

Original Article

Comparison of the current level of the selected speed abilities of juniors in terms of player positions in ice hockey

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Abstract:

The aim of the study was to compare the current level of the selected speed abilities of juniors hockey players between defenders and forwards (n = 20, height = 182.3±4.9cm, weight = 81.5± 6.7kg, age = 18.44±0.70 years; defenders = 8, height = 184.0±3.8cm, weight = 84.2±6.5kg, age = 18.60±0.59 years; forwards = 12, height = 181.2±5.4cm, weight = 79.6±6.7kg, age = 18.33±0.77 years) in a competitive year 2014/2015. The indicators of selected speed abilities were observed by two tests: 1. Run to 40m with changes of direction and agility 2. Test – Illinois. Statistical analysis was conducted by using the software IBM® SPSS® Statistics V19. The average value of the test run to 40 m with changes of the direction of the whole file was 8.49±0.25s, among defenders was 8.29±0.13s, among forwards 8.61±0.22s, which is a statistically significant difference between defenders and forwards (U = 10, Z = -2.93, p<0.05, r = 0.66 – large effect) in favour of the defenders. In the agility test – Illinois, the average value of the whole file was 16.43±0.36s. For the defenders, the average finish time indicated of the value 16.20±0.16s and for forwards 16.57±0.38s, which again is statistically significant difference in favour of the defenders (U = 5.17, Z = -2.36, p<0.05, r = 0.53 – large effect).

Key Words: defenders, forwards, Illinois test, run to 40 m.

Introduction

According to Šimonek & Zrubák (2003) Ice hockey is characterized by high intensity of physical activity lasting about 50 seconds to 1 minute, with multiple repetitions. The individual players alternate regularly, most often three or four in the formation. Over one-third in three formations for each player, representing around 6-7 of intense activities, among which is rest about 250 seconds when playing at 4 formation and respecting the time when the game is interrupted. Based on research, it was found that during the match defender has skated about 5 km and forward 7 km. In each alternation player skates an average of 500 to 600m (maximum 900m, minimum 200m). The average speed is about 15km.h⁻¹ and maximum 38km.h⁻¹. Assuming a regular alternation of three complete formations on the single player it is from 15 to 20 minutes of the game. We agree with the Opáth (2013) that the current sport places high demands not only on the tactical level, theoretical, physical, psychological as well as physical training. We agree with Moravec et al. (2004), that final game performance in ice hockey is influenced by a lot of factors. Some are trainable, some inborn. The current level of sport performance is primarily influenced by factors of techniques, conditioning preparedness, tactics, psychology, somatic factors and internal conditions. A part of fitness abilities is speed abilities that are responsible for making of short-term locomotors activity as short as possible. Among the dominant locomotive abilities in ice hockey players we include speed abilities that are genetically determined, and influenced by the training only partially in comparison with the strength and endurance abilities. Speed abilities belong among the conservative hard to develop with a high level of genetic conditionality. Nevertheless, we know the possibilities of their development. But it is important to start with influencing them in optimal sensitive period, aged 10-14 years (Košťál & Kampmiller, 2003). This opinion is shared by other authors Šimonek & Zrubák (2003), Výboh et al. (2005). Pavliš et al. (2003) indicate that the contents of conditioning training off the ice are mainly exercises specialized on development of motor skills. With regard to ice hockey obtains preference development of speed, high-speed-power, power, power-endurance and coordination abilities. The general character of this type of training only during the transitional and preparation period.

In the ice hockey, the speed abilities can be developed in several ways, either through special exercises on the ice and off the ice. In selecting exercises and composition of the training unit must be taken into particular account the age of players, and we should respect particularly sensitive period for the development of the speed abilities. A very frequently used method for the development of the speed abilities is a method of plyometrics (Výboh et al., 2005; Popelka & Pavlović, 2015). In terms of structure of speed abilities we are divided them for the reaction speed, action and frequency (Výboh et al., 2005). The reaction speed is defined as a response for the stimulus in the shortest time. Thus, it is given by the difference between the start time of the initiative and the start of its own motion. The fastest we are able to react with tactile stimulation, a little slower, it is at the initiative of sound and slowest reacting to visual stimulus (Starší & Jančoková, 2001). By the term action speed

we understand the ability to perform the movement as soon as possible after the initiation of movement (Výboh et al., 2005; Pupišová, 2013; Tonhauserová, 2013; Tonhauserová & Pupiš, 2013). In the frequency speed, we strive to make the largest number of motion cycles at specified times (Bartík, Adamčák & Rozim, 2004).

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 speed capability of juniors hockey players in terms of players' positions of the team HC'05 Banská Bystrica in a competitive year 2014/2015.

Material & methods

Subject characteristics

The group consisted of hockey players of junior team HC'05 Banská Bystrica (n = 20, height = 182.3±4.9cm, weight = 81.5±6.7kg, age = 18.44±0.70 years; defenders = 8, height = 184.0±3.8cm, weight = 84.2±6.5kg, age = 18.60±0.59 years; forwards = 12, height = 181.2±5.4cm, weight = 79.6±6.7kg, 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 morning hours when we can speak about the first daily peak of performance in accordance with Jančoková (2000), but research by Vančová (2015) presents that the young people (university students) tended to have balanced physical performance during the day. Diagnostics of speed abilities was realized at the gym on elastic polyurethane surface, which was slip.

Realization of measurements

To diagnose the level of speed abilities, we used standardized test - run to 40m with changes of direction (Figure 1). Tested player started on mid-height start to the opposite plate on sound signal of the coach where a player had to both feet cross the line and also touch it. Changing direction is always conducted face to the coach. The time was measured with an accuracy of 0.1s. We evaluated and wrote down the best time of two attempts. The second test was a test of agility – Illinois. The player started from mid-height start, ran forward from the starting line then between stands by slalom and ran to the finish line. If the player threw any stand attempt was invalid. The time was measured with an accuracy of 0.1s.

