A COMPARISON OF THE CURRENT LEVEL OF THE SELECTED POWER ABILITIES OF JUNIORS IN TERMS OF PLAYERS' POSITIONS IN ICE HOCKEY

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Abstract

The aim of the study was to compare the current level of the selected power abilities of juniors hockey players between defenders and forwards (n = 20, height = 182.3±4.9 cm, weight = 81.5±6.7 kg, age = 18.44±0.70 years; defenders = 8, height = 184.0±3.8 cm, weight = 84.2±6.5 kg, age = 18.60 years ±0.59; attackers = 12, height = 181.2±5.4 cm, weight = 79.6± 6.7 kg, age = 18.33±0.77 years) in a competitive year 2014/2015. The indicators of selected power abilities were observed by three tests: 1. 3 hop jump on one foot from the place, 2. Sit up and 3. Weights on the bench press with 70% of its own weight. Statistical analysis was conducted by using the software IBM ® SPSS ® Statistics V19. The average value of the test The average value of measurement for 3 hop jump on one foot from the place (left leg) of the research file was 473.6±32.26 m the best recorded time was 512 m, the lowest time was 417 m. The difference between defenders and forwards was statistically significant (U = 30, Z = -1.93, p <0.05, r = 0.31 – medium effect). The average value of measurement for 3 hop jump on one foot from the place (right leg) of the research file was 479.9±39.12 m the best recorded time was 565 m, the lowest time was 424 m. The difference between defenders and forwards was statistically significant (U = 26.5, Z = -1.66, p < 0.05, r = 0.37 – medium effect). In the test Sit up, the average value of the whole file was 69.10±7.53 repeat. For the defenders, the average finish time indicated of the value 69.5±8.77 repeat and for forwards 68.83±6.79 repeat, which again is statistically significant difference in favor of the defenders (U = 41.5, Z = -0.5, p < 0.05, r = 0.11 – small effect). The average value of the test Weights on the bench press with 70% of its own weight of the whole file was 21.7±4.23 repeat, among defenders was 25.5±2.67 repeat, among forwards 19.17±3.01 repeat, which is a statistically significant difference between defenders and forwards (U = 5.5, Z = -3.3, p < 0.05, r = 0.74 – large effect) in favor of the defenders.

Key Words: *ice hockey, defenders, forwards.*

INTRODUCTION

Veillette (2008) provides that a player has 17 alternations in the match and the time spent on the ice is about 85 seconds. During its the player is about 40 seconds in load-energy (at maximum, medium and low) and 45 seconds without a load-energy after interruption of the game. The power and speed-power abilities create limiting factors of sports performance in ice hockey. A good level of these skills directly affects athletic performance (Kampmiller et. al., 2012; Korčok & Pupiš, 2006; Pupiš & Broďáni, 2007; Pupiš et al., 2009; Veillette, 2008). One of the limiting factors in ice hockey is sufficiently developed level of speed-power abilities, which are reflected in the acceleration of the player in shooting in tackles and in other activities. The speeds -powers abilities are determined by complex relationships among several factors that contribute significantly on the speed-power activities (Kabát & Vanderka, 2013; Pupišová & Pupiš 2013; Tonhauserová 2012).

Power abilities

Several authors agree in the opinion that power abilities in ice hockey are applied in speed skating, in the activities of individuals, in the tackles, in the access to opponents, as well as their implications in the design of cooperative games, in their strategy to play against an opponent. In Ice Hockey has a resistance different form such as action of opponents, body weight, inertia while skating, and activities of player to the weight of the equipment. A certain level of these skills is essential to the development of sport performance in many sports sectors (Výboh et al., 2005, Perič & Dovalil, 2010).

An integral component of sports training of every ice hockey player is the development of strength abilities, which is specific to each age group. In the development of strength abilities we have to take into account the age and requirements of the sport sector in terms of sensitive periods of physical abilities. We can include strengthening with weights, which perform many movements of resistance size determination, from the category of youth.

