

Passing efficacy of young basketball players: test or observation?

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Abstract

Basketball is a combined game demanding elevated physical and technical skills, mental characteristics and tactical behaviour. These characteristics cannot be evaluated only by skill tests, which are considered inadequate to record the mental ability of the athletes. For the complete evaluation of the athletes' performance observation methods have been proposed, which record all of their efforts during the game. The aim of the present study was to evaluate the athletes' efficacy in passing skill, with two different methods: (a) the skill test and (b) game observation and correlate the results with the total game performance. For this purpose three basketball teams composed by 33 athletes, aged 14-15 years old, participated in the study. Initially, the athletes performed the passing test and afterwards in order to evaluate their passing efficacy and their overall performance, three games between the teams were recorded. Results indicated that performance in passing skill test was not correlated with passing efficacy or with total performance in the games. On the contrary, passing efficacy in the games was significantly correlated and could clearly predict the overall performance of the athlete. The athletes' performance in passing skill should not be evaluated only by application of test, but additionally by observation of the games.

Key words: basketball, passing skill test, observation, performance

1. Introduction

In the last few decades, basketball has developed significantly enough, thus the number of adolescents involved in the sport significantly increased. Because of the large number of adolescents involved in the sport, selection of the most skilled is necessary. The young basketball players undergo certain skill tests, where their technical skills and their physical abilities are evaluated throughout. In a study of Bos (1988), coaches were asked about the usefulness of these tests. A great percentage of these coaches (82%)

responded that they used these tests for the following reasons: (a) evaluation of performance, (b) the follow-up on the athletes' further development, (c) the athletes' motivation, (d) the manipulation of the practices, (e) the contribution to the players' decision making, (f) the comparison of the groups, and (g) the group formation.

The methods implemented by the American Alliance for Health, Physical Education, Recreation, and Dance (1966, 1984) and the Institute of Sports Science in Heidelberg (Bos, 1988) are the ones most widely used to evaluate young basketball players.

The most widespread battery of skill tests is the one of American Alliance for Health, Physical Education, Recreation, and Dance (1984), which was based on Brace's (1924) research. It was applied in a sample of 900 boys aged 12-18 years old and was consisted from the following five skill tests: (a) speed spot shooting, (b) free throws accuracy, (c) accurate and quick passes in uneven targets, (d) obstacle dribble, and (e) speed of defensive movement. Validity and reliability of the tests were well documented.

The second consecutive set of skill tests is that of Heidelberger Basketball Test by Bos (1988), which includes two test batteries. The first battery is related to technical abilities and the second in physical conditioning. The technical abilities battery consisted of: (a) lay-ups, (b) shooting accuracy, (c) obstacle dribble and (d) speed passing. The physical conditioning test consisted of: (a) 4m shuttle run for 30 sec, (b) pivoting, (c) 30 sec rebounding, (d) defensive sliding, and (e) push-ups for 30 sec.

Also, in a more recent research by Apostolidis, N., Nassis, G., Bolatoglou, T. and Geladas, N. (2004), elite young basketball players results of a modified dribbling test were reported to be correlated with their mean power as it was measured through the wingate test. This is an indication of the close association between physiological and technical skills (as they are measured with tests) of the players.

However, in the study done by Oslin, Mitchell and Griffin (1998), it was reported that application of tests which were used to determine the ability of the athletes in various skills of the sport, was not particularly important due to the unwillingness of the participants to perform their maximum effort. Furthermore, when the participants were asked about their preferred method of evaluation (skill test or during competition), 93% of them responded positively to the evaluation during competition. The reason was that the game is not like testing, so they perceive less pressure.

Therefore, it is obvious that basketball though as most sports cannot be characterized only by these skills tests because it involves different behaviours among its athletes (Chatzopoulos, *et al.*, 2005). So, the evaluation of the adolescents' performance is accomplished with several other methods which are based on observation and have been suggested from international literature (Grehaine, Godbout & Boutier, 1997; Oslin, Mitchell & Griffin, 1998; Turner & Martinek, 1999).

