Relationships of Individual Skill, Tactical Understanding and Team Skills in Finnish Junior Basketball Players

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INTRODUCTION

In basketball, players can move with or without the ball using varying patterns of motion, techniques to master the ball and tactical decisions to master the game . All these actions vary in duration, space, speed and direction. Thus each individual action by a player can be considered as a random test for individual skills, tactical understanding and team skills in basketball. The skill output in the game and in testing conditions can be measured using video and/or traditional skill tests. Tactical understanding can be evaluated with questionnaires or psychomotor tests. Analysis of video recordings have been used to study game actions in basketball both qualitatively and quantitatively. Individual techniques used with the ball in a basketball match has not been evaluated at junior level with video analysis.

The purpose of this study was to investigate the relationships of individual skills in match and test conditions, understanding of the game, team skills, physical and psychomotor tests in junior basketball players.

METHODS

Ten national level junior teams participated in this study. The subjects who completed all test batteries and games are presented in Table 1.

TABLE 1. The age, height and weight of the subjects (X ± SD).

AG	n	Age (yrs)	Height (cm)	Weight (kg)
A	11	18.0 ±1.4	186 ± 6	74.3 ± 5.1
B	17	16.5 ±0.7	182 ± 6	67.4 ± 3.8
C	14	14.8 ±0.5	174 ± 10	59.4 ± 11.2
D	16	12.5 ±0.6	157 ± 8	43.6 ± 8.1
E	13	10.2 ±0.7	143 ± 7	35.0 ± 6.0
Total	61	p<.001	p<.001	p<.001

All actions in the matches with the ball were recorded with a Hitachi VHS color video camera recorder (VT-8E, VK-C-870), which included a timer ($\pm$ 0.04 s). Using video playback, slow motions and still frames of the skill maneuvers all actions with ball were coded on a data sheet according to written instructions. The technical skill aspects examined were receiving, passing, dribbling, shooting, scoring and rebound situations for all players. These were analyzed with respect to the team, player, position, location on the field, time spent in a single maneuver, technique used, speed, and direction of the maneuver. These aspects of the different skills were divided into different categories, which have been reported before.

The skill test battery included dribbling, throwing, combined dribbling-lay-up, combined dribbling passing and a skill specific ball handling test. From this data the total skill index (TSI) was calculated. The physical test battery included maximal starting speed, maximal running velocity (MRV), vertical jumping height (VJH). The psychomotor tests included simple reaction and choice reaction time (CRT) measurements to light signal responding with fingers. In the game understanding test purposefulness action of one player and player group were measured. Additionally knowledge of the rules was measured. The total index of understanding (TUI) was calculated.

Conventional statistical methods were employed with VAX-8600 computer and SPSS-X software. A one-way analysis of variance with respect to the age category and Pearson's correlation coefficient analysis between all measure variables were done. For the significance testing FD-ratio in variance analysis and t-test in correlation analysis were applied.

RESULTS

The total amount of actions in the match analysis with the ball was 4163. On the average in one game with their own rules the players executed 25 passes, tried 28 receptions, executed 16 dribbles, eight shots for scoring, tried five interceptions and five rebounds. Relatively the players, succeeded in their attempts as follows: passing 92%, receiving 95%, dribbling 61%, throwing for scoring 36%, interceptions 50% and rebounds 68%. The average duration of the actions with the ball was 2.2 seconds. The mean distance covered in one action (pass or dribbling) was 4.4 meters. Selected results in the psychomotor, physical, skill tests and successful executions in match situations are shown in Table 2. An analysis between the winners and losers was done concerning all tested variables and actions in game situations. The total scores for the winners were by points 60 vs 49. The winners mastered the total amount of actions with ball 370 vs 361, the duration of actions with the ball per one action was 2.2 s vs 2.1 s and the distance covered with ball per one action was 4.6m vs 4.2m, but the successful actions only in successful shots for scoring in percentages were 37.6% vs 35.1%. The losers mastered successful actions in games as follows: successful receivings 22.4 vs 20.6, velocity and jumping tests by 1-2%. The winners were better than the losers in the game understanding test by 4% and in psychomotor tests in reaction time by 3%, but in choice reaction time the losers were better by 5%. Selected correlation coefficients between the total technical passings 20.0 vs 18.7 and dribblings 8.4 vs 7.7. In skill tests the losers were also better than the winners as follows: dribbling the ball 1%, combined dribbling-lay-up 6%, dribbling-passing 6% and total skills 1%. The winners were better than losers in ball handling by 5% and throwing for scoring by 3%. The losers were better than the winners in physical running velocity and jumping skills, understanding, running, jumping and successful actions in match situation are shown in Table 3. The correlation coefficient between the total skills and different technical skills ranged from .754 to .831 (p <.001).

TABLE 2: Mean values of selected variables describing psychomotor, physical, skill and understanding tests and successful receivings (SFR) and passes (SFP) in a match per each age group (AG).

AG	n	CRT (ms)	MRV (m/s)	VJH (cm)	TSI (pts)	TUI (pts)	SFR (pts)	SFP (pts)
A	11	224	7.9	46	81	27	37	35
B	7	217	7.8	45	72	25	37	35
C	14	248	7.5	43	73	20	24	20
D	16	277	6.6	35	66	23	21	18
E	13	323	6.0	29	52	18	16	14
p<		.001	.001	.001	.001	.001	.001	.001

TABLE 3. Selected correlation coefficients between the tested skill, understanding, physical and successful actions in match conditions (n = 61).

Variable	1	2	3	4
1. Total skills	1.000			
2. Total understanding	.420	1.000		
3. Maximal velocity	.775	.486	1.000	
4. Jumping heigh	.629	.494	.904	1.000
5. Successful passes	.282	.329	.371	.270
6. Successful receivings	.293	.361	.399	.323
7. Successful dribblings	.313	.264	.371	.323
8. Successful shootings	.229	.302	.289	.257

DISCUSSION

The meaning of the individual basketball skills, psychomotor skills, physical abilities and tactial understanding of the game have been speculated often in the practical basketball coaching. In this study it has been shown that at junior level the age, physical abilities, psychomotor skills, and game like skills are not clearly influencing the success in the match. As evidence for this was found that the winners were behind the losers in the tested basketball skills 1%, physical strength and speed 1-2% and psychomotor choice reaction speed 5%. However, the winners were better than the losers in control, the ball in all actions with ball as amounts of actions, as time of actions, as the covered distance of actions and in the throwing percentage for scoring during the matches. In different tests the winner were better than the losers in ball handling, throwing skills, reaction time and understanding the game tactically. In the present study the relationships between the tested skills, understanding the game and physical abilities like running speed and jumping height were higher than the corresponding correlations between the successful actions in passings, receiving, dribbling, and shooting (Table 3). This could mean that the training programs for the total training have not been well balanced for the total development of the teams and players. It could be suggested that when the coaches are planning their future programs the better balance between the skill, tactical and physical training should be reached. More effort should be done for combining in a simple way the skill training and tactical training in terms of basic understanding the game.

In conclusion, it could be stated that the players with higher starting, running, decision making velocity, better ball control, skills and undertanding have more time in the game situation to read the game and execute the purposeful decisions for the existing situations than the players with the lower corresponding velocities, skills, and abilities.

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