# THE APPLICATION OF SPECIFIC SKATING DRILLS IN HOCKEY TRAINING

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- Specific skating drills,
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**Abstract:**

Top level sport is researched and studied drawing on findings especially in youth categories. The relevance of early specialization places considerable emphasis on the exercise programming in particular cycles of sports preparation. In other words, what should be the optimal intensity of exercise tolerable for specific age categories? Skating performance is one of the main components of hockey fitness and is the performance-related criterion of game skills. Skating performance affects the perception sensitivity of one's own movement and coordination. The study sample consisted of Under-15 ice hockey players. Skating performance was assessed in hockey players of clubs MHC Martin and HC 07 Prešov. The intervention program utilized methods according to [3], which are designed to improve motor structure and to develop skating speed through execution of imitation drills and strength-development exercises. The exercises and drills are targeted at the development of lower-body static and dynamic strength. The drills were performed off the ice using the intermediary method based on movement stoppage for 5 seconds in designated body positions. The interruption of movement in individual combinations of imitation drills is beneficial as the drills are based on the accuracy of required motor structure. The use of specific skating drills in training of young ice hockey players confirmed positive changes in skating performance. The effect of imitation drills contributes to the formation of the base for skating performance development. The conducted study showed that imitation drills promote development of lower-body strength.

## INTRODUCTION

Top level sport is researched and studied drawing on findings especially in youth categories. The relevance of early specialization places considerable emphasis on the exercise programming in particular cycles of sports preparation. In other words, what should be the optimal intensity of exercise tolerable for specific age categories [1]? Ice hockey and skating require general physical preparedness as well as specific skating preparation, which make an irreplaceable part of hockey training during the in-season. Skating is characterized by isometric muscle action. Unlike other cyclic motor structures that use mainly flexors and extensors of the hip and the knee, skating itself recruits practically all lower-body muscles [5].

Along with increasing athletic demands, the spectrum of means utilizable for performance enhancement is growing. As reported by [6] general development exercises are insufficient to achieve optimal training effect. Only special exercises performed under standard conditions allow for recruitment of muscle groups necessary for skating. Drills performed from identical skating positions determine strength gains, which lead to performance enhancement in not only standard positions, but also in positions not present in

other sports. One of such means is the use of specific skating imitation drills [3]. At school age, the basis of speed development is formed through execution of a variety of movements and decomposition of a complex game-related movement into respective functional parts. The simplicity and appropriateness of drills may guarantee the completion of motor structures. An important component is the synchronization of pace and course of lower-body and upper-body movements.

The process of sports preparation in ice hockey falls in the category of rather complex processes, which are considered to be endless and upon which no final conclusions can be drawn.

## MATERIAL AND METHODS

The study sample consisted of Under-15 ice hockey players. Skating performance was assessed in hockey players of clubs MHC Martin and HC 07 Prešov *(Table 1)*.

**Table 1.** Sample characteristics

| | | **Age** | **Body height (cm)** | | **Body mass (kg)** | |
|---|---|---|---|---|---|---|
| | **n** | **x** | **x** | **s** | **x** | **s** |
| MHC Martin | 15 | 13.8 | 170.7 | 8.0 | 61.1 | 8.9 |
| HC 07 Prešov | 16 | 13.9 | 171.3 | 6.4 | 66.4 | 8.2 |

Legend: n – sample size, x – arithmetic mean, s – standard deviation

In December during 2012/2013 hockey season, baseline testing targeted at assessment of general and specific motor fitness was conducted. During this time, the players of MHC Martin learned to perform skating imitation drills using reproductive conscious motor learning in order to develop skating performance and strength. The intervention program utilized methods according to [3], which are designed to improve motor structure and to develop skating speed through execution of imitation drills and strength-development exercises. The exercises and drills are targeted at the development of lower-body static and dynamic strength. The drills were performed off the ice using the intermediary method based on movement stoppage for 5 seconds in designated body positions. The interruption of movement in individual combinations of imitation drills is beneficial as the drills are based on the accuracy of required motor structure.

