



TESTING AGILITY SKILL AT A BASKETBALL TEAM (10-12 YEARS OLD)

SOPA IOAN SABIN¹, POMOHACI MARCEL²

Abstract

Aim. Our study focuses on examining the agility skill on a mini basketball team, 12 players with age between 10 and 12 years old. The tests analyse coordination and speed combined with lateral movement, essential skills in nowadays basketball game.

Methods. In our research we used as methods of research some specific agility test for basketball as: Lane Agility Drill, Half-court zigzag sprint, Agility Drill or Compass, Lane Arrow Closeout, Quadrant Jump Test. We had two tests, initial test in November 2014 and final test in May 2015.

Also as research methods we used: observation method, statistical and mathematical research method.

Results. Significant improvements can be seen from the initial test until final test, our experiment group

Conclusions. Agility is an important skill in nowadays sport performance, coordination and speed; components of agility are very well developed in young age. Developing and testing agility can improve sport performance. After improving agility our team improved results in basketball games, so we can conclude that agility is an important component in teams development.

Key Words: agility skill, testing agility, basketball.

Introduction

Classically agility is defined simply as “the ability to change direction rapidly” (Bloomfield, Ackland & Elliot, 1994) or “the ability to change direction rapidly and accurately” (Barrow & McGee, 1971).

Others define agility as “the ability to maintain or control body position while quickly changing direction during a series of movements” (Twist and Benickly, 1995).

Recently scientific papers of some authors try to complete the agility definition adding “whole body change of direction as well as rapid movement and changing direction of body parts” (Draper & Lancaster, 1985).

Most researchers consider speed and agility complex psychomotor skills (Verchoshansky, 1996). Those skills imply moving the whole body as fast as possible, thus agility has an extra characteristic of changing direction. When defining speed most researchers refer to the shortest time required for an object to move through a fixed distance, the definition resembles to velocity definition but without mentioning the direction of movement (Harman & Garhammer, 2008).

Sport research concluded that speed is an important component in agility skill but the old

definition of agility is too basic and simplistic, agility skill has more fundamental components like balance, coordination, the ability to adapt and react to a change of the environment (Plisk, 2008). Some specialists consider agility as a complex motor skill and classify agility among mixed physical capabilities (Mekota, 2000).

Although speed is a component of agility it must not be confused and put an equal between them, agility should be superior to speed, quickness and coordination abilities. Past researchers define agility as the ability to change direction, start or stop the movement with quickness (Gambetta, 1996; Parsons & Jones, 1998). Newer investigation claims that speed and agility represent independent physical abilities and for their development it requires high degree of muscular specificity (Sheppard & Young, 2006). Also important role in developing agility skill has anticipation and decision making abilities (Young et al., 2002). A correct form of evaluating agility must take in consideration the rapidly change of direction, acceleration and fast stopping.

Agility skill have different moving mechanism than that used by track sprinters and its employed more in sport games and martial arts (Sayers, 2000). Agility needs change of direction and is different from straight line speed performance (Little &

¹ National University of Physical Education and Sport Bucharest, ROMANIA

² University “Lucian Blaga” Sibiu, ROMANIA

E-mail address: sopa_sabin@yahoo.com

Received 17.10.2015 / Accepted 09.11.2015



Williams, 2005). Other components of agility are acceleration and deceleration that are involved in change of direction movements and help improving the performance, so those are specific skills that should be trained separately (Jeffreys, 2006).

In team sports when we talk about agility we are not resuming only to the ability to change direction of the movement as well as the capacity to anticipate opponent moves and counteract, read and react to specific situation coming in the game (Gamble, 2013).

Other new researchers tried to provide an exact definition of agility as “rapid whole body movement with change of velocity or direction in response to stimulus coming from the environment” (Sheppard & Young, 2006). So in team sport games, agility skills, are not limited to rapidly change of direction but also to abilities like perception and decision making also like speed of expression, agility in the context of team sport being multifunctional (Gamble, 2013).

General definition that all accepted for agility is “a rapid whole-body movement with change of running direction in response to a stimulus” (Van Gelder & Bartz, 2011). Agility involves moving upper body segments to change the running direction rapidly without losing balance (Allum et al., 2002).

Many sport games have in their basic movements different changes of direction. The ability used in this basic movement is agility. Scientist found that are a lot of similarity in performance in agility t-test and 50 meters sprint not counting if man or woman (Paule, Madole & Lacourse, 2000).

Coordination and movement control are important in agility skills, but apart from this other components affects the level of agility such as dynamic balance, mobility of joints, power and flexibility, resources of energy, strength, speed and biomechanical structure of movement (Sporis, et al., 2010).

