposing team from going into the soccer goal.
12. Soccer shoe refers to the cleated foot equipment worn by soccer players. See Appendix A.
13. Triangle hand position refers to the action of catching the soccer ball with the index finger and thumb creating a window to see a triangle shape. See Figure 3.
14. 'W' hand position refers the action of catching the soccer ball with the thumbs close together and fingers spread apart. See Figure 2.

CHAPTER TWO

REVIEW OF THE LITERATURE

Traditionally medicine balls were only used to enhance strength in the core (midsection) and for rehabilitation. Recently medicine balls have been introduced to take on various shapes and colors in the sports world. They can be air-filled, multi-colored polyurethane balls designed to 'bounce' and 'float' offering a wide range of exercise applications (Collins, 1999). They also are variable in size for simulating sport activities such as baseball, volleyball and basketball. Each medicine ball can provide various weights and simulations. For example, some medicine balls can allow air to be inserted to allow for a heavier weight and provide more bounce to no bounce. This allows the versatility of the medicine ball to move from the sports field to the personal trainer's gym with ease. Because of the adaptability to age, strength, ability, sport specific movements and coordination levels, the medicine ball has become an exercise tool designed to improve athletic performance (Collins, 1999). The medicine

ball is designed to be a multi-purpose training tool that can be used alone or with a partner for improving core strength, functional movements, muscle coordination, and reaction time as well as improving overall strength and flexibility (Jespersen, 2001).

Most medicine ball programs in the past have focused on tennis, volleyball, basketball, softball, baseball, golf and swimming, incorporating core strength development and upper torso training using catching and throwing of a medicine ball. The research demonstrates a medicine ball training guide for soccer athletes, but the exercises are designed for field players (Chu, 1989). A pamphlet on the market involves training soccer goalkeepers with a size 5 medicine ball, yet it is not very thorough on a training regimen (DiCicco, 1990). It does not prescribe an exercise program, but shows pictures demonstrating the various exercises for goalkeeper-specific movements using a soccer-specific medicine ball. However, it does briefly describe and demonstrate the physical demands for use of the soccer medicine ball and how they can intertwine with the technical ability of the goalkeeper.

Benefits of Medicine Ball Training

The ability to build strength, power, speed and flexibility all in one program with a simple 2 to 35 pound round weighted ball is gaining in popularity (Jespersen, 2001). The medicine ball is completely portable, relatively inexpensive, is used to activate both anaerobic and aerobic energy systems, can be used to mimic sports specific movements and it can add variety to workouts for indoor or outdoor use (Lee, 1999). The major advantage of medicine ball training is that almost every exercise directly or indirectly conditions the torso (Collins, 1999). Medicine ball training can allow athletes to tailor their program to meet specific goals and objectives and to provide a challenging and motivating exercise regimen (Chu, 1989). The combinations of plyometrics, ballistic and static exercises, core strength training development, anaerobic and aerobic exercise, progressive resistance and the ability to impose specific demands during a training session allows the medicine ball the diversity to be a unique multipurpose training tool

for any sports athlete, in an individual or dual setting (Collins, 1999).

Plyometrics

The roots of plyometric training can be traced to Eastern Europe, where it was simply known as jump training or shock training (JOSPT, 1993). Typical plyometrics are designed to involve the lower extremities, but with a medicine ball plyometrics can be a safe and effective way to involve the upper body (Chu, 1989). The practical definition of plyometrics is a quick powerful movement involving a pre-stretching of the muscle, thereby activating the stretch-shortening cycle (JOSPT, 1993). Plyometric exercises can be designed to enhance the explosive and reactive movements involved in sports by using the medicine ball through progressive training regimens (Morse, 1992). For example, the stretch reflex principle allows the muscle to shorten and lengthen with in the same movement by catching (eccentric) and throwing (concentric) a medicine ball (Morse, 1992). Training the whole body is typically the goal of every strength conditioning program (Kirner, 1990). The medicine ball allows this through powerful range of

movements in the torso. Medicine ball training bridges the gap between the type of strength developed in the weight room and the application of that strength to the specific sport skill or movement pattern (Gambetta, 1991). Plyometric training has been adapted to improve upper extremity and trunk power by using a weighted object such as a medicine ball to create the necessary resistance (Chu, 1989).

Ballistic Performance

Many ballistic sport skills require a transfer of muscular force from lower to upper limbs (Pate, 1989). The transfer of a synchronized movement by muscles from the feet to the hands to throw a soccer ball involves a pelvic rotation. One technical skill that involves a pelvic rotation with coordinated movement up through the arms is distributing a ball by throwing. Therefore, coordination is sequentially occurring and perfectly timed body movements are involved (Pate, 1989). A medicine ball will allow the ideal exercise for developing a complex movement by doing a pelvic rotation sequence (Pate, 1989). The specific movement of this exercise with the medicine ball will allow the generation of a greater force that

will increase the distance a regular ball is thrown. Medicine ball training is a multi-joint activity that develops the dynamic, explosive ballistic properties necessary to apply strength to sport skill (Gambetta, 1991). Performing medicine ball exercises in a dynamic fashion, with speed and power, builds muscle coordination and improves reaction time (Jespersen, 2001). The exercises become appropriate for developing total body fitness.