Grehaine *et al.* (1997), proposed a method for the evaluation of the efficacy in games and sports based on observation. This research masters significant advantages because it refers to the most popular games, such as basketball, football, volleyball and handball, which are part of the Greek scholar physical education teaching system. A complete

description of the evaluation protocol, which included various game situations, was referred. In this protocol the observers recorded the observed behaviours. In the present study we will evaluate the performance of basketball players when induced in a technical ability skill test and at the same time we will observe their attitude in actual competition conditions and evaluate the same technical ability (as in the skill test) there as well.

According to Grehaigue *et al.* (1997) the way to evaluate the athletes' performance was through (a) standardized tests, (b) post-game statistical analysis, (c) evaluation of performance in fixed environments, and (d) observation during the competition. In addition, when the youngsters undergo the different skills test, possible psychological influences cannot be observed because the tests take place outside competition conditions (Chatzopoulos *et al.*, 2005).

Berri, Schmidt, and Brook (2006), proposed a formula called "Win Score", in order to evaluate the basketball players gaming efficacy. The formula had been investigated in the past from researchers and basketball coaches (they had given the name Tendex) and was an idea of a simple addition of all the positive players' efforts in the game and the subtraction of the negative ones. Later, Berri and his colleagues based on their previous studies expanded their research and proposed a more adjusted formula which is applied in both of the most spectacular world championships: NBA and Euroleague.

The present study will try to examine the degree of effectiveness of certain technical abilities tests and their ability to be implemented in an actual basketball game. Simply put, we will try to check the degree a technical ability is executed correctly in a game after being implemented and taught outside game conditions. For example, accurate and quick passing in uneven targets test, versus quick passing in uneven height players during the game. Thus, the reliability of the test can be evaluated. Finally, we will try to clarify if there is any relevance between the several evaluation methods of performance.

The cause of this study is enforced by the fact that: (a) American Alliance for Health, Physical Education, Recreation, and Dance (1984) skills tests were used, (b) it was based in the most recent studies that support observation of performance and (c) it involved youngsters of 14-15 years old, which is a critical age for further evaluation and development in sports.

2. Methods

2.1. Participants

Thirty three (N=33) young basketball players (ages 14-15, $M=14.6$) members of three different basketball clubs participated in the study ($n_1=12$, $n_2=9$, $n_3=12$), after complete information of their parents, and following approval from the Department's Ethics Committee. All volunteers were informed of the nature of the study and they all gave their informed consent. The tests were applied during the competition season. All the three selected teams composed by players of balanced capacity, so that the games between them to be balanced.

2.2. Measurements

Passing skill: the specific test was preferred after 20 basketball coaches were asked to choose among all of the basketball skills, which one they considered was the most valid, and which one was important for further development of a basketball player. Most basketball coaches (14/20) chose the passing ability as the most important skill.

The purpose of the specific test (American Alliance for Health, Physical Education, Recreation, and Dance, 1984) is to measure the participant's ability to pass and receive the ball fast and accurately in motion. Figure 1 presents the structure of the test. The participants executed 3 attempts that lasted 30 sec each. The first attempt was warm-up and the sum of the other two consistent the final result.