Volek (2014) argues that the strength in the Ice Hockey is a source of vigor, dynamism and speed of movement. It contains component explosive and speed. Component explosive movement starts and accepts. Speed component generates continuous tempo. Emphasis on start and acceleration of movement adds dynamism. Strong explosive contribution required skating start and other reflections. Plyometric training focused on reflection includes vertical, lateral and diagonal reflections.

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Chelly et al. (2009) subjected football players strength program (70-85% 1 RM) two times a week for eight microcycles. Observed probands have improved significantly in vertical jump and also in the five-jumps. Ronnestad et al. (2011) concluded that through generally oriented strength program reported improved performance in the vertical jump of reporting file (p< 0.05). Villarreal et al. (2011), Pivovarniček et al. (2013a,b) found that by strength training can be improved performance in subjects and the horizontal reflection; by increasing the power component in the speed-strength display. Mangine et al. (2008) dealt with the training program, in which combines maximum strength with ballistic principles of movement and recorded improvements in test 1 RM bench press (p< 0.04), performance in the test squat-jump (p< 0.02).

In the study we focused on the junior's age group (16-20 years), which in terms of physical maturity of the players is like the senior category. In terms of intensity and the deployment in the game junior category equalizing with senior, what increases the demands on the players' fitness. For these reasons, it is necessary to focus on the complexity, volume and intensity of training load in pre-season and competitive period. The study presents the results of research aimed at compare the level of selected power capability of juniors hockey players in terms of players' positions of the team HC'05 Banská Bystrica in a competitive year 2014/2015.

METHODS

Characteristics of the research file
The group consisted of hockey players of junior team HC'05 Banská Bystrica (n = 20 height = 182.3±4.9 cm, weight = 81.5±6.7 kg, age = 18.44±0.70 years; defenders = 8, height = 184.0±3.8 cm, weight = 84.2±6.5 kg, age = 18.60 years ±0.59; attackers = 12 height = 181.2±5.4 cm, weight = 79.6±6.7 kg, age = 18.33±0.77 years) in a competitive year 2014/2015. Team played in the examined period in the top Slovak league in junior category organized by the Slovak Ice Hockey Federation.
In terms of holding the stick it was in the team 17 left-handers and 3 right-handers. The file consisted of players who devoted ice hockey an average of 7.9±1.0 years. In the previous year 2013/2014 competitive team ranked in highest hockey league of juniors third place.

Organization of measurements
The diagnostics was conducted on February 2nd 2015 in competitive year 2014/2015 at the premises of the ice stadium in Banská Bystrica in the morning, when we can in accordance with Jančoková (2000) talk about the first daily peak of performance. Diagnostics of speed abilities was realized at the gym on elastic polyurethane surface, which was slip.

Realization of measurements
To diagnose the level of power abilities, we used standardized test - 3 hop jump on one foot from the place. The player starts by standing behind a line with feet shoulder width apart. When ready, they are to perform three consecutive broad jumps non-stop, using a forward as well as a vertical jump style that allows them to gain maximum distance. The distance was measured with an accuracy of 0.10 cm. We evaluated and wrote down the best distance of two attempts. The second test was a test sit up. The player lie on a floor with knees bent at approximately right angles, with feet flat on the ground. Hands should be resting on thighs. Squeeze stomach, push back flat and raise high enough for hands to slide along thighs to touch the tops of knees. The number of repeats in 60 s was measured with an accuracy of 1 repeat.

The third test was a test weights on the bench press with 70% of its own weight. The players eyes should be directly under the barbell lie down on the bench. The feet should be directly under your knees. Grip on 1.5x shoulder width apart. Suitable is helping not to lose an optimal position to carry out the exercise. Arms still push down and back. Forearms should constrict to the torso angle of 45 degrees when lowering barbells. Tint is required when lowering, which helps to curb the movement, barbell should easily touch the chest. The number of repeats was measured with an accuracy of 1 repeat.