Other researchers define agility as “the ability that makes possible for a sportive to change direction of movement, make quick stop and make fast, smooth, efficient and repetitive movements” (Miller et al., 2006).

In wider context agility can be defined as “speed coordination” and in some specific sports it is used the term “specific agility”, because it has special moves patterns (Sporis, et al., 2010).

In developing agility skills specialists use some basic walking technique, running technique, quick changing direction of movement, jumps and landings (Wroble & Moxley, 2001). Plyometric training, counter-movement jumping and drop jump

can positively affect vertical jump development, as well as agility level (Thomas, French & Hayes, 2009).

It is considered that agility is a dynamic movement requiring high muscle power and it is assumed that jumping and agility performance would be closely related some specialists stated that “both maximal jumping and sprints are generally considered as dynamic movements requiring high muscle power and they should be related” (Kukulj, Ropret, Ugarkovic & Jaric, 1999). Agility skill needs rapid force development and high power output, and also the ability to efficiently use the stretch-shortening cycle in ballistic movements (Plisk, 2000). Also the power of inferior members has been correlated with agility (Mayhew, et al., 1989).

Methods

We tried to develop agility skills at our basketball team using different specific moves that agility requires.

Our study, with the main theme “testing agility skill at a basketball team”, took place in Bucharest, at basketball team ACS Force Sport, with an effective of 12 players all boys with age between 10 and 12.

The experiment took place in the period: October 2014 (Initial test) until May 2015 (Final Test).

After developing agility we test it using some specific agility test like Agility Lane Drill, Agility Cone Drill, Half Court Zigzag Sprint Test, Quadrant Jump Test, Lane Arrow Closeout.

Lane Agility Drill

The Lane Agility Drill is a test of agility in the basketball player. This test is part of the fitness testing battery for the SPARQ basketball and NBA Draft, and their protocol is listed here.

- purpose: this is a test of speed, body control and the ability to change direction (agility).

- equipment required: stopwatch or timing gates, measuring tape, 6 marker cones, a basketball court.

- procedure: Set up the cones as illustrated in the diagram. The test is based on the pro-sized foul lane (16' wide x 19' deep). If using a High School sized court (lane width is only 12 feet) or other non-standard court dimensions, the markers may need to set outside the lane markings. Start with one foot behind the start line, no rocking movement allowed. Hand timing starts from first movement from the set position. Run forwards to the baseline. At the cone, change movement to a side shuffle, and move sideways to the right across the baseline.

At the next cone back pedal up the lane to the foul line, then side shuffle left back towards the start line. Here the subject touches the floor at a point even with the starting cone, then reverses direction to return back around the course to complete another

revolution. First side shuffle right, forward sprint, side shuffle left then back pedal to complete the test. Remain facing forwards towards the baseline throughout the test. Two trials are allowed.

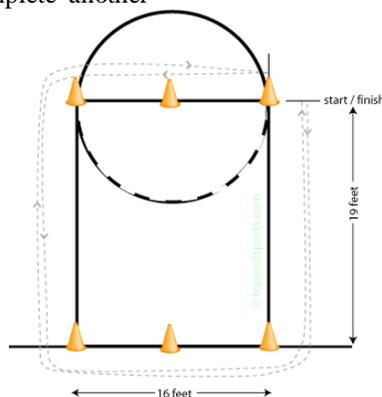


Fig. 1. The Lane Agility Drill scheme

<http://www.topendsports.com/testing/tests/agility-lane.html>

Agility Cone or Compass Drill

The Agility Cone Drill is a lateral movement test that measures the agility of the athlete, especially body control and change of direction.

- **purpose:** this is a test of speed, explosion, body control and the ability to change direction (agility).
- **equipment required:** stopwatch or timing gates, measuring tape or chalk, 5 marker cones, a flat non-slip surface.
- **procedure:** The cones are laid out as per the diagram, with four marker cones placed in a diamond shape, and one in the middle. The outer cones are each placed 3 meters from the center. The player crouches behind and with their left hand on the middle cone, facing forwards (towards cone 5). The

player then turns and runs to the right and touches the cone (2) with their hand. They then turn back and run to the center cone, out to the next cone (3), back to the center, out to the next cone (4), back to the center and then finally turn and finish by running through the finish line at cone 5. The player is required to touch the cone with their hand at each turn. Timing starts when the hand comes off the center cone, and stops when the chest passes through the line of the final cone. Rest for three minutes, then repeat the drill, moving in the opposite direction (counterclockwise, cones in order 1-4-3-2-5).

