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The Developments of Goalball Famous Visually Impaired Blind Athletes' Agility Using Smart Ladder Drill Prototype

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***Abstract*---**Designing the quasi-experimental research method to develop the agility of goalball athletes using the smart ladder drill prototype. The duration of the training was 8 weeks, 5 days per week with a sample size of 20 blind goalball athletes' students of the Songkla School for the Blind; Songkhla Province, Thailand with purposive sampling was selected. The independent variable is a training program using the smart ladder drill prototype that the smart ladder drill prototype, the master control box, and the remote sensor pad and working concept by Singhachainara et al., (2019) including running, high-knee running, side slides, and footsteps activity developments using pretest-posttest-design method was compared on independent and dependent variables. Training styles obtained with four types: One-Two-Three-Four-In-Linear-Run-Throughs. Statistically significant was analyzed with Cronbach reliability ranged from 0.78 to 0.98, variance ranged from 0.47 to 1.01, F-test analysis indicate that

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of .01. Comparisons between pre-test activity development and training activities (post-test) of the agility improvements are differentiated of four activity developments, significantly ($p<.01$). That is, the mean in the training activities of the agility improvements (post-test) was lower than the mean in goalball athletes' agility group's pre-test.

***Keywords*---**gfour activity developments, goalball athlete for the blind students, goalball athletes' agility, quasi-experimental research method, smart ladder drill prototype.

Introduction

The sport originated in 1946 when Austrian Hanz Lorrenzen and German Sett Reindle developed the game as a way to keep blinded WWII veterans physically active. Goalball has since become the premier team sport for blind athletes and is played competitively in 112 countries. Goalball is the most popular team sport for the blind and visually impaired. In goalball, two teams of three players each face each other across a court that is nine meters wide and 18 meters long. The object of the game is to roll a basketball size ball with bells inside over the opponent's goal line. Player opponents listen for the oncoming ball and attempt to block it with their bodies. Once they are able to stop the ball and take control of it, they become the offensive team (United States Association of Blind Athletes, 2020).

Goalball is a team sport designed specifically for athletes with vision impairment. Participants compete in teams of three, and try to throw a ball that has bells embedded in it into the opponents' goal. Governed by the International Blind Sports Federation (IBSA), goalball was included in the Paralympics' sport programme for the first time at Toronto 1976. The ball is thrown by hand and never kicked. Using ear-hand coordination, originating as a rehabilitation exercise, the sport has no able-bodied equivalent (The International Paralympics' Committee, 2015).

In goalball, two teams of three players each face each other across a court that is nine meters wide and 18 meters long. The object of the game is to roll a basketball size ball with bells inside over the opponent's goal line. Your opponents listen for the oncoming ball and attempt to block it with their bodies. Once they are able to stop the ball and take control of it, they become the offensive team (Disability Sports, 2004). Able-bodied athletes are also blindfolded when playing this sport. The *International Blind Sports Federation* (IBSA), founded in 1981 and responsible for a range of sports for the blind and partially sighted, is the official governing body for the sport. IBSA is the international federation for several sports for people with a visual impairment, including three Paralympics' sports (Blind football, Goalball and Judo), Powerlifting, Ten-pin bowling, Nine-pin bowling, Torball, and Showdown (The International Blind Sports Association, 2015).

The *International Blind Sports Federation* (IBSA) is a non-profit organization founded 1981 in Paris, France. It was formerly known as the International Blind

Sports Association. IBSA's mission is to promote the full integration of blind and partially-sighted people in society through sport and to encourage people with a visual impairment to take up and practice sports. IBSA is a full and founding member of the *International Paralympics Committee* (IPC). IBSA also organizes world and regional championships in many of its sports. Regional or continental championships are generally held in odd years, while world championships take place every four years in even years when there are no Paralympics Games (International Blind Sports Federation, 2017).

The International Blind Sports Federation (IBSA) has been representing and developing athletes and sports for people with visual impairments for 40 years. IBSA's showcase event is the IBSA *World Championships and Games*, held every four years. The first games took place in 1998 in Madrid, Spain followed by the event in 2003 at Quebec City, Quebec, Canada (The International Blind Sports Federation, 2012). In 2015, the 5th IBSA World Championships and Games was held in Seoul, South Korea and included competitions in powerlifting, judo, goalball, football, chess, tenpin bowling, tandem cycling, swimming, showdown, and athletics (Member of the International Paralympics' Committee (2016). Today IBSA is the world's leading organization for the development of sports for people with visual impairments. It has more than 100 members in every region of the world (The International Blind Sports Federation, 2018).