Core Development With Medicine Ball Training

Medicine ball training bridges the gap between the type of strength developed in the weight room and the application of that strength to the specific sport skill or movement (Gambetta, 1991). Perhaps the most important benefit of medicine ball training is that it targets the core (center of power and balance) directly or indirectly (Gambetta, 1991). A strong core is essential to all sport because it provides a platform around which the limbs can move effectively, especially when forces are transferred from the legs to the arms (Collins, 1999). Core stabilization of the hip, pelvis and shoulder girdle are prerequisites for safe and effective force application (Collins,

1999). The weight of a medicine ball forces the body through a greater range of motion while still exerting muscle control (Gambetta, 1991). In addition, core strengthening methods can prevent athletic injuries to the spine, extremities and lower back (Bartoli, 2002).

Designing the Program

The majority of the literature has focused its design of programs based on pre-season, in-season and post-season strength and conditioning regimens. These considerations were kept in mind while designing this soccer-specific medicine ball program. The program designs for this project originate from various goalkeeping books, personal experiences, and the studies designed for medicine ball training. This program is going to consist of warm-up exercises, goalkeeper-specific exercises and advanced training regimens for goalkeepers using the soccer medicine ball. Each session will be designed to improve specific technical abilities, as well as strength and explosiveness for the goalkeeper position through dynamic exercises. Pending what season (pre, post or in) the team is in, the coach will decide how much of

what particular exercises the goalkeeper may have to focus on and possibly not do. The program is designed to be a tool for improving strength and technique at the same time. It is not the magical solution for all goalkeeping preparation and conditioning.

CHAPTER THREE
MEDICINE BALL PROGRESSIVE
RESISTANCE PROGRAM

A portion of the warm-up will be performed individually and another portion will be performed with a partner, the trainer or a peer. The stretches performed should be of static nature. The stretching exercises will not be discussed, as it is assumed the goalkeeper already knows the specific stretches needed to warm-up properly. Becoming familiar with the soccer ball is an important aspect of becoming a keeper (Welsh, 1998). The same concept should be applied to a medicine ball. The participant should understand the weight they are handling and become familiar with the force that the ball can produce. The warm-up is an integral part of the medicine ball program because it is the basis for all goalkeeping exercises and fundamental skills learned and applied for the complete program. After the warm-up is introduced the progressions in the program become complex as partners are added and the exercises become intense. The focus of the goalkeeper's technique

becomes an important part for catching and fatigue purposes.

After the warm-up the intensity of the program will increase as well as most of the exercises competitiveness. Adding a partner to the workout allows the goalkeepers proper rest between repetitions and the desire to compete against someone who also wants the same starting position on the team. The program will consist of general techniques using the medicine ball to increase strength. As well as, non-goalkeeper specific maneuvers to increase whole body strength. The program's main objective is to increase strength in an environment suitable to the goalkeeper's everyday training regimen.

The Warm-up

The first exercise is ready-set stance ball bouncing (Figure 1). The ready-set stance is when the goalkeeper is standing on the balls of their feet, legs about shoulder width apart, knees slightly bent forward, the upper body slightly bent over the knees with the hands in front of the whole body. The position should feel as if one is falling forward and

having to catch oneself with every move. Using the 'W' catching technique bounce the ball while standing in the ready-set position. The 'W' catching technique can be better illustrated in Figure 2. The focus is on catching the ball and warming-up the arms through a ballistic movement. The exercise should be performed for about 2 minutes in duration.



Figure 1. Ready-Set Stance Ball Bouncing to 'W' Catch

The second exercise is a progression of the first (Figure 2): ball bouncing while walking around slowly then move to a faster paced rhythm once fundamentals are attained. While walking slowly take one step forward for every bounce and once a rhythm is established pick up the pace about 2 to 3 steps per bounce. The purpose of this exercise is to maintain possession of the ball while moving forward,

as well as increase velocity on the ball while moving. This exercise should last about 2 to 3 minutes in duration.