- **scoring:** Record the time to complete the test in seconds to the nearest two decimal places for each direction. The score is the average time of two trials.

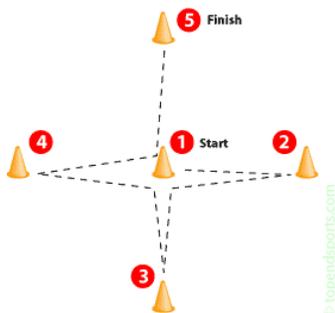


Fig. 2. Agility cone or compass drill scheme

<http://www.topendsports.com/testing/tests/agility-cone-drill.html>

Half Court Zigzag Sprint Test.

This test was created to test the speed and agility of basketball players. The sportive starts from the back line runs in diagonal through the first cone

and passes it, runs at the center of the court and passes the second cone and then runs until the last cone situated in the corner of the gym.

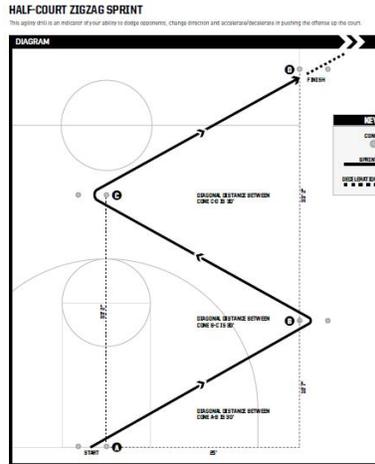


Fig. 3. Half court zigzag sprint test

<http://www.eliteathletetraining.com/sparq-basketball-testing>

Quadrant Jump Test.

This test was performed to measure the agility of the subject in changing body position rapidly by jumping.

Equipment needed was a marking tape and a stopwatch.

Two cross lines 3 feet long were marked thus making four quadrants. Numbers 1, 2, 3 and 4 were marked in these quadrants in diagonal fashion.

The subject was asked to begin from behind the small starting tick mark on the line between quadrants 1 and 4 and jump with both feet into 1 and then 2, 3, 4 and back into 1 again. The pattern is continued until the signal “STOP” was given. The score for each subject was the number of times the feet landed in a correct zone in 10 seconds. The best score of two trials was recorded as the test score.

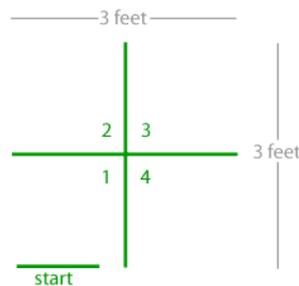


Fig. 4. Quadrant Jump Test

<http://www.topendsports.com/testing/tests/quadrant-jump.html>

Lane Arrow Closeout

In this test the agility and speed are tested, the player starts from the back line run forward until the first cone touches it and makes sidesteps to the

left and then to the right then runs back to the center cone and to the finish line.

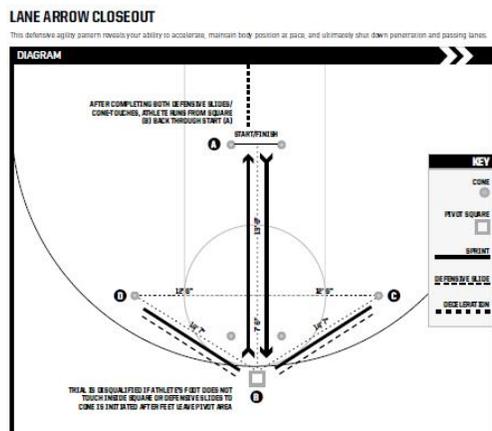


Fig. 5. Lane Arrow Closeout

<http://www.eliteathletetraining.com/sparq-basketball-testing>

Results

After developing agility skills we test the agility using some specific test like: Lane Agility Drill, Agility cone, Half Court Zigzag, Quadrant Jump Test, Lane Arrow Closeout. The results of the tests are shown in the next tables and graphics. The

tests were done 2 times, first the Initial test at the beginning of the experiment and second at the end of the experiment Final test (T2). As we can see we had improvements in both groups in every test but higher numbers in the experimental group.