Goalball training offers a comprehensive analysis of the modern goalball techniques and tactics based on the understanding that due theoretical and practical provisions need to be put in place for the education, training and competitive processes in the sport disciplines of the Winter and Summer Paralympics Game programs, with the team sports for blind and vision-deficient athletes being no exclusion. Analyses of the modern goalball techniques and tactics will be designed in the context of the urgent need in due theoretical and practical provisions for the training and competitive processes in the relevant team sport disciplines that are largely interrelated (Kornev&Pravdov, 2017).

Two teams of three blindfolded athletes attempt to throw a ball with bells inside into their opponent's goal net. This fast-paced game requires strength to throw the 2.75-pound ball and speed to defend the goal. Athletes play both offense and defense. Goalball is open to athletes with visual impairments. Becoming a Goalball Paralympian is a distinction very few athletes can claim. Becoming a Paralympian in any sport requires commitment and perseverance but the ultimate reward is certainly worth the effort involved. Do you have what it takes to become a Goalball Paralympian? Here's what goalball's players will need to do, to work, towards their goal of competing in a Paralympic Games. Team training that will help integrate your individual skills as part of a goalball team (United States Association of Blind Athletes, 2021).

Goalball Thailand, World class champion for the first time in the history of the Thai national team globally. Only 1 month of introductory period + motivation from staff coaches, and what is indispensable is the intensive transfer of techniques and knowledge from the senior national team. Make this the best U19 team. In the eyes of foreigners we may go as an ornamental plant. But this ornamental plant is a strong and beautiful ornamental plant. From now on we

will grow up strong and stable. All teams, associations, and athletes, with the Thai flag on the left chest will create. And add memories to the Thai national team's global team to truly step into the world (Goalball Thailand, 2019).

But goalball sport is a sport that requires a lot of force. Players must have a physical exercise every time before entering the field, and must wear clothes that help protect themselves from injury while playing. Men must wear protective gloves and chestnuts. For women, there must be an island on the chest that all because of the cushioning from heavy global balls. The Paralympic Games for people with disabilities are sporting events that encourage people to see the potential of people with disabilities more. So does global sports if supported by the government, the new generation will have appropriate activities for self-development (Jitprasert, 2017) (Figure 1).

Figure 1. Man and Female Sports in the Papalympics Games in Tokyo 2020
Source:Wheelchair Sports Federation (2020)

Training to increase speed and agility training. It is important for global athletes to dribble away from opponents to score goals.This exercise requires agility and speed skills. This results in the ability to make quick, quick, and responsive decision-making in the motor nervous system. Most trainers using smart ladder drill prototype to practice.A smart ladder is a device with two ropes in the middle of the steps with plastic like a ladder. There are various lengths from 4 meters, 5 meters, 8 meters and 10 meters, with a number of steps from 10 or more.

Figure 2. Smart ladder for training the sports' players
Source: Graham Media Group. (2021).

Practice areas and training patterns help to improve agility and speed. Using the speed of short movements creates a connection between the brain and movement (coordination) in smart ladder training If we practice more often, the skill will increase.This form of training is very important because goalball players use

agility, and speed in competition. It has a chance to win more. Each training session will also help with cardio training as well. because it will be continuous training in each time forplayers' practicing. Their heart rate will be high, and it's in the zone that helps burn fat as well. The smart ladder drill prototype training pattern can be practiced in a variety of ways:

- Run so that 2 feet touch the gap. Go to the very end and then come back.
- Double leg jumps along the gap until the last hole. then jump back.
- Footsteps outside the smart ladder drill prototype then stomped inside. Go up one by one until the last one and then step back.
- Use the squat position to practice. Squat on the outside and jump your feet close together inside. Then jump to the next outside squat. Then jump your feet close to the inside. Do it until the end and come back.
- Put your feet on the monkey ladder and slowly slide sideways. Alternating feet to touch the inside until the last hole and slide the foot back into the inside

Should practice like this, 2 rounds, 3 sets each. In every practice, we should use a stopwatch every time. In order to know how much time each round takes to practice. So that we can improve this skill over and over again. The more we practice, the more agile we become, the faster we become. We can perform activities better, and can also help to have a healthier, more fit body. However, manual timekeeping still has some discrepancies. Also, there is no tool to count the number of athlete's foot steps. This leads to a lack of measurement of the sensitivity of the foot steps. For the above reasons, the researchers are interested in improving the agility of global athletes with the intelligent monkey ladder. This will make training global athletes more efficient. The trainers can control and view the results via a smart phone type mobile phone conveniently.