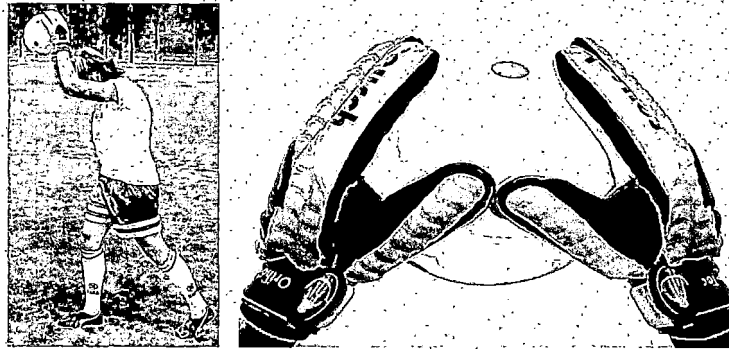


Figure 2. Ball Bouncing to 'W' Catch

Third exercise: throwing the ball underhand in the air and catching with the triangle method of catching. Begin by balancing the ball in the hand with elbow bent as seen in Figure 3. Keep legs shoulder width apart and begin in a flat stance at the feet. As the knees bend accelerate the arm to release the ball into the air as the arms are moving upwards adjust footwork to the balls of the feet. Throw the ball into the air about 5 to 7 feet and in front of the body. Retrieve the ball by jumping off of one foot and bending the opposite knee to help elevate and receive the ball with hands, arms reached above and

angled in front of head, elbows bent to catch ball at highest point. Land on both balls of feet and soft in nature with the ball in the basket catch (See Figure 6 for basket catch demonstration). Repeat by alternating arms thrown with for about 2 minutes. The focus is to see the ball into the hands while jumping at the ball.

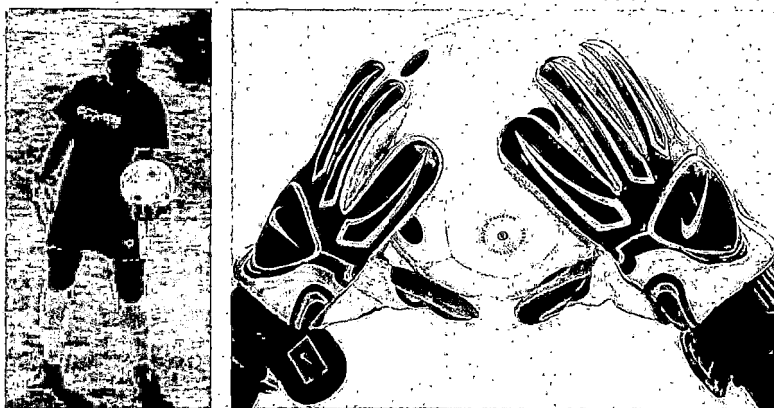


Figure 3. One-arm Throw to Window Catch

Fourth exercise: throwing the ball underhand in the air to self and catching it by jumping up to receive ball at highest point. This exercise is a step above the previous exercise. Bend down into a squat with the ball in both hands. As both arms swing upwards, explode into a jump in the air simultaneously (like a frog in Figure 4). Attempt to throw ball as high as one could with complete body control. Use

footwork to get to ball and catch at highest point by jumping off of one foot and bending the opposite knee as the previous exercise prescribed (see Figure 4).

Repeat for a total of 15 repetitions. Focusing on the explosion of the ball being released in the air and the second one to get the ball at the highest point.



Figure 4. Underhand Throw to Catch at Highest Point

Fifth exercise: rolling the medicine ball 5 to 8 yards to self and running quickly to recover ball by stepping in front of the ball completely and scooping it as to receive a ball shot on the ground. When rolling the ball, act as if bowling (ball in one hand) and get the ball to the ground as soon as possible by extending front leg and lowering the center of gravity by bending at the knees as a forward lunge is

performed. When approaching the ball to scoop it, act as if performing a forward lunge again and scoop the ball with both hands by spreading the fingers (thumbs out) and placing the pinkie fingers close to one another (Figure 5). Once the ball is scooped into hands bring the ball into the body as a basket catch is performed and stand straight up (see Figure 6). Perform exercise for 1-2 minutes, varying the distances the ball is rolled. The quality of the exercise is to be enforced not the quantity of repetitions.

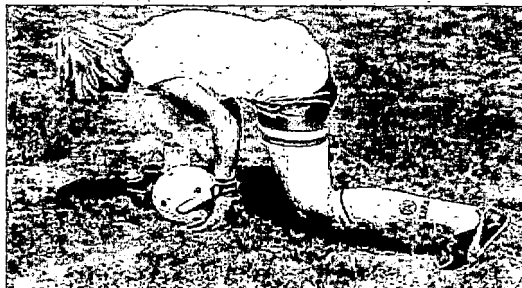


Figure 5. Scooping from the Ground

Sixth exercise: (Figure 6) throwing the ball down with both hands with the 'W' catching technique, as if to slam it on the ground and receive it with the basket catch. This exercise is designed to develop the upper body and emphasize the technical aspect of

the basket catch and how to manipulate the body to bounce the ball as hard as one could to the ground so the ball bounces over the head and get underneath the ball to catch it with confidence. Perform 20 repetitions emphasizing the ball moving higher or just as high as the previous bounced ball. As a higher level of skill is achieved challenge the goalkeeper by asking to do a forward roll or a push up before catching the ball off the bounce.