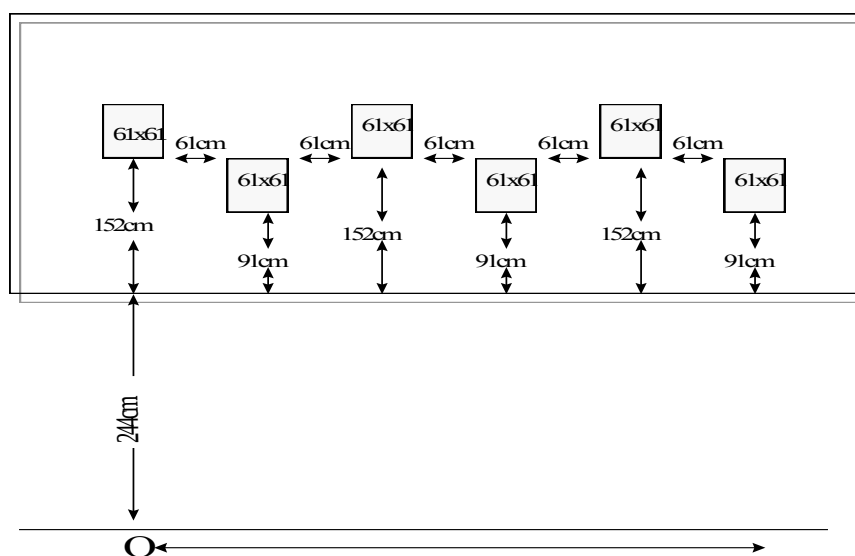


Figure 1. Speed and accuracy passing test (American Alliance for Health, Physical Education, Recreation, and Dance, 1984).

Observation: 3 basketball games between the 3 selected similar balanced teams were videotaped in order to get a picture of the technical ability of the players and their playing behaviour under the pressure of the game. The coaches were obligated to use all of their players at least for one period of the game (10 min). Then, three basketball coaches experienced in team scouting, separately analysed the recorded games and evaluated the youngsters' efforts. However in a previous pilot study, the total performance of the players in three games was given to the three observers to analyse and record. All three observers presented identical results in both: the pilot study and the experimental games. The criterion examined in the three games of the specific research was if the players' passes were completed at all times. The observers collected also the total performance of the basketball players according the Berri's (2007) win score formula ($\text{Tendex} = \text{points made} + \text{rebounds} + \text{steals} + \text{blocks} + \text{assists} - \text{missed shots} - \text{turnovers/time played}$). Finally, the games passing efficacy and the overall performance of the players, was then compared to the results of the passing ability skill test in order to control for the reliability of the test.

2.3. Statistical analysis

All data were analysed: (a) descriptively with means and standard deviations, (b) Pearson correlation in order to correlate all of the investigated variables (passing skill test, passing efficacy in games, overall gaming performance), (c) stepwise regression analysis for the control of the significance of the gaming passing efficacy (predictor variable) to the prediction of the overall gaming performance (dependent variable). Statistical significance was accepted at $p < 0.05$ level.

3. Results

The results showed that all of the players rated in advance level of passing ability. They were all placed among the higher levels when compared to the American Alliance for Health, Physical Education, Recreation, and Dance (1984).

Simultaneously, the results showed that the averages for all three groups were similar (no statistical differences) and as a result all three groups presented homogeneity (table 1).

Table 1. Descriptive statistics of the sample performance.

	A.A.H.P.E.R.D.		Game passes		Tendex	
Groups	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
n ₁ =12	104.33	5.84	56.33	36.59	1.14	0.39
n ₂ =9	102.89	11.54	108.22	79.67	1.18	0.56
n ₃ =12	105.67	6.02	66.08	49.78	1.36	0.52
Totals n=33	104.36	7.65	74.03	58.04	1.23	0.48

In further analysis, comparing the results for all three groups to the American Alliance for Health, Physical Education, Recreation, and Dance (1984) norms it is concluded that most of the young basketball players are in the 5th and highest level for the ages 14-15. Therefore most players had developed a very high ability of passing the ball. Specifically, 5 players ranked in the 4th level (49-48), 21 players in the 5th level (49-55 passes) and 7 are over the top level referred by the American Alliance for Health, Physical Education, Recreation, and Dance (1984) norms. The qui-square test revealed statistically significance difference in favour of the 5th level of passing ability ($\chi^2=13.82$, $p < 0.001$) (figure 2).