Materials and Methods

Modified the agility ladder isn't a specific exercise. It is a piece of equipment that can be used to perform a wide number of agility drills. These quick movements raise your heart rate, challenge your balance and coordination, and can improve speed and athletic performance (Frey, 2020). Each type of training provides substantial benefits for blind students in School for the Blind, it is a school that provides teaching, activities, and facilities for students with visual impairments and disabilities to gain knowledge and skills to apply in daily life.

Research aim

To develop the agility of goalball athletes using the smart smart ladder drill prototype

Sample size

Sample size for agility training program. A total of 20 blind students with purposive sampling were used to develop the agility of global athletes by using smart ladder drill prototype, namely, Global Athletes of the Songkla School for the Blind, Songkhla Province, Thailand.

Variables studied

The independent variable is a training program using the smart ladder drill prototype incliding one-in linea smart ladder drill prototype run through, two-in linear run through, three-in linear run through, and lateral run through. The dependent variable is the agility of the global athlete.

Ethical consideration

The researcher will follow the three principles of human research ethics, namely the principle of respect for person by providing complete information. until those invited to participate in the research understand it well and make independent informed decisions about participating in the research.The researcher will respect the privacy and confidentiality of the subjects. In the data record there is no identifying information, beneficence/non-maleficence, and the principle of justice.

Principles of creating a training program

What is the main goal of goalball?

- Objective: Simply roll the ball on the floor in a bowling motion and have the ball completely cross over the opposing team's goal line, scoring a point. Playing time: 14 minutes (two x seven minute halves) and a three minute brake to change ends (Paralympic School Day, 2021).
- General goal: Students gain respect for the sporting performance of athletes with blindness/visual impairment.
- Specific goals: To learn about the rules of Goalball. To gain understanding of the spatial awareness and object orientation skills of Goalball players. To gain respect for the sport abilities of Goalball players.
- Environment: Indoor/outdoor. Quiet space, undisturbed by other ongoing activities. Create tactile markings of the court boundary lines by placing tape over a rope or cord.
- Suggested equipment: Blindfolds for all participants. Goals. Bell balls or objects of varying size which make sound (e.g., bells in volleyballs, beep baseball).
- Students involved in the activity: Session leader, assistants and athletes with blindness/visual impairment (if available). Goalball Value: Respect for sporting achievement Activity: Practicing Goalball skills.
- Required knowledge: Students should gain awareness and information about persons/athletes with blindness/visual impairment. It is suggested that activity 9: Vision is conducted in every group prior to the Goalball activity.
- Starting the activity: The session leader gives a brief introduction of Goalball through video fragments and photographs (provided on the PSD DVD), which give the children a mental picture of the sport. If possible, a live demonstration by Goalball athletes would be beneficial.

Basic skills

GoalBall is a team sport designed for athletes who are blind or have visual impairments. The game is played indoors on a gym fl oor that is thesize of an offi cial volleyball court. Teams consist of three players; to ensure visual equality all participants play while wearing eyeshades. Integrating adisability sport (like GoalBall) as part of the general physical education curriculum is an effective way to facilitate an appreciation for individualdifferences on basic rules and basic skills (Martinez, & Pedersen, 2020).

- Blocking: Blocks are typically made from a horizontal lying position with arms and legs fully extended.
- Throwing - An underhand technique is used to throw a GoalBall. The skill closely resembles the delivery used in bowling (Martinez, & Pedersen, 2020).

Throwing Anticipate Blocking

Figure 3. Basic Goalball rules should be explained during the exercises
Source:United States Association of Blind Athletes. (2021).

Croust dimention of goalball

To investigate the influence of ball time, ball trajectory and ball type on the probability of scoring a goal in female and male elite goalball. Researchers also aimed to categorize throw ball time, taking into consideration ball trajectory and ball type.