Figure 6. Ball Bouncing to Basket Catch

Seventh exercise: (Figure 7) involves ballistic stretching by weaving in and out of legs from the ground to the head. Take movements from slow speeds to quicker speeds with proficiency. This exercise is a goalkeeper's stationary speed test. The movement

starts by moving the ball between the legs in a Figure eight one time around as the ball is moved between the legs the ball is picked up and the ball is to be moved in a Figure eight between the legs at the knees after this is accomplished the ball is moved around the waist one full revolution, after this is accomplished the ball is moved one revolution around the head and then back down in reverse order. The goal is to get



Figure 7. Ballistic Ball Movement

the ball to move around the body as fast as one could without losing control of the ball and with speed.

The whole body is used to move the ball from bottom to top and back again. It is the ballistic movement that allows it to stretch the whole body in one simple exercise. Perform exercise for 2 minutes.

Eighth exercise: (Figure 8) jumping over the ball at moderate speed and increase speed. Begin with side-to-side lateral jumps over the ball. Focusing on the landing and taking off movements. The landing should be on the balls of their feet for immediate take off. The explosive take off should be a synchronized movement between the arms and legs lifting the body over the ball with an explosive jump. Be sure the goalkeeper keeps their feet about a half to a foot apart from one another. Perform 1-minute intervals three times. Then move to forward and backwards jumping over the ball. In this sequence for



Figure 8. Lower Extremity Jumping Movement

safety purposes the movement is slower and the emphasis is a higher explosive movement from the ground to the air and a soft landing. A soft landing

moves from the balls of the feet to the heel and the take off is the reverse with bent knees and forward synchronized arm movement. This exercise is also performed three times for 1-minute intervals.



Figure 9. Forward Lunge Torso Turn

Ninth exercise: a forward lunge with the medicine ball held with both hands in front of the upper torso at the chest with elbows bent. A turn is made at the upper torso to the right after the lunge is performed and brought back to the center before the feet come together and the body becomes erect. The next forward lunge involves the alternate side of the body. As shown in the Figure 9, whichever leg lunges forward is the side the torso rotates towards. The key to the exercise is to control the speed of movement for proper balance and support of body.

Perform these exercise 20 to 32 repetitions at 2 lunges at a time.

Perform these exercises and/or advanced variations of the exercises a minimum of three times a week as the warm-up routine for 25 minutes. The rest periods are when the goalkeeper is performing stretches between the exercises making sure to stretch the muscles thoroughly before beginning the following exercise. The ball can be used to assist static stretches. For example, sitting on the ground with the medicine ball between the extended legs bend at the trunk and reach the hands and arms to touch the ball in static nature. Remember to breath in through the nose and out through the mouth while stretching. Once the goalkeeper has become familiar with the ball move to more specific goalkeeper movements using a partner or trainer to assist movements and training regimen for both aerobic or anaerobic conditioning.

The following exercises are designed to be goalkeeper specific movements, increasing total body exercise. The amount of time spent in each exercise will vary due to a goalkeeper's level of experience as well as confidence of a specific technique.

Advanced Partner Movements

Exercise 1: (Figure 10) while lying on the ground using quick movements from left side to right side catching the ball by trapping into the ground and throwing ball back to partner sitting about 10 yards away from one side to the other at a quick pace.

Focus on catching every ball with the hands only and a partial sit up to throw ball back to partner. When throwing ball back to the partner use a double hand over-the-head throw while sitting up, as shown below in the second photo of Figure 10. When the ball is



Figure 10. Sit-up Throw to Fundamental Diving Catch

caught with both hands it is immediately pushed to the ground to create a low ball save. The ground is considered to be the third hand in this scenario, as shown in the first photo of Figure 9. The exercise is designed to get the goalkeeper in a position that mocks a diving save to both sides of the body without

leaving the ground. Again the 'W' hand position is the technique used in the catch. The amount of time spent on this exercise will range from 2 to 5 minutes.

Exercise 2: (Figure 11) lying on ground and partner lying on ground 10 to 12 yards apart catching and throwing ball back and forth performing a sit up on throw and catching ball with correct 'W' technique and moving it behind head. While moving ball behind head alternate each knee moving to the chest as if jumping up for a ball and catching the ball at the highest point. The emphasis is on performing numerous sit up's and developing the lower back and abdominal region for fitness purposes, but still working on the technique of catching a ball and visualizing catching it at the highest point. This exercise is performed for 4 minutes at a fast pace.



Figure 11. Sit-up Throw to Catch Above Head

Exercise 3: (Figure 12) in a standing position one partner throws the ball above the head underhand

using both hands and the opposing partner catches it. Varying heights of the throws to either a basket catch or catching the ball above the head at highest point with triangle technique. The exercise is continuous and partners change roles for every catch and throw taken. Focus on alternating legs being jumped from and landing on. The feet need to be in a ready stance (balls of feet) to perform an underhand throw for partner. The partner needs to be in this stance before they react to the ball being tossed in the air. Perform exercise for 4 to 5 minutes at a moderate pace.