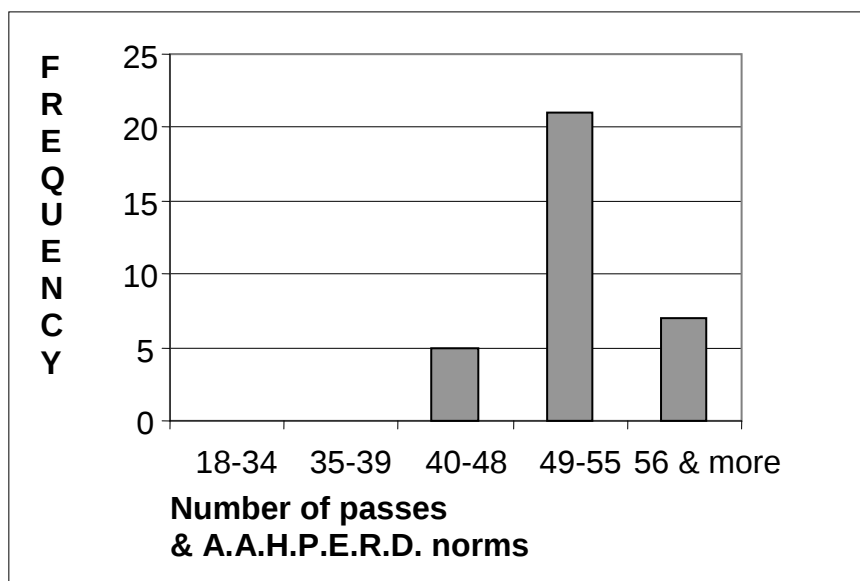


Figure 2. Frequency of passing results according to the American Alliance for Health, Physical Education, Recreation, and Dance (1984) norms.

Of course the American Alliance for Health, Physical Education, Recreation, and Dance norms are the same since 1984. It is possible, if not certain, that the physical and technical abilities have changed the last 28 years. At the same time the coaching thinking has changed all these years. The game of basketball is emphasized by other abilities nowadays.

Pearson correlation results between the “passes completed during the basketball games” and the “overall performance” referred significant ($r=0.68$, $p<0.01$). No statistical differences revealed between the “passing test” results and “passes completed in the game”, as well as with the “overall performance”.

Finally, step by step regression analysis showed that the “passes completed” by the basketball players can strongly predict their “overall performance” during the competition, explaining the 46% of the total variance, $F=26.94$, $p<0.001$ (table 3).

Table 2. Step by step regression analysis of passes completed against Tendex.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.68	0.46	0.45	0.36

predictor: passes completed

dependent variable: Tendex

$F=26.94$, $p<0.001$

4. Discussion

The test of accuracy and speed passing, from the American Alliance for Health, Physical Education, Recreation, and Dance (1984) battery of tests is a widely used

method, for the evaluation of the basketball players' passing ability. In the review of literature chapter, studies based both on tests for evaluating the performance of basketball players in technical skills, as well as on observation of the players in games, were mentioned. The question posed at the beginning of the study was whether and how the results of a technical skill test is associated with the efficacy of a basketball player in gaming activity. Furthermore, specific purpose of this study was to attempt to give a suggestion to every young researcher or coach who wants to deal with evaluating the performance of his athletes and concerned which of the two methods is more valid.

The accuracy and speed passing test from the battery of the American Alliance for Health, Physical Education, Recreation, and Dance (1984) tests, is a widely used method for the evaluation of the basketball players in the specific skill. In the above review of literature both methods that were either based on tests for evaluating the performance of basketball players in technical skills or on the observation of the players efficacy in actual conditions (games) were mentioned.

Regarding the passing test results, when comparing the three sample groups with the established norms of American Alliance for Health, Physical Education, Recreation, and Dance (1984), it was observed that the most of the youngsters ranked in the fifth and highest level of norms for the age of 14 to 15 years. Specifically, five players ranked in the 4th level (40 to 48 passes), twenty-one in the fifth level (49 to 55 passes) and seven players completed greater number than given by the American Alliance for Health, Physical Education, Recreation, and Dance (1984), (56 or more passes). The conclusion from the above reference regarding the classification of the athletes is that all of them are characterized by a highly developed passing ability analogues to their age.