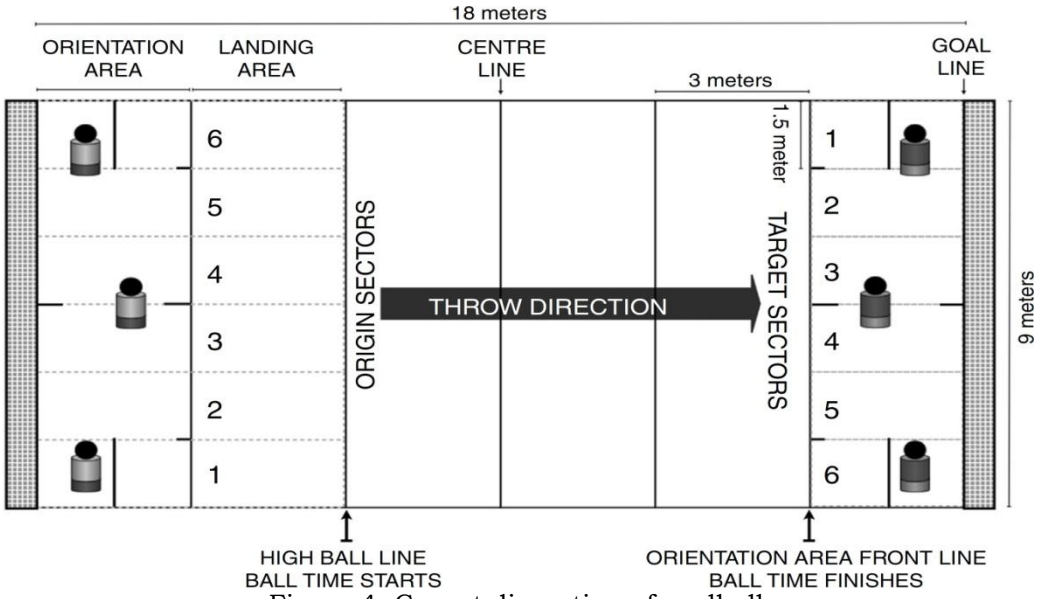


Figure 4. Croust dimention of goalball
Source: Morato*et al.*,(2018)

Systematic video analysis of 1341 male and 1304 female throws was performed on 20 randomly selected matches from the Paralympic Games. In both genders, reducing ball time was associated with an increased probability of scoring a goal, while there was no association for ball trajectories or ball types. The proposed ball time categories are thought to be a useful tool for coaches and sport scientists, as it provides reference values on how fast a ball moves regarding different ball trajectories and ball types for each gender (Morato et al., 2018).

How does goalball work?

Principles of creating a training goalball program. Goalball is a team sport played indoors by athletes with vision impairment. The object of the game is to roll the ball into the opponent's goal while the opposing players try to block the ball with their bodies. Bells inside the ball help orientate the players by indicating the direction of the oncoming ball (Paralympics Australia, 2020).

Principles of creating a training program using smart ladder drill prototype

Looking for a way to mix up your workouts? Why not give the agility ladder a try? These fast-paced drills get your heart pumping and torch plenty of calories. Beyond that, they're also the perfect form of cross-training for virtually any other workout you're currently doing. Why? They improve three key fitness factors—speed, agility and quickness—in addition to strengthening your joints, ligaments and tendons. Incorporating agility ladder workouts into your fitness routine is also great for improving brain health! What's not to love?! (Jeangsakul, 2004).

- Consider choosing exercises or exercises that are suitable for your intended purpose. Developing physical fitness in each area to be organized into a blend.
- In ordering each exercise, practices that are developed in the same muscle group should be avoided in close proximity to each other so that the previously performed muscle groups are relaxed for consideration to determine the distance between each exercise.
- Consider the number of trips. The number of rounds of each exercise by experimenting with the trainees to do as many times as possible, after which, determine the suitability of each round, for example, to do 2 out of 3 or 1 in 2 of the number of rounds possible.
- Consider the timing of each exercise. In total, the total training time should be between 30-45 minutes.
- Increasing the number of trips in each round is to add 15-20 percent of the weight every 2 weeks or 4 weeks.
- The optimal interval for following a cycle exercise program should be between 8-10 weeks, and the optimal frequency of following an integrated exercise program should be 3-4 days per week.
- Development of circulatory and respiratory endurance It must be designed to be trained continuously for 15-20 minutes or more to maintain a target heart rate of 45 in the 60-80% range of the maximum heart rate. Throughout the period in the training cycle to complete all cycles.
- The fluency development, this is done by having athletes try to use their maximum speed in running or moving in various forms that are close to the movements in that sport.
- Rest time between trips between sets It should allow the body to have enough rest, or long enough for the athlete to feel relieved, or a few minutes.
- There should be about 5-6 repetitions per set. Perform 1-2 sets to allow the body to have enough time to rest for 2-3 minutes.