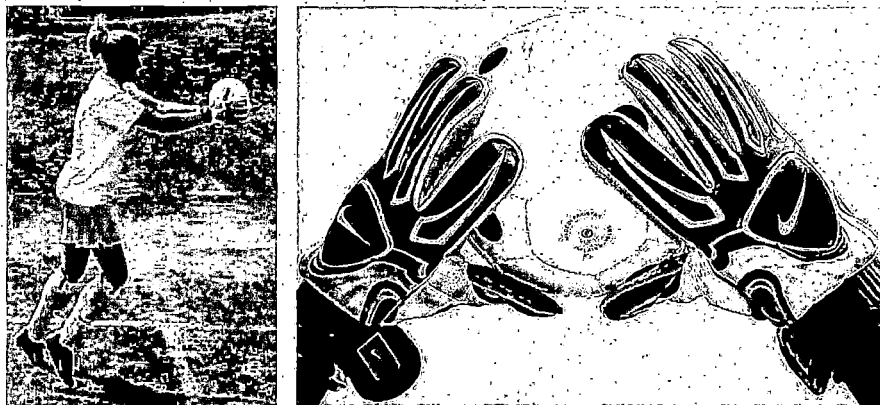


Figure 12. Underhand-toss to Overhead Catch

Exercise 4: (Figure 13) distribution of a ball by alternating rolling (bowling), throwing overhead

(single and double arm) and sidearm throws. When rolling the ball with force the goalkeeper needs to be sure the leg opposite of the throwing arm is extended forward first. The goalkeeper's should be about 20 yards apart when rolling the ball to each other. The focus needs to be on getting the ball to the ground quickly and smoothly, as well as putting enough momentum on the ball for it to carry 20 yards quickly. When throwing overhead or sidearm the goalkeeper needs to focus on stepping with the foot opposite of the throwing arm and throwing the ball in a downward motion. When throwing a ball larger than the hand. The hand cups the ball between the forearm and the spread fingers.

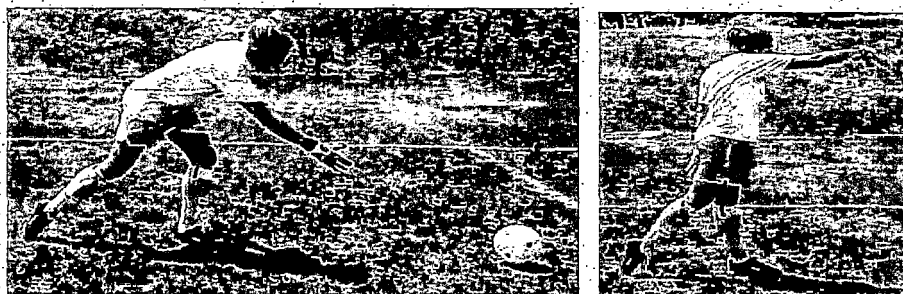


Figure 13. Ball Rolling and Overhead Throw Distribution

The throwing motion is the ball starts behind the body while cupped in the hand and as the trunk rotates

forward the shoulder rotates the ball over the head for release. The whole body is used to perform the throw for added velocity. The throws can start 15 to 20 yards apart, but need to progress 5 to 10 yards more as players gain confidence in the distance thrown of the medicine ball. Perform exercise for 3 minutes.

Exercise 5: (Figure 14) lateral shuffle pass from chest facing your partner and moving in the same direction laterally at the balls of the feet, hands ready in 'W' formation for receiving of the ball. This exercise should be performed in front of the goal. The area covered needs to range from one side of the goal to the opposite side.

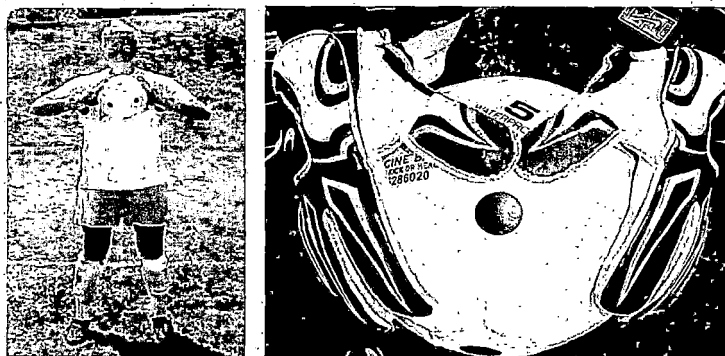


Figure 14. Chest Pass and Shuffle to 'W' Chest Catch

The goalkeeper's stand about 3 yards apart from one another. The person who is facing the goal decides on

when to stop and change direction with the partner following their lead. The feet should not cross, nor should they touch. The focus of this exercise is getting to the opposite side as quickly as possible. The exercise is performed for about 3 minutes for footwork purposes.