Table 1. Testing agility at a basketball team – Initial Tests

Agility Test	Aithmetic mean	Standard Deviation	Standard Error	Confidence Interval for Mean	
				Lower Bound	Upper Bound
1. Lane Agility Drill	12.40	3.567	0.765	11.23	14.32
2. Agility cone Drill	10.27	2.126	0.643	9.26	11.43
3. Half Court Zigzag Drill	9.43	2.098	0.601	8.42	10.21
4. Quadrant Jump Test	12	3.193	0.732	10	13
5. Lane Arrow Closeout	8.21	3.121	0.987	8.02	10.32

The first step in our experiment was to apply the Initial Tests on our experimental group in October 2014 at the beginning of the study. The group had five agility tests that were done twice and the best performance was registered. Then was a period of trainings that had as main objectives developing the agility skills, we worked only for developing speed, coordination, lateral movement and all agility components. After the training period

in May 2015 we took the Final Tests and the results were significant higher in the Final Test as in the Initial Test as we can see in Table 1 and Table 2. In Fig. 6 We can see the difference on the arithmetic mean on both tests.

Table 2. Testing agility at a basketball team – Final Tests

Agility Test	Aritmethic mean	Standard Deviation	Standard Error	Confidence Interval for Mean	
				Lower Bound	Upper Bound
1. Lane Agility Drill	11.20	3.691	0.824	10.11	13.23
2. Agility cone Drill	9.11	2.368	0,678	8.76	12.10
3. Half Court Zigzag Drill	8.02	2,237	0.657	7.32	11.42
4. Quadrant Jump Test	14	3,232	0.798	12	16
5. Lane Arrow Closeout	7.42	3,127	0.743	7.02	8.04

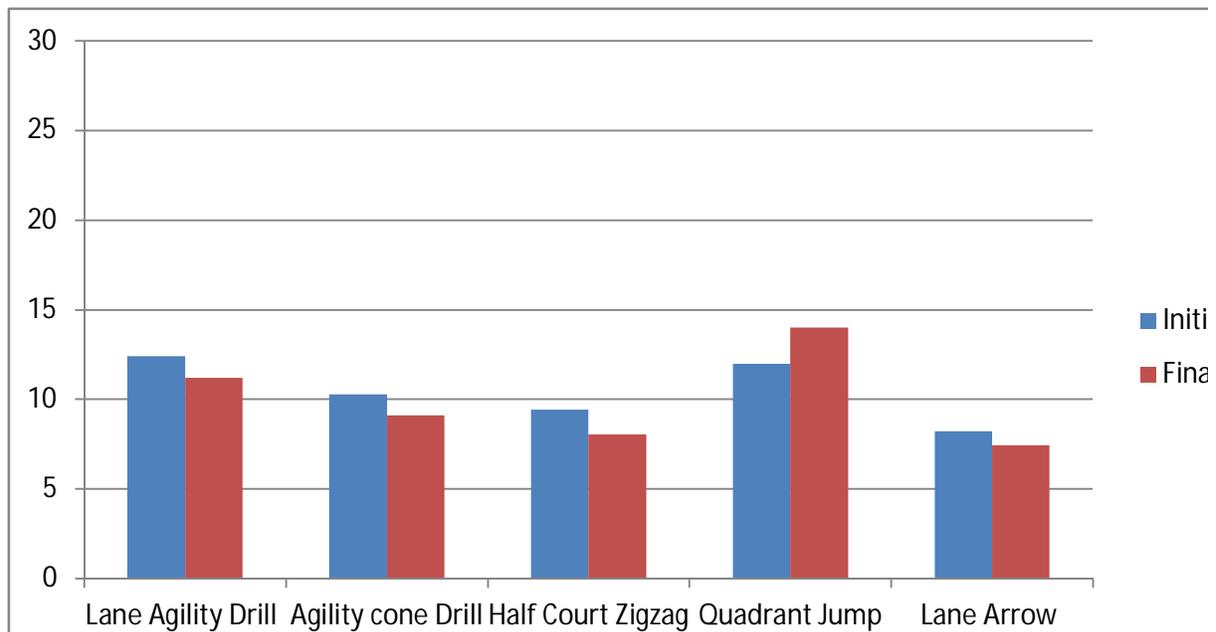


Fig. 6. Agility tests at basketball team – Initial and Final tests

Discussions

Some skills are very well and easily developed in youth, skills like coordination, speed, moving in different directions and other components of agility. Our study focused on how important is to develop agility skills and also on testing agility. As we can see the results showed significant improvement from the initial test until the final test As we can see in Table 1 and Table 2, we calculated some statistical parameters like: Arithmetic mean, Standard Deviation, Standard Error and Confidence Interval for mean (lower bond and upper bond). The arithmetic mean we calculated in both initial and final testing to see the progress that we made on developing agility skills. As we can see at every agility test we have some progress, in Lane Agility

Drill Fig. 1 we have a progress from 12.40 s to 11.20 sec, in Agility Cone Fig 2. we have 10.27 at the initial test and 9.11 at the final test, at half court zigzag drill Fig. 3 we had 9.43 at initial test and 8.02 at the final test, in Quadrant Jump test Fig. 4 we had 12 repeats and at final test we had 14 repeats and in Lane Arrow Closeout Fig. 5 we had 8.21 sec at initial test and 7.42 at the final test.

