RELATIONSHIPS OF SUCCESSFUL MANOEUVRES IN SELECTED MATCH AND TEST CONDITIONS IN JUNIOR ICE HOCKEY PLAYERS

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INTRODUCTION

General problems in the coaching of the competitive collective team games at junior level are as follows:

1. The training of physical properties, skill abilities, tactical understanding, perceptual and psychological abilities and group dynamics in the team,
2. The training of different skill domains and
3. The different training methods of the essential skills and tactical understanding.

In the field of ice hockey research no causal studies have been carried out. Several statistical studies have been done at international senior team level from the point of view of the number of actions /e.g. Gut, 1978/ and efficiency of the purposeful actions in games /e.g. Korolev, 1978/. Also large number of physiological /e.g. Minkoff, 1982/, skill /e.g. Herniston et al. 1979/, psychological /Vairo, 1981/ and group dynamics /e.g. Salminen & Luhtanen, 1988/ have been performed.

PURPOSE

The purpose of this research was to study the relationships between successful manoeuvres of ice hockey in match conditions and the selected individual skills /skating and dribbling/, speed /skating and running/, strength /explosive leg strength/, endurance /skating endurance/ and game understanding in Finnish junior ice hockey players.

PROCEDURE

Fourteen Finnish Hockey League level teams participated in this study. There were 276 subjects who completed all the test batteries and games.

The methods to analyze the matches and the test batteries performed has been presented elsewhere /Luhtanen et al. 1988/.

For the further analyses new variables were calculated. The independend test variables were constructed as follows :

1. The individual skill index (SI) was the average value of the tests in skating speed forward, backward, slalom without and with puck,
2. The speed index was the average maximal running speed (MRS) in the distance of 30 meters,
3. The index of explosive leg strength was indirectly the vertical jumping strenght (VJS) as jumping height in maximal vertical jump,
4. The index of the reaction speed was the inverse of choice reaction time (CRS) to the light signal using fingers,
5. The total index of understanding (TIU) of the game was measured using multichoice questionnaires concerning the purposeful action of one player, a player group and knowledge of the rules. TIU was calculated as the sum of these variables.
6. The index of skating endurance (SKE) was the average speed in the shuttle skating test of 288 meters.

The linear regression analysis was applied to the successful action in match conditions and tested background variables as follows :

1. The dependent variables were separately the percentage of the successful manoeuvres (PSM) in

interception, face-offs, shooting and average of all successful manoeuvres;
2. The independent variables were the individual skill index, the index of running speed, explosive leg strenght, reaction speed, skating endurance and total index of understanding of the game.

The formula for the forced linear regression equation was as follows :

$$PSM_i = a*SI + b*MRS + c*TIU + d*VJS + e*CRS + f*SKE + C$$

where a-f = linear regression coefficients and
C = constant

The other abbreviations have been explained in the methods.

The linear regression analysis was performed with VAX 8600 computer and SPSS-X software. For the testing of statistical significance F- ratio was applied.

RESULTS

The total amount of actions in the match analysis with the puck was 7112. For the dependent variables the players succeeded relatively in their attempts as follows: passing 57%, receiving 79%, skating with puck 57%, shooting technically 68% and for scoring 10%. The results in the independent variables have been described by Luhtanen 1989.

The results of the regression analysis have been concluded in the Table 1. The model of the forced linear regression analysis described significantly /P< 0.001/ the percentage of the successful maneuvers in passing, dribbling and total skills in match conditions in relation to the tested background factors. No significant model was found in face-offs and shooting skills. In every case the percentage of explanation was less than 49%.

DISCUSSION

Most often discussed problems in ice hockey training are individual and team skills during a game and innovative ways of developing these skills. Several conceptual characteristics behind these skills are for instance as follows: ability to read and react in all play situations quickly, fast accuracy and powerful execution of all individual skills, accuracy and timing in cooperation, quick acceleration and speed.

The highest amount of skill manoeuvres per player was in passing and receiving. The relative success in these actions were 57% and 79%,respectively. The model of linear regressioon worked in an efficient way explaining successful passing skills in match condition with the tested individual skills, speed and understanding of the game. The percentage of explanation for the studied model in passing was 49%. A similar type but lower trend was observed in receiving and dribbling skills in match conditions. The amount of explanation for the studied model in passing seventeen. A slightly positive influence for the succesful interception manoeuvers in match conditions was due to the tested speed and strength factors.

The model of linear regression analysis was not signifcant in face-offs and shooting skills in match conditions. Maybe the main reason was that the amount of these actions per player was on the average low and some players did not execute any face-offs or shooting in the game.

For the total skills in match conditions, it can be concluded that at junior level in ice hockey all successful actions with the puck were positively related to the tested individual skills, game understanding, leg strength and skating endurance and negatively related to the maximal running speed, and choice reaction speed. Maybe, this emphasized that the training programs of all teams had not been in an optimal balance between all player abilities.

Especially, this was observed in the youngest junior groups. There the most difficult domain might be the combination of training of the individual skills and understanding the game.

For future this method to analyze successful maneuvers in match condition related to the background factors of the players could be applied to different age categories separately. In follow-up studies the independent

variables could be the changes in the tested background skills and abilities.

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TABLE 1

Linear regression coefficients between dependet (percentage of successul maneuvers in match condition) and independent variables (tested background factors) in junior ice hockey.

	Independent variables									
Dependent variables	SI	MRS	TIU	VJS	CRS	SKE	Constant	R	F	P<
Receiving	10.33	-4.60	.18	-.21	-.01	-3.94	72.48	.330	3.60	.01
Passing	17.29	5.00	1.10	-.15	-.05	-13.98	5.52	.700	27.03	.001
Dribbling	15.01	-3.93	1.97	.61	-.01	-16.10	20.78	.470	6.78	.001
Interception	-5.31	1.35	-.49	.20	-.03	-4.52	117.73	.240	1.88	.05
Face-offs	-11.77	3.53	-.56	.10	.05	12.79	53.54	.240	.47	N.S.
Shooting	-2.26	3.38	-2.21	-.30	.08	22.05	-11.50	.270	1.48	N.S.
Total skills	2.58	-1.17	.26	.20	-.02	2.01	51.12	.460	8.00	.001

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