Exercise frequency:

- twice per week,
- exercise intensity: submaximal – maximal,
- work-to-rest ratio: 1:3,
- during of training session: 30 minutes,
- set duration: 30 seconds.

**Table 2.** Parameters of general and specific motor fitness

| | **O. n.** | **Parameter** |
|---|---|---|
| General motor fitness | 1. | Standing one-legged triple jump (L/R) (cm) |
| | 2. | Agility test – Illinois (s) |
| | 3. | One-legged bench squat L/R (p) |
| Specific motor fitness | 1. | Forward skating 36 meters (s) |
| | 2. | Backward skating 36 meters (s) |
| | 3. | Square-shaped skating with changes of direction (s) |

Legend: O. n. – ordinal number, p – number.

The post-intervention measurements of general and specific motor fitness were conducted in March during the play-offs. Table 2 shows test items used for fitness assessment during the in-season of the training cycle in ice hockey players of MHC Martin and HC 07 Prešov.

The results of testing were processed using correlation analysis. The effect of the intervention program on the development of general and specific motor fitness was determined using the independent samples t-test. The significance of differences was determined at $p<.05$.

## RESULTS AND DISCUSSION

Skating performance is one of the main components of hockey fitness and is the performance-related criterion of game skills. Skating performance affects the perception sensitivity of one's own movement and coordination. Skating technique that players gradually acquire to a certain level when performing skating locomotion, is individual in every player, however, general principles hold true for all players [4].

The correlation analysis was used to determine the relations between parameters, which made part of the test battery at the baseline and post-intervention measurement *(Table 3).*

**Table 3.** Correlates between general and specific fitness parameters (n = 15)

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| **1.** | Forward skating 36 m | - | | | | | | | |
| **2.** | Backward skating 36 m | **0,75*** | - | | | | | | |
| **3.** | Square-shaped skating (changes of direction) | **0,72*** | **0,85*** | - | | | | | |
| **4.** | Standing triple jump (left leg) | - | **-0,54*** | - | - | | | | |
| **5.** | Standing triple jump (right leg) | - | **-0,60*** | - | **0,84*** | - | | | |
| **6.** | One-legged bench squat (left leg) | - | - | - | - | - | - | | |
| **7.** | One-legged bench squat (right leg) | - | - | - | - | - | - | - | |
| **8.** | Agility test – Illinois | - | **0,64 *** | **0,66*** | **-0,69*** | **-0,77*** | - | - | - |

To make the data more transparent, the results were processed using correlation coefficients at $p<.05$ level of significance. We analyzed 8 test items of which three: *1. Forward skating 36 meters, 2. Backward skating 36 meters, 3. Square-shaped skating with changes of direction* were targeted at the assessment of specific motor fitness. The values of correlation coefficients between specific and general parameters showed that sub-tests *4. Standing triple jump (left leg), 5. Standing triple jump (right leg), 6. One-legged bench squat (left leg), 7. One-legged bench squat (right leg), 8. Agility test - Illinois* assess general parameters of motor fitness. Therefore, we may conclude that tests Forward skating and backward skating for 36 meters represent appropriate indicators for the assessment of skating performance. On the other hand, we should take into account the existence of common basis of skating variables, which despite different recruitment and exertion of lower-body muscle groups and motor coordination bears identical informative value and indicates the existence of a common criterion of these test items.

We may conclude that skating performance is to a large extent dependent on lower-body explosive and dynamic strength, maintenance of balance during the execution of complex motor structures. In young categories, the level of lower-body explosive strength appears to determine skating performance, speed and agility to a significant extent [2].

The effect of the intervention program for the development of specific and general motor fitness during 2012/2013 hockey season was determined using independent samples t-test. Table 4 shows statistically significant changes after the intervention period in the hockey team MHC Martin.