Exercise 6: two goalkeeper's standing 12 yards apart drop kicking the medicine ball back and forth. Use 12 yards because it is the distance from the penalty spot to the goal. Moving the feet to get the body behind the ball and make the save (catching the ball). This exercise is designed to develop a stronger kick when punting the ball out of the goalkeeper's area. A drop kick is a ball that is dropped to the ground in front of the body and bounced one time before it is kicked. This exercise needs to be performed for 3 to 5 minutes.

Exercise 7: (Figure 15) distribution of single arm throw by kneeling on both legs, moving the ball from behind the head to the release point in front of head and landing in a push up position (as shown in Figure 16). When kneeling on the ground the legs should be about shoulder width apart for proper

balancing though the body. The concept of this exercise is to transfer the weight of the ball from behind the body to in front of the body. The landing in the push up position and pushing oneself back up is for upper body arm strength. After performing this exercise for 2 minutes, alternate the throws and throw with the opposite arm for 2 minutes and then move to double arm throws from behind the head for 1 minute.



Figure 15. Alternating Arm Throws to 'W' Chest Catch

Exercise 8: (Figure 16) push up to spring to catch ball with partner. One goalkeeper begins in push up position from knees and bent elbows to push self up to squatting position before diving to catch the ball. The other goalkeeper is standing readily with the ball in both hands using the 'W' catching technique about 7 yards away in ready-set stance

position. Once the keeper with the ball shouts a command the goalkeeper in push up position elevates self to save the ball. Once the ball is caught the keeper with the ball now gets up without using their hands and proceeds to repeat the sequence with the partner in same starting position as they once were. The rotation process continues until both goalkeepers have completed 20 repetitions.



Figure 16. Chest Pass to Push up and Save Position

Exercise 9: (Figure 17) one keeper is in a diving save position on ground with the medicine ball in the diving save position. The opposing goalkeeper moves in to kick the ball at about 70% of their maximum kicking strength. The objective is to hold the ball in the same position and not allow the ball to be kicked out of their hands. After each repetition the ball is moved back to starting position and the sequence is repeated five more times, alternate sides

after the five and for every ten alternate duties. Each goalkeeper needs to successfully complete 20 repetitions before moving onto the next exercise.



Figure 17. Ball in Save Position to Kick

Exercise 10: (Figure 18) begin in a ready-set stance 1 to 2 yards behind the ball and move to a power step then low dive at a stationary ball. Both goalkeepers will be performing the exercise together by facing one another and moving at a different ball 3 to 4 yards away from the center on the opposite side simultaneously. After each diving save the keeper will leave the stationary ball in its original position, move back to their starting position and repeat the exercise to the opposite side. This exercise needs to progress to a higher level after 3 minutes. The next progression is the low dive from a moving ball. Where each goalkeeper will hold a ball in front of their body at waist level with the

outside hand 5 yards opposite their partners. On command they both drop their ball and attempt to get to the opposing ball with footwork and diving before the ball bounces twice.



Figure 18. Diving to a Ground Ball and Low Ball

Most of the exercises can be modified to compete at a higher level depending upon each of the goalkeeper challenges. The partner needs to be sure he/she is training them selves by raising their heart rate as well as his/her partners for optimal performance. After all soccer medicine ball exercises are performed be sure the remaining of the training session is performed with the regulation ball. To vary the exercises do 2 to 3 sets exercises and vary when the regulation ball will be incorporated first set or last set of specific exercises. Some

training sessions may not want to as rigorous due to practicing a day before game.

Various other advanced techniques to perform, which will help add more strength to the core as well as develop reaction time; jumping over obstacles, going under obstacles, changes of speed and direction, and forward rolls to a ready-set stance are a few that can assist changes in the training session.

A minimum of 15 minutes should be spent performing any variation of these exercises from simple-to complex. The maximum amount of time is 30 minutes because fatigue sets in on the muscles and the quality of the exercises are lost. If maximum time is reached the competitive activities should be performed with a regulation ball.

Competitive Activities

In the small-sided games the goalkeeper needs to make a goal using the training flags as their goal. The concept in making the goal is to challenge the goalkeeper into finding the range they can cover in the goal with ease and how much they need to improve

based on the actual size of the goal in comparison to the goal they are defending at that moment.

Exercise 1: make two small-sided goals using training flags (as shown in Figure 20) 12 yards apart and perpendicular from each other. Each goalkeeper attempts to throw the medicine ball into the opposing goal and the opposition must attempt to save ball by whatever means possible. The objective is to mimic a game-like situation. As the goalkeepers improve and increase their range make the goal larger.