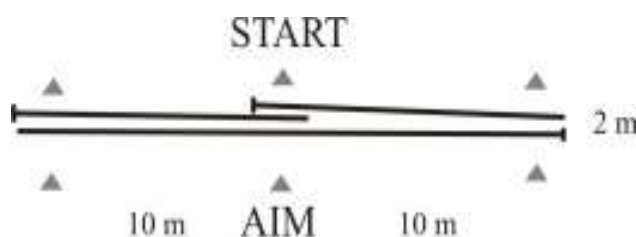


Figure 1 Schematic test run to 40 meters with change of direction

Source: www.hockeyslovakia.sk

Data Analyses

We chose the following descriptive statistics characteristics – for measurements of central tendency we used the arithmetic mean (\bar{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 $ES = |z|/\sqrt{n}$ (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 speed abilities in the competitive year, we analysed on the basis of test results (1. Run to 40m with changes of direction and 2. Test agility – Illinois).

Table 1 The level of speed abilities - run to 40m with changes of direction (s) competition period

Run to 40m with changes of direction	File	Defenders	Forwards
x	8.49	8.29	8.61
SD	0.25	0.13	0.22
min	8.02	8.16	8.02
max	8.85	8.52	8.85
Mann-Whitney U test; effect size	U = 10, Z = -2.93, p<0.05; r = 0.66		

The average value of measurement for run to 40 m with changes of direction of the research file was 8.49±0.25s the best recorded time was 8.02s, the lowest time was 8.85s. The average value of measurement for run to 40m with change of direction among the defenders was 8.29±0.13s and forwards 8.61±0.22s. From the perspective of time of whole file achieved better average time defenders about 0.20s, the forwards worse about 0.12s compared to the whole file. The difference between defenders and forwards was statistically significant (U = 10, Z = -2.93, p < .05, r = 0.66 – large effect, Table 1).

Table 2 The level of speed abilities - Test agility – Illinois (s) competition period

Test agility – Illinois	File	Defenders	Forwards
x	16.43	16.20	16.58
SD	0.36	0.16	0.37
min	16.01	16.01	16.09
max	17.10	16.45	17.01
Mann-Whitney U test; effect size	U = 17.5, Z = -2.36, p<0.05; r = 0.53		

The average value of the measurement in test agility – Illinois of the whole file was 16.43±0.36s, the best recorded time was 16.1s, the lowest 17.1s. The average value of the defenders was 16.2±0.16s and forwards 16.58±0.37s. In terms of the average time of the whole file was defenders achieved better average time 16.20±0.16s about 0.23s, the forwards worse time 16.58±0.37s about 0.15s compared to the whole file. The difference between defenders and forwards was statistically significant (U = 5.17, Z = -2.36, p<0.05, r = 0.53 – large effect, Table 2).

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., 2010b).

Outcome measures we realized in accordance with the methodology of the literature Tóth et al. (2010b). 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 run to 40m with changes of direction and Test agility – Illinois 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.

The issues of impact on the performance of ice and on ice dealt in the study Janot, Beltz & Dalleck (2015). They concluded that significant factors for the anticipation of skating performance in terms of speed tests are: Cross 40 yards and vertical jump. Among the dominant physical abilities of ice hockey players we include speed abilities that are genetically determined, and by training influenced only in part, in comparison with the strength and endurance abilities. Moravec, et al. (2007), and Tóth et al. (2010a) contend that speed abilities are most genetically determined, and they can be influenced for about 10 to 15%.

In terms of comparison of examined indicators speed abilities of the individual players' positions reached defenders in both tests significantly better results. As Pivovarniček et al. (2014), we concluded that the issue of the level of the speed 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). We agree with Duthie et al. (2006), that acceleration is important factor of success in team sports. High level of speed abilities, especially

with acceleration character creates higher presupposition of catching the puck earlier than the competitor and has the playing situation and game development under control (Pivovarniček et al., 2014).

By research of relationship of speed measured on the ice and off-ice dealt Farlinger & Fowles (2008) and came to the following conclusions. Only 30m sprint test ($r = 0.56$, $p = 0.01$) and Edgren side shuffle ($r = -0.46$, $p < 0.04$) tests were off-ice, which significantly correlated with improvement in speed skating on ice. Krause et al. (2012) reported the results of a test run for 40 yards to anticipate performance in skating forward.

Conclusion

The level of speed abilities we examined by test running for 40m with changes of direction and agility test – Illinois. The average value measured at 40m running with changes of direction of the research file was 8.49 ± 0.25 s, the best time recorded was 2.8s, and the lowest time was 8.85s. The average value of the test running for 40 meters with change of direction was at defenders 8.29 ± 0.13 s and at forwards 8.61 ± 0.22 s. Differences in the average measured values of the tests in terms of positions of players was statistically significant ($U = 10$, $Z = -2.93$, $p < 0.05$, $r = 0.66$ – large effect). The average value of the measurement in agility test – Illinois of research file was 16.43 ± 0.36 s, the best recorded time was 1.16s, and the lowest time was 10.17s. In the agility test – Illinois, the average value among the defenders was 16.20 ± 0.16 s 16.57 ± 0.38 s at forwards. The difference in the average measured values of tested players was statistically significant ($U = 17.5$, $Z = -2.36$, $p < 0.05$, $r = 0.53$ – large effect). In research, we concluded that the level of the speed abilities in research file in terms of players' positions is different. A higher level of speed abilities in both tests achieved defenders.

The difference in the level of the speed abilities was statistically significant what proving that players' position significantly affects the level of the speed abilities of players of research file.

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