**Table 4.** Arithmetic means, standard deviations and values of independent samples t-test of baseline and post-intervention measurements in MHC Martin (n = 15)

| **Parameters** | **$X_1$**<br>**$X_2$** | **$S_1$**<br>**$S_2$** | **„t“ test** |
|---|---|---|---|
| 1. Forward skating 36 meters (s) | 5.73<br>5.65 | 0.54<br>0.55 | 1.81 |
| 2. Backward skating 36 meters (s) | 6.89<br>6.69 | 0.64<br>0.67 | 3.66** |
| 3. Square-shaped skating with changes of direction (s) | 16.35<br>16.02 | 1.50<br>1.50 | 4.21** |
| 4. Standing triple jump – left leg (cm) | 548.27<br>567.13 | 50.57<br>55.35 | -2.94* |
| 5. Standing triple jump – right leg (cm) | 555.80<br>570.07 | 56.80<br>49.44 | -2.24* |
| 5. One-legged bench squat – left leg (n) | 13.20<br>17.93 | 7.99<br>10.61 | -2.80* |
| 6. One-legged bench squat – right leg (n) | 16.40<br>21.73 | 13.93<br>14.50 | 3.32** |
| 7. Agility test– Illinois (s) | 17.67<br>17.35 | 1.26<br>1.05 | 3.45** |

Level of significance: $t_{0.05}$=2.13; $t_{0.01}$=2.95
Legend: n – sample size, x - arithmetic mean, s – standard deviation.

The effect of imitation drills contributes to the development of skating performance: Backward skating for 36 meters and Square-shaped skating with changes of direction. Changes in lower-body explosive strength: one-legged bench squats (R/L) have shown that these exercises affect lower-body strength development. The results of standing triple jump (L/R) showed that this test may be regarded as an indicator of the future development of skating performance. The relevance of the parameter: Agility test – Illinois is to a large extent affected by strength gains as this test is characterized by frequent changes of direction coupled with coordination of movement. As repeated acceleration and frequent changes of direction on ice require considerable strength effort, it may be assumed that imitation drills are beneficial especially when developing specific motor fitness. Therefore, this shows that specific off-ice preparation grows in importance especially in young ice hockey players, who experience initial stabilization with respect to the general motor preparedness.

Strength test – One-legged bench squats (L/R) measure the dominance and preference of a particular lower extremity. With regard to transfer of effect on the specific on-ice movement this test appears to be one of the potential indicators for the assessment of skating performance.

**Table 5.** Arithmetic means, standard deviations and values of independent samples t-test of baseline and post-intervention measurements in HC 07 Prešov (n = 16)

| **Parameters** | **$X_1$**<br>**$X_2$** | **$S_1$**<br>**$S_2$** | **„t“ test** |
|---|---|---|---|
| 1. Forward skating 36 meters (s) | 5.50<br>5.51 | 0.43<br>0.38 | -0.17 |
| 2. Backward skating 36 meters (s) | 6.59<br>6.64 | 0.46<br>0.60 | -0.89 |
| 3. Square-shaped skating with changes of direction (s) | 16.55<br>16.32 | 1.50<br>1.50 | 2.81* |

Level of significance: $t_{0.05}$=2.13;
Legend: n – sample size, x – arithmetic mean, s – standard deviation.

In ice hockey players of HC 07 Prešov, there was no significant effect of training and game-related workload on the development of skating speed (Table 5). Statistical significance was found only in parameter no. 3 Square-shaped skating with changes of direction.

## CONCLUSIONS

The use of specific skating drills in training of young ice hockey players confirmed positive changes in skating performance. The effect of imitation drills contributes to the formation of the base for skating performance development. The conducted study showed that imitation drills promote development of lower-body strength. During in-season, players experience gains in specific motor fitness, which is predominantly based on on-ice training. Paradoxically, with respect to strength there was no change in general motor fitness.

Specific drills can be used for the development of skating speed in young ice hockey players and represent one of the options of achieving optimal acquisition of skating technique and enhancement of skating performance.

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