Statistical analysis
We chose the following descriptive statistics characteristics – for measurements of central tendency we used the arithmetic mean (x) and for measures of variability the standard deviation (SD). We used a minimum (min) and maximum (max) value of examined speed indicators. Mann–Whitney U test was used to determine the significance of differences in observed speed indicators between defenders and forwards. The significance of differences was evaluated at level $\alpha = 0.05$. Effect size coefficient (r) was calculated from the relationship ES = IzI/√n (Corder & Foreman, 2009) and has been interpreted as follows: small effect = 0.10, medium effect = 0.30, large effect = 0.50 (Cohen, 1988). Statistical analysis was performed through software IBM® SPSS® Statistics V19 (Statistical Package for the Social Sciences).

RESULTS

By comparison players' positions in terms of the current level of selected indicators of power abilities in the competitive year, we analyzed on the basis of test results (1. Three hop jump on one foot from the place, 2. Sit up and 3. Test Weights on the bench press with 70% of its own weight).

Table 1. The level of power abilities – Test 3 hop jump on one foot from the place.

Test 3 hop jump on one foot from the place	File Ľ	Defenders Ľ	Forwards Ľ	File P	Defenders P	Forwards P
x	473.6	485.38	465.75	479.9	499	467.17
SD	32.26	32.01	31.27	39.12	44.04	31.09
min	417	417	419	424	437	424
max	512	511	512	565	565	531
Mann–Whitney U test; effect size	U = 30, Z = -1.39, p < 0.05; r = 0.31			U = 26.5, Z = -1.66, p < 0.05; r = 0.37		

The average value of measurement for 3 hop jump on one foot from the place left leg of the research file was 473.6±32.26 m the best recorded time was 512 m, the lowest time was 417 m. The average value of measurement for 3 hop jump on one foot from the place left leg among the defenders was 485.38±32.01 m and forwards 465.75±31.27 m. From the perspective of time of whole file achieved better average time defenders about 11.78 m, the forwards worse about 7.85 m compared to the whole file. The difference between defenders and forwards was statistically significant (U = 30, Z = -1.93, p < 0.05, r = 0.31 – medium effect, Table 1).

The average value of measurement for 3 hop jump on one foot from the place right leg of the research file was 479.9±39.12 m the best recorded time was 565 m, the lowest time was 424 m. The average value of measurement for 3 hop jump on one foot from the place right leg among the defenders was 499±44.04 m and forwards 467.17±31.09 m. From the perspective of time of whole file achieved better average time defenders about 19.1 m, the forwards worse about 12.73 m compared to the whole file. The difference between defenders and forwards was statistically significant (U = 26.5, Z = -1.66, p < 0.05, r = 0.37 – medium effect, Table 1).

Table 2. The level of power abilities - Test Sit up.

Test Sit up	File	Defenders	Forwards
x	69.1	69.5	68.83
SD	7.43	8.77	6.79
min	54	60	54
max	88	88	82
Mann–Whitney U test; effect size	U = 41.5, Z = -0.5, p < 0.05; r = 0.11		

The average value of the measurement in test Sit up of the whole file was 69.1±7.43 repeat, the best recorded time was 88 repeat, the lowest 54 repeat. The average value of the defenders was 69.5±8.77 repeat and forwards 68.83±6.79 repeat. In terms of the average time of the whole file defenders achieved better average time 69.5±8.77 repeat about 0.4 repeat, the forwards worse time 68.83±6.79 repeat about 0.27 repeat compared to the whole file. The difference between defenders and forwards was statistically significant (U = 41.5, Z = -0.5, p < 0.05, r = 0.11 – small effect, Table 2).

Table 3. The level of power abilities - Test Weights on the bench press with 70% of its own weight.