The training program that has been created is theoretically correct and appropriate to the athlete's skill level. Steps in implementing the program to carry out training sessions to achieve the desired goals.

Principles of agility training
What is the training method for agility?

Agility training exercises help improve speed, explosive power, coordination, and specific sports skills. From high school to professional sports teams, all athletes can benefit from agility training exercises. Incorporate these drills a few times a week into your training routine to perfect your foot speed and refine your sports technique such as lateral plyometric jumps, forward running, high-knee drills, lateral running, side-to-side drills, dot drills, jump box drills, 1 drills, plyometric agility drill, and shuttle runs. Set a training area with two markers, such as cones, about 25 yards apart. With explosive speed, sprint from one marker to the other marker and back. Repeat 6 - 8 times. Consider switching it up by including forward-touch-return runs, forward-backward runs, and side-to-side runs (Vertimax, 2016).

Elements of agility

Adaptability and flexibility are key in agility. The most agile of organizations exhibit these ten pillars of enterprise agility: culture of innovation, empowerment, tolerance for ambiguity, vision, change management, communication, market analysis and response, operations management, and structural fluidity (Reed, 2015) including the ten pillars of enterprise agility: culture of innovation, empowerment, tolerance for ambiguity, vision, change management, communication, market analysis and response, operations management, and structural fluidity that indicates of coordination, muscle power, reaction time, and flexibility.

Factors affecting agility

Reaction time and accuracy, foot placement, and in-line lunge movement have been shown to be related to agility performance. The contribution of strength remains unclear (Paul, Gabbett,& Nassis, 2016). Factors that affect agility: *Strength*: Strength is the fundamental basis of all athletic movement; *Power:* Power is very closely related to strength;and *Neuromuscular Control*: This is your brain's ability to control the muscles in your body (Maximum Training Solutions, 2017). Body proportions, skills training, strength, flexibility and endurance. These five factors will influence what sport you play, what position you play and how good you can be at either. Each of these factors may individually or as a group affect your sport performance (Workout Healthy, 2016).

Research instruments
The Agility Training Program (ATP)

The APA was invented for creating an *Agility Training Program*. In order to use the information obtained as a guideline for creating an 8-week agility training program, it was sent to 3 specialists for a trial (Tryout) with a group of 5 non-experimental global athletes. Analyze the validity of the training program. The experts checked again. The agility training program was applied to the sample size of 20 students at the Sonfkla School for the Blind in Songkhla Province, Thailand.

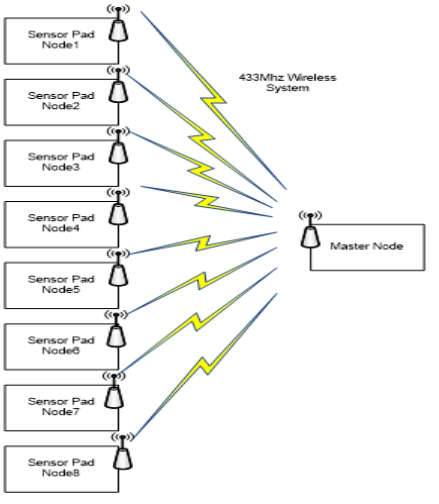
The Smart Ladder Drill Prototype (SLDP)

A smart ladder is designed to be portable and simply was used by Singhachainara *et al.*, 2019. All equipment runs on rechargeable battery power. It can operate in both manual and automatic modes. Wireless transmission is used to send/receive data and commands between a master control box and remote sensor pad nodes. A smart ladder has five operation modes such as automatic stopwatch mode, Automatic footstep count mode, automatic stopwatch with footstep count mode, manual stopwatch with automatic footstep count, and Automatic footstep count with limited time. The system consisted of two parts. A master controller used for model selection and display results is shown in Figure Caption 5b, and the working concept is shown in Figure 5d

5a. Smart ladder drill prototype

5b. The master control box

5c. Remote sensor pads



5d. Smart ladder conceptual design

Figure 5. Smart ladder drill prototype, the master control box, and the remote sensor pad and working concept
Source: Singhachainara et al., (2019)

Research procedures

A group of 20 subjects were enrolled in an agility training program using the Intelligent Monkey Ladder for 8 weeks, 5 days per week (Monday, Wednesday and Friday from 4:00 PM to 5:00 PM and weekends on Saturday and Sunday). from 10:00 a.m. to 11:00 a.m.) by completing the training program before practicing each day.