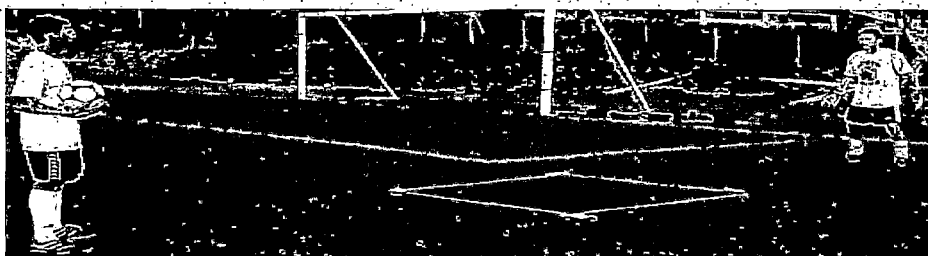


Figure 19. One Square Goalkeeping Game

Exercise 2: (Figure 19) modified game setting for lateral movement. Both goalkeepers need to position themselves across from each other. The ball must bounce in the square to be considered a legal throw or toss with one or two hands. The object is to not allow the ball to get behind the keeper. A goal is scored if the ball does get behind the keeper. If

a save is made, then only one step may be taken from the point of the save or catch before throwing the ball.

Exercise 3: (Figure 20) a game designed for competition between two or more goalkeepers in a grid the size of the 6-yard box (6 yards by 12 yards). The concept is to throw the ball by distribution exercises through the opponent's goal in order to score. Keeping score is vital, as each Goalkeeper does not want the opponent to score by making saves any way possible. Two-steps off your line are all that is permitted when throwing the ball. After about 6 minutes take the medicine ball away and use an ordinary soccer ball to increase scoring opportunities.

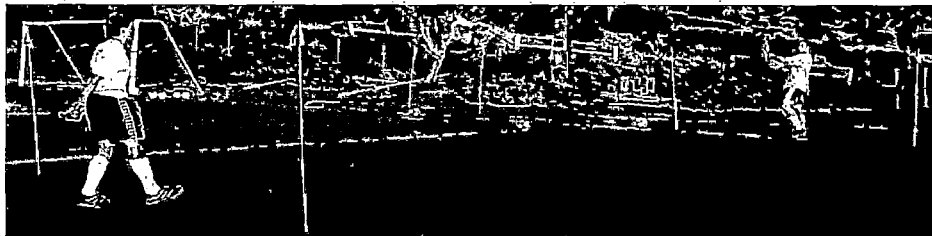


Figure 20. Medicine Ball Keeper Wars

Exercise 4: (Figure 21) like exercise 8, the modification is starting from a sitting position and

using the sit-up throw to toss the medicine ball through the opponent's goal. The goalkeeper's need to keep the knees bent and the upper torso vertical to assist in quick explosive movements off the ground. Using the whole body to get the hands to the ball. Variations could be using more goals instead of two for added rest between throws and saving balls at various angles..



Figure 21. Sit-up Keeper Wars

Exercise 5: (Figure 22) the final exercise is a modified game using three goalkeepers. Flexible training flags are used to mark the goals that are as wide as the goal (24 feet) and bent in at about 1-2 yards in width. The idea is for the goalkeepers to adjust their feet and body for the proper angle of defensive stance. The game is started by a goalkeeper

attempting to score through the bent flags by rolling for throwing the ball through. The object of the keeper defending the goals is to not allow the ball to get through the goal. A goal is not awarded to the outside goalkeepers until the opposite side goalkeeper has made a save and not allowed the ball to get behind them. The goalkeeper in between the goals stays in the goal until they have made a specific amount of saves desired by the coach.



Figure 22. Angle Play Keeper Wars

The concepts involved in the competitive environment are great for interaction between goalkeepers. The desire, understanding of the game and the ability to win a game are qualities that must be established by every goalkeeper. Like any other exercise if it is not practiced no one will know what goalkeeper has which traits and what needs to be

worked on with the coach. The player's involvement into each exercise is what establishes the time limitations in the competitive exercises. Certain goalkeeper's may enjoy one activity over another and maintaining focus in one activity may be easier than another. All the activities are designed to physically challenge the goalkeeper. But nothing can replace an actual game involving players and true competition.