Test Weights on the bench press with 70% of its own weight	File	Defenders	Forwards
x	21.7	25.5	19.17
SD	4.23	2.67	3.01
min	15	20	15
max	28	28	24
Mann–Whitney U test; effect size	U = 5.5, Z = -3.3, p < 0.05; r = 0.74		

The average value of the measurement in test weights on the bench press with 70% of its own weight of the whole file was 21.7±4.23 repeat, the best recorded time was 28 repeat, the lowest 15 repeat. The average value of the defenders was 25.5±2.67 repeat and forwards 19.17±3.01 repeat. In terms of the average time of the whole file was defenders achieved better average value 25.5±2.67 repeat about 3.8 repeat, the forwards worse value 19.17±3.01 repeat about 2.53

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repeat compared to the whole file. The difference between defenders and forwards was statistically significant (U = 5.5, Z = -3.3, p < 0.05, r = 0.74 – large effect, Table 3).

DISCUSSION

Diagnostics of motor performance of hockey players is connecting theory and practice. For successful realization the evaluation of the diagnostic process is necessary to respect certain principles of measurement. We pay attention to selection of appropriate test battery standard external conditions the motivation of the players and the most important principle is how we will evaluate the results obtained (Tóth et al., 2010).

Outcome measures we realized in accordance with the methodology of the literature Tóth et al. (2010). We used standardized tests approved by the Slovak Ice Hockey Association and have been mandatory for all Slovak hockey clubs in this age category. Players have been noted about tests, we explained the testing, make the results valid. When evaluating the discipline 3 hop jump on one foot from the place, sit up and test weights on the bench press with 70% of its own weight would be more appropriate to measure times by using the software photocells. We used measurement with handheld stopwatches and results were rounded one tenth.

I agree with Pivovarniček et al. (2014), the diagnostic of motor abilities could be a decisive factor in the level of the individual, particularly limitation of movement abilities, for coaches and realization teams of sports teams. On the other hand, even an excellent level of motor abilities is not automatically reflected in the individual game performance and game performance teams. Insufficient level of motor abilities limits the gaming performance, particularly at the top level, where details decided matches.

In terms of comparison of examined indicators power abilities of the individual players' positions reached defenders in all tests significantly better results. We concluded that the issue of the level of the power abilities in terms of players' positions could be slave indicators in monitoring and interpreting success in different game situations, for example game situation forward – defender. One of the limiting factors in ice hockey is a sufficient level of speed-power abilities, as reflected in the acceleration of the player in shooting in tackles and in other activities (Kabát & Vanderka, 2013). The issues of relationship of physical fitness test results and hockey playing potential in elite-level ice hockey players dealt Burr et al. (2008). They found that in standing long jump was identified as a significant predictor

variable for forwards and defense and could be a useful surrogate for assessing overall hockey potential. Significant differences exist between the physiological profiles of current players based on playing position. They showed a strong cor-relation between vertical jump and three on-ice characteristics: acceleration, speed, and power. The evaluation of vertical jump is common due to the association between lower body power and skating performance. The similar research conducted Farlinger et al. (2007). They concluded vertical jump is commonly regarded as a valid measure of leg power in athletes and has been shown to predict on ice skating performance.

These results and arguments are an appropriate topic for the realization of further investigations regarding the level of the power abilities of hockey players' off-ice and skating performance. Even more important, it was also shown, the correlation between the results on the ice and skating performance, because power is important for the individual game performance of hockey player in ice.

CONCLUSION

The level of power abilities we examined by test 3 hop jump on one foot from the place, sit up and weights on the bench press with 70% of its own weight. The average value of measurement for 3 long hop on one foot from the place left leg of the research file was 473.6 ±32.26 m the best recorded time was 512 m, the lowest time was 417. The average value of measurement for 3 hop jump on one foot from the place among the defenders was 485.38± 32.01 m and forwards 465.75±31.27 m. From the perspective of time of whole file achieved better average value defenders about 11.78 m, the forwards worse about 7.85 m compared to the whole file. The difference between defenders and forwards was statistically significant (U = 30, Z = -1.93, p < 0.05, r = 0.31 – medium effect).
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In research, we concluded that the level of the power abilities in research file in terms of players' positions is different. A higher level of power abilities in all tests achieved defenders. The difference in the level of the power abilities was statistically significant what proving that players´ position significantly affects the level of the power abilities of players of research file.

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