Training style

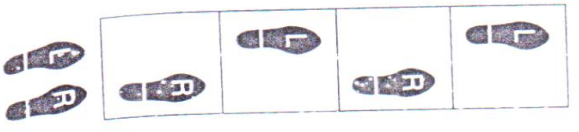


Figure 6. One-In linear run through

The practitioner stands in a ready position at the starting point. Running to the front, put one foot in the first sheet. Then step another foot on the next sheet continue, alternating until the last sheet.

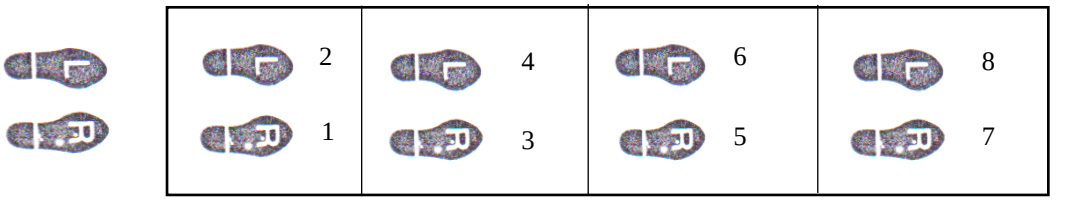


Figure 7. Two-In linear run through

The practitioner stands in a ready position at the starting point. Place one foot on the first sheet. Place the other foot next to the other foot on the same sheet. Keep practicing until the last sheet.

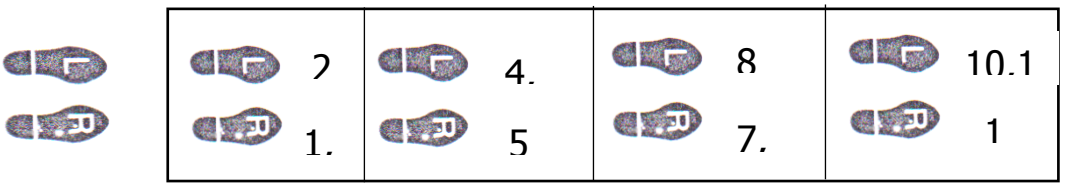


Figure 8. Three-In linear run through

The practitioner stands in a ready position at the starting point. Place one foot on the first sheet. Place the other foot close together, and repeat the other foot by doing the same work on the same sheet as a 3-step repeat with a step. Keep practicing until the last sheet.

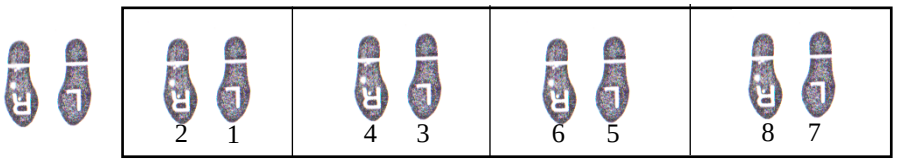


Figure 9. Four-In linear run through

The practitioner stands sideways in a ready position at the starting point. Step one foot to the side and place it on the first sheet. Place the other foot next to the other foot on the same sheet. Continue the practice until the last sheet.

Results and Discussions

This research is a quasi-experimental research that aims to develop the agility of goalball athletes using the smart ladder drill prototype. The duration of the training was 8 weeks. Mean, standard deviation, and t-test independent were compared. The data were presented in tabular and collation. The analysis steps are divided as follows.

Assessing the goalball athletes' agility using smart ladder drill prototype

An assessment of the agility improvement of 20 goalballathletes' agility by using the Smart Ladder Drill Prototype was based on 8 weeks of pre-test and training activities (post-test), including running, high-knee running, side slides, and footsteps with means, staandard deviation, Cronbach alpha reliability, F-test, and independent t-test that reported on Table 1, 2, 3, and 4.