Conclusion

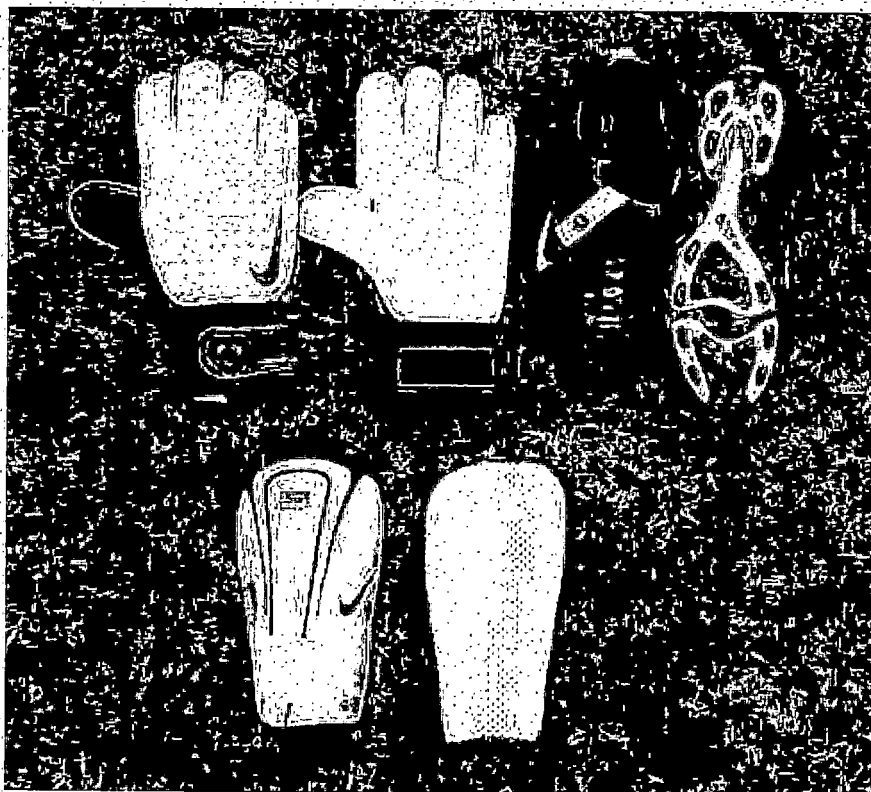
The combination of the soccer-specific medicine ball and the specificity training principle are two main reasons this method of training improved strength and speed. The training in the specified environment and the use of the heavier ball allowed the body to get accustomed to the program described in Appendix B. This program was designed for the goalkeeper to increase strength without losing the daily technical attributes connected to the position allowing them to spend more time on the field and less time in the weight room. The exercises were designed to move from simple to complex progressions as techniques improved.

and strength was gained. Variations were also needed to keep player interest while still working on goalkeeping techniques. The largest adjustment to the program needs to be the weight of the medicine ball, with age and experience being the largest factors of what size and weight of ball is appropriate for each exercise. A heavier ball would definitely need to be made to maintain strength for professional goalkeepers.

Recommendations

Future considerations would be to take a body composition test to find if the medicine ball program reduces body percent fat and/or produces muscle mass gains. Also testing of the specific programs in which a heavier ball (4 pounds) could increase the speed and strength twice as fast as the 2-pound ball.

APPENDIX A
GOALKEEPER'S EQUIPMENT



Gloves, Shoes and Shin Guards

APPENDIX A
INTERMEDIATE WORKOUT PROGRAM

The Sample Program Used for
this Project with the
Goalkeeper In-season

Figure #	Name of Activity/Exercise	Days	Weeks	Reps	Time	Ball
N/A	Jogging to increase heart rate/blood flow	every	4	N/A	4 min	med.
N/A	Static stretching between each exercise	every	4	each	20 sec	N/A
1	Ready-set ball bouncing to 'W' catch	M,W,F	4	many	2 min	med.
4	Underhand throw to catch at highest point	M,W,F	4	15x	own pace	med.
5	Scooping from the ground	M,W,F	4	many	2 min	med.
7	Ballistic ball movement	M,W,F	4	many	2 min	med.
8	Lower extremity jumping movement	M,W,F	4	9x	30 sec	med.
9	Forward lunge torso turn	M,W,F	4	24x	own pace	med.
N/A	Final stretches before training/water	every	4	many	2 min	N/A
10	Sit-up throw to fundamental diving catch	M,W,F	4	many	2min	med.
12	Underhand toss to overhead catch	M,W,F	4	many	2min	med.
13	Ball rolling	M,W,F	4	many	2min	med.
14	Chest pass shuffle	M,W,F	4	many	2min	med.
N/A	Drop kicking ball	M,W,F	4	many	2min	reg.
16	Chest pass to push-up and save	M,W,F	4	many	2min	med.
17	Ball in save position to kick	M,W,F	4	many	2min	med.
18	Diving to ground ball	M,W,F	4	many	2min	med.
19	One square goalkeeper game	M,W,F	4	2x	5 min	reg.
21	Sit-up keeper wars	M,W,F	4	2x	5 min	reg.
22	Angle play keeper wars	M,W,F	4	2x	5 min	med.
N/A	Field game	every	4	N/A	20 min	reg.
N/A	Cool down/replenishment	every	4	N/A	10 min	N/A

Key M,W,F; Monday, Wednesday, Friday
reg.; regulation ball
med.; soccer-specific medicine ball
N/A; not applicable

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