Acknowledgements

This paper is made and published under the aegis of the Research Institute for Quality of Life, Romanian Academy as a part of program co-funded by the European Union within the Operational Sectorial Program for Human Resources Development through the project for Pluri and



interdisciplinary in doctoral and post-doctoral program Project Code: POSDRU/159/1.5/S/141086.

References

- Allum, J, Carpenter M, Honegger F, Adkin A and Bloem B, 2002, Age-dependent variations in the directional sensitivity of balance corrections and compensatory arm movements in man. *The Journal of Physiology*.
- Barrow H, McGee R, 1971, A practical approach to measurement in physical education. Philadelphia, PA: Lea & Febiger.
- Bloomfield J, Ackland TR, Elliot BC, 1994, Applied anatomy and biomechanics in sport. Melbourne, VIC: Blackwell Scientific.
- Draper JA, Lancaster MG, 1985, The 505 test: A test for agility in the horizontal plane. *Australian Journal for Science and Medicine in Sport*.
- Gambetta V, 1996, How to develop sport-specific speed. *Sports Coach*.
- Gamble P, 2013, *Strength and Conditioning for Team Sports: Sport-Specific Physical Preparation for High Performance*. London and New York, Routledge: Taylor and Francis.
- Harman E, Garhammer J, 2008, Administration, Scoring, and Interpretation of Selected Tests. In: *Essentials of Strength Training and Conditioning*, 3rd ed., Edited by T.R. Beachle, and R.W. Earle, Champaign, IL: Human Kinetics.
- Kukolj M, Ropret R, Ugarkovic D, Jaric S, 1999, Anthropometric, strength, and power predictors of sprinting performance. *The Journal of Sports Medicine and Physical Fitness*.
- Jeffreys I, 2006, Motor Learning – Applications for Agility, Part 1, *Strength and Conditioning Journal*, 28(5), pp.72-6.
- Little T, Williams AG, 2005, Specificity of Acceleration, Maximum Speed and Agility in Professional Soccer Players. *Journal of Strength and Conditioning Research*.
- Mayhew JL, Piper FC, Schwegler TM, Ball TE, 1989, Contributions of speed, agility and body composition to anaerobic power measurements in college football players. *Journal of Applied Sports Science Research*.
- Mekota K, 2000, Defining a motor structure. In: *Czechs kina tropology*.
- Miller MG, Herniman JJ, Ricard MD, Cheatham CC, Michael TJ, 2006, The effects of a 6-week training program on agility. *Journal of Sports Science and Medicine*.
- Paule K, Madole K, Lacourse M, 2000, Reliability and validity of the T-test as a measure of agility, leg power and leg speed in college aged men and women. *Journal of Strength and Conditioning Research*.
- Plisk SS, 2000, Speed, agility and speed endurance development. In T.R. Beachle and R.W. Earle (Eds.), *Essential of Strength Training and Conditioning*. Champaign, IL: Human Kinetics.
- Sayers M, 2000, *Running Technique for Field Sport Players*. Sport Coach.
- Sheppard JM, Young WB, 2006, Agility Literature Review: Classifications, Training and Testing. *Journal of Sports Sciences*.
- Sporis G, Milanovic L, Jukic I, Omrcen D, Molinuevo J, 2010, The effect of agility training on athletic power performance; *Kinesiology*.
- Thomas K, French D, Hayes PR, 2009, The Effect of Two Plyometric Training Techniques on Muscular Power and Agility in Youth Soccer Players. *Journal of Strength and Conditioning Research*, 23(1), 332-335.
- Twist PW, Benicky D, 1996, Conditioning lateral movements for multi-sport athletes: Practical strength and quickness drills. *Strength and Conditioning* 18(5), 10-19.
- Van Gelder LH, and Bartz SD, 2011, The effect of acute stretching on agility performance. *The Journal of Strength & Conditioning Research* 25, 3014-3021.
- Verkhoshansky YV, 1996, Quickness and Velocity in Sports Movements. *New Studies in Athletics*, 11(2-3), pp.29-37.
- Wroble RR, Moxley DP, 2001, The effect of winter sports participation on high school football players: strength, power, agility and body composition. *Journal of Strength and Conditioning Research*, 15(1), 132-135.
- Young WB, James R, Montgomery I, 2002, Is Muscle Power Related to Running Speed with Changes of Direction? *Journal of Sports Medicine and Physical Fitness*, 43, pp.282-288.