Table 1
Means, Standard Deviation, Cronbach Alpha Reliability, Variance, F-test, and t-test for Running Activity Development

Trial	Item Mean ($\bar{X}$) (second)	Standard Deviation	Variance	α-Reliability	F-test	*t*-test	Sig.
Pretest	1.69	0.49	1.01	0.91	35.59***	5.97***	.000
Posttest	1.27	0.55					

*N=20, *p<.05, **p<.01,***p<.001*

Table 2
Means, Standard Deviation, Cronbach Alpha Reliability, Variance, F-test, and t-test for High-Knee Running Activity Development

Trial	Item Mean ($\bar{X}$) (second)	Standard Deviation	Variance	α-Reliability	F-test	*t*-test	Sig.
Pretest	1.69	0.36	0.54	0.94	41.21***	6.42***	.000
Posttest	1.44	0.39					

*N=20, *p<.05, **p<.01,***p<.001*

Table 3
Means, Standard Deviation, Cronbach Alpha Reliability, Variance, F-test, and t-test for Side Slides Activity Development

Trial	Item Mean ($\bar{X}$) (second)	Standard Deviation	Variance	α-Reliability	F-test	*t*-test	Sig.
Pretest	3.49	0.91	0.47	0.98	72.14***	8.49***	.000
Posttest	3.11	0.97					

*N=20, *p<.05, **p<.01,***p<.001*

Table 4
Means, Standard Deviation, Cronbach Alpha Reliability, Variance, F-test, and t-test for Footstep Activity Development

Trial	Item Mean ($\bar{X}$) (second)	Standard Deviation	Variance	α-Reliability	F-test	*t*-test	Sig.
Pretest	1.78	0.77	0.71	0.78	13.78**	3.71***	.001
Posttest	1.19	0.22					

*N=20, *p<.05, **p<.01,***p<.001*

As reported in Table 1 (for running activity development), Table 2 (for high-knee activity development), Table 3 (side slideactivity development), and Table 4 (for footstep activity development). The means average score on the pre-test assessments are higher than the taining activities (post-test) of the agility improvement for 20 goalball athletes' agility by using the Smart Ladder Drill Prototype was based on 8 weeks, statistically significant was analyzed with Cronbach reliability ranged from 0.78 to 0.98, variance ranged from 0.47 to 1.01, F-test analysis indicate that of .001 as three of four improving development (eccept for footstep activity development) that similality as comparisons between pre-test activity development and taining activities (post-test) of the agility improvements are differentiated on three of four activity developments, significatlly (p<.01).

Summalized the developments of goalball athletes' agility using smart ladder drill prototype

Summalized the means average score on the pre-test assessments are higher than the taining activities (post-test) of the agility improvement for 20 goalball athletes' agility by using the Smart Ladder Drill Prototype was based on 8 weeks as reported in Table 5.

Table 5
Means, Standard Deviation, Cronbach Alpha Reliability, Variance, F-test, t-test, and Simple Correlation (r) for Goalball Athletes' Agility Using Smart Ladder Drill Prototype Activity Development

Trial	Item Mean ($\bar{X}$) (second)	Standard Deviation	Variance	α-Reliability	F-test	*t*-test	Simple Correlation
Pretest	2.16	0.18	0.11	0.91	873.52***	29.55***	0.84***
Posttest	0.33	0.03	0.00				

*N=20, *p<.05, **p<.01,***p<.001*

In terms of the means' scores of pre-test ($\bar{X}$ = 2.16, S.D. 0.18, σ^2 = 0.11), andthe taining activities (post-test)($\bar{X}$ = 0.33, S.D. 0.03, σ^2 = 0.00), F-test = 873.52, standard deviation, cronbach alpha reliability, variance, F-test = 873.52 (p<.001), comparisons between pre-test activity development and taining activities (post-test) of the agility improvements are differentiated, significatlly (p<.001). However, this study is correlated with the Simple Correlation (r) for Goalball Athletes' Agility Using Smart Ladder Drill Prototype Activity Development as 0.84 (p<.001), correlatively. That is, the mean in the taining activities of the agility improvements (post-test) was lower than the mean in goalball athletes' agility group's pre-test. The results of this study found that the mean agility test of the taining activities of the agility improvements group showed a decrease in the mean test after 8 weeks of training.When analyzing the mean of the experimental group before and after the *Smart Ladder Test* for comparison between the groups, it was seen that there was a significant statistical difference at the 0.05 level, which is in line with the postulate research hypothesis. The the 20-taining activities of the agility improvements group of experimental groups trained with the Agility program using the Smart Ladder had lower mean values than before the experiment.