Nevertheless, the American Alliance for Health, Physical Education, Recreation, and Dance (1984) norms, have been published in 1984, at a period when the training methods as well as the physical and technical skills of the young basketball players were not highly developed as they are in now days. Furthermore, the training science continuously progressing so, obviously the specialization of the adolescents is adapting to everything being performed with accuracy and with applied scientific methods. Besides, Apostolidis and his colleagues (2004) have documented that skill test are correlated with the young players' power. Thus, we can presume that new specialized training methods continually improve the physical and technical level of the athletes, and lead them to elevated levels of performance.

However, the passing skill test as all tests can be used as additional training instrument, since it is a method which coaches can use, aiming to determine whether the goal-setting was achieved. Coaches by submitting their athletes in technical skill tests can achieve the following goals: (a) to group the athletes according to their abilities, because the creation of homogeneous groups facilitates the teaching and creates the desired atmosphere among the athletes, which is not achieved when groups are heterogeneous, (b) tests and measurements can provide important information about the technical and physical condition of the athletes, so coaches by pointing out the weaknesses of the team can implement a scientifically tested program based exclusively on the needs of the athletes, (c) skill tests application is a valid method for the monitoring progress of the athletes, especially when these test are applied at the beginning, the middle and the

end of the season. Thus, coaches are able to control both, the progress of the players, and the effectiveness of the program (Anastasiadis, 2006).

Do to the above mentioned purposes, the application of skill tests is considered as a valid tool of objective control for the players' technical skill, but on the other side tests cannot be used for the efficacy evaluation of each athlete's skill in the game, which is a dominant parameter for the total player's evaluation

In conclusion, the passing skill test, in this case potentially evaluates the power and the accuracy of the performance of the basketball players, but cannot assess their psychological and mental qualifications of them, the timing in thought and the execution of the skill, the choice of proper passing option per event, and finally the interference and obstruction by the opponent, which are key components of a basketball game.

On the other side the observation results regarding the completed passes in games, revealed homogeneity between the three groups. Within the first group a higher homogeneity was revealed compared to the other two groups of samples, due to the better deviation of the playing time among the young players. Regarding the overall performance of the players, the first group revealed higher homogeneity compared with the other two groups of samples, but the second one completed significantly more passes in the games.

From the correlation of the three measured variables, it is apparent that the passing skill test is not related with the passing efficacy of the young basketball players during the game. The test application evaluates the strength of the players and a part of their technical skill, since the stronger a player is, the more passes he can complete. The skill test cannot measure the prediction ability, any outcome factors and the psychological status of a player. The present study is in accordance with Veal's (1992), which concluded that the skills test cannot give enough input whether a player is a good player or not. Furthermore, Chatzopoulos *et al.*, (2005) proposed that a young basketball player can perform the basic skills of a sport during a test, away from competition conditions, without the interference or confrontation of an opponent, so practically he is evaluated only for the execution and not for the result.

Conversely, the gaming passing efficacy is strongly correlated and in addition can clearly predict the total performance of the players. This finding indicates that the passing efficacy defines the evolution of the game, and is very important for the coaches to improve the specific skill of their athletes. Also, the skill tests can evaluate the strength and the accuracy of the execution, but they cannot evaluate psychological abilities such as, the way the player is thinking during the execution of the pass, the way the player chooses to pass correctly, and most importantly the possible interference of an opponent during the game.

5. Conclusions

We suggest that application of test can function as a motivation to the players for their further development, but observation is a more accurate evaluation method to determine the performance of young basketball players. Such a method is confirmed from old and recent literature (Grehaine *et al.*, 1997; Oslin *et al.*, 1998; Turner & Martinek, 1999). The observation method leads to the conclusion that the ability of the young players to pass the basketball is significantly related to their overall performance (Tendex). The greater passing ability a player has the better performance he will present during the game.

In conclusion, the variables of this study that were measured in real conditions such as a game, are related to each other but not to the skill test variable. Future research must focus on larger samples, various ages and more analysed games for the absolute documentation of the basketball skills evaluation throughout game observation.

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