This study is consistent with the results of the research shown the data on agility skills in different populations using pre-planned, change of direction speed tests have previously been reported. However, there are no available data on the agility times of athletes specializing in different sports obtained from reactive agility tests. Comparing agility time in groups of athletes of different sports where agility is one of the limiting factors of performance. The best agility times are in athletes of racquet sports, followed by competitors of combat sports with reactions to visual stimuli, then players of ball sports, and finally competitors of combat sports with reactions to tactile stimuli (Zemková, 2014).

In terms of the correlation between the testing agility skills,the relationship between speed factors and agility in sport games. This study deals with the issue of various understanding of the term "agility", mainly within the context of team sport games. Under this term complex psychomotor abilities are understood. Their development requires a high degree of neuro-muscular specificity. The development of these abilities are underpinned also by perceptual components including also anticipation and decision-making processes. The results suggest that agility is not simply one of speed abilities. Besides simple reaction speed, acceleration, deceleration accompanied by the change of direction of movement it comprises also perceptual components determined by complex reaction to unexpected, changeable stimuli occurring during a sport game (Horička, Hianik, & Šimonek, 2014).

Focused on the agility's sport is a significant determinant of success in soccer; studies have rarely presented and evaluated soccer-specific tests of reactive agilityand non-reactive agility. The study consisted of 20 players who were involved at the highest national competitive rank. divided into three playing positions (defenders, midfielders, and forwards) and two performance levels (U17

and U19). Variables included body mass (BM), body height, body fat percentage, 20-m sprint, squat jump, countermovement jump, reactive-strength-index, unilateral jump. Newly developed tests of soccer-specific agility are applicable to differentiate U17 and U19 players (Pojskic*et al.,* 2018). Therefore, athletes research on twenty-six male basketball players from Udonthani province, aged between 15-18 years, were recruited for this study. They were divided randomly into two groups: the experimental or specific movement training group (n=13) and control or traditional movement training group (n=13). Both groups were trained 3 days per week for 6 weeks. The general physical characteristics, agility, and speed were measured before and after training.The agility and 5-meter speed in the experimental group was lower ($p<.05$) than in control group. However, the speed at 10 and 20 meters were not significant differences ($p>.05$).The specific movement training program is more effective for improving agility and 5 meter speed than the traditional movement training program. This indicates that the specific movement training program can be used as an adjunctive exercise for improving agility in young male basketball players (Polek & Srihirun, 2020).

Athletes'agility is an important skill for both attackers and defenders in invasion sports such as codes of football. On the sporting field, agility requires reacting to a stimulus, often presented by an opponent's movement, before a change of direction or speed. There is a plethora of research that examines the movement component of agility in isolation, which is described as change-of-direction (COD) ability, and this is thought to underpin agility performance.It is suggested that COD tests can be applied to sports that involve pre-planned COD movements (Young, Rayner, & Talpey, 2021). Finally, to determine the effect of agility ladder training on the agility of the student of the futsal extracurricular 24-students at Bina Darma University Palembang. The research method used in this study is a quasi-experimental method with one group pretest-posttest-design. The technique of collecting data uses an agility test instrument, namely Illinois Agility Run. Thus it can be concluded that there is a significant influence agility ladder training for agility at participant's futsal extracurricular Bina Darma University of Palembang (Hidayat, 2019).

Conclusion

Training to develop agility Athletes must be trained in other basic physical fitness as well. To create connections in many skills that require dexterity. Agility training is essential for almost any sport. Agility exercises should use a distance of 5 to 10 meters to allow athletes to move between 3-5 targets. During the training athletes must control their body so that it does not hinder movement. And should be guided by a trainer every step of the way for efficiency and effectiveness of training. This study the effect of developing agility with the intelligent monkey ladder of 20 global athletes, using a specific sample group selection method. Global athletes trained using the smart monkey ladder in conjunction with the global training program for 8 weeks and tested using the Smart ladder test. When comparing the mean difference of the results of the agility test using the Smart Ladder test of the experimental group from the test. The results were as follows: Before training, the mean was 2.16 seconds, after 8 weeks of training, the mean was 0.33 seconds, which was a statistically significant difference at the .001 level.

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