HOCKEY PATINES: ESTUDIO CORRELATIVO DE LA CAPACIDAD DE ACELERACIÓN CON Y SIN PATINES

ROLLER HOCKEY: CORRELATIVE STUDY ABOUT THE SPEED CAPACITY WITH AND WITHOUT SKATES

Jordi Arboix Alió¹, Joan Aguilera Castells¹, Cristina Ferrándiz Bernal¹

¹ Universidad Ramón Llull, Barcelona, España. E-mail: feinacoordinador@gmail.com.

RESUMEN
El propósito del estudio es analizar la capacidad de aceleración en una muestra de 10 jugadores de hockey patines comparando la influencia y el rendimiento deportivo de los ejercicios efectuados con y sin patines. Los jugadores de sexo masculino y no profesionales (edad=22,6±3,6 años) realizaron el test de 20 Meter Dash, que analiza la capacidad de aceleración. El test se realizó con patines y con baba contrastando y correlacionando sus registros. Se aplicó la t de Student y la correlación de Pearson. Se observaron mejores registros en el test de 20 Meter Dash con bamba (3.11±0.11 seg) en comparación con patines (3.19±0.07 seg) (p=0,035). La correlación en el test de 20 Meter Dash fue moderate y no significativa (r=0,331; p=0,350). En consecuencia, sería recomendable debido a esta falta de correlación que los entrenamientos de los deportistas de hockey sobre patines con el objetivo de mejorar su rendimiento deportivo y su capacidad de aceleración se realizaran predominantemente con patines.

PALABRAS CLAVE: hockey patines, 20 Meter Dash, rendimiento, correlación.

ABSTRACT
This study is aimed at analyzing the speed capacity in a sample of 10 roller hockey players by comparing the influence and the performance of the exercises executed with and without skates. Non-professional and male players (aged 22.6±3.6 years old) were undergone to the 20 Meter Dash test, which analyzes the speed capacity. The test was applied with skates and with sneakers comparing and correlating their records. The Student t test and Pearson’s r were applied. Better records were observed in the 20 Meter Dash test with sneakers (3.11±0.11 sec) compared to the test with skates (3.19±0.07 seg) (p=0.035). The correlation in the 20 Meter Dash test was moderate and non-significant (r=0.331; p=0.350). In consequence, it is recommended, due to the lack of correlation, that the training of the roller hockey players, in order to improve their performance and speed capacity, should be executed on skates.

KEYWORDS: roller hockey, 20 Meter Dash, performance, correlation.
1. INTRODUCTION

Roller hockey is a tactic team sport in which “uncertainty” stands out as an identifying feature of the development of the game.

Intermittent work predominates since both the duration of the intensity and break time vary. From a physiological and biomechanical point of view, roller hockey would classify as an aerobic and anaerobic activity. It is determined by cardiovascular and metabolic requirements that demand alternate use of the three ways of energy production.

In the last few years, the training methodology in team sports have considerably changed, since it tends to use more and more concrete methods oriented towards the competitive activity in question and thus develop the specific needs of each sport.

At present, there are many studies on competitive activity and performance in many team sports, either soccer, basketball, rugby. Nevertheless, in roller hockey there is not enough scientific evidence about sport training and performance.

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For that reason the present paper aims to develop a study about the influence of skates against sneakers in the physical speed capacities due to the significance of this variable on the performance on the track team sports, since it might have a big practical interest for the sport performance and to design a type of concrete training in tune with the demands of the sport.

The goal is to analyze whether there is a relation between the speed capacity and the use or not of skates. This has a practical interest because if that relation is confirmed the training with or without skates to improve the speed capacity would be indifferent. On the contrary, the training on skates should be a priority to improve the sport performance.

Consequently, two hypotheses were determined: first that the speed capacity of the players would increase with skates rather than with sneakers and the second that there would be poor correlation among the results of a same test conducted with and without skates.

2. METHODOLOGY

Participants
The sample was made up by a total of 10 male roller hockey players (n=10) aged 17-30 years old (Table 1). The participants were selected through a convenience sampling. All of them were players of the F.C. Martinenc that competed in the First Division of Catalunya, training three days a week in 90 minute sessions and competing every weekend. All of the subjects signed the consent willingly after a previous reading of the information document to the participants. The design of the research adjusted to the Declaration of Helsinki and was approved by the Ethics Committee of Ramon Llull University of Barcelona.

Table 1. General characteristics of the participants

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (♀)</td>
<td>22.6±3.66</td>
<td>17-30</td>
</tr>
<tr>
<td>Age (years)</td>
<td>1.77±6.37</td>
<td>164-187</td>
</tr>
<tr>
<td>Height (m)</td>
<td>69.11±7.25</td>
<td>75.4-52.1</td>
</tr>
</tbody>
</table>

SD: standard deviation; m: meters; Kg: kilograms

Procedure
To measure the speed capacity was used the 20 Meter Dash test since the point of maximum velocity is not achieved before the 20 meters\(^9\), but between the 40-60 meters\(^10\).

Instruments. In the 20 Meter Dash test was followed the protocol used by García Manso\(^11\) and Martínez\(^12\). The time to cover the 20 meters was measured with two chronometers (Model CW Kalenji 100; Decathlon SA., Madrid, ESP). Cones and American tape were used to delimit the distances and the space where the test was applied. The distances were calculated with a measure tape (Model 1-E/15; Hidraenergic., Barcelona, ESP). Prior to applying the results of the study was carried out a training session with the records of the chronometer and their validation to be certain of the homogeneity of the values obtained.

Intervention. A descriptive design was created, in which the subjects participated in two sessions of data collection with a week of difference. Both in the first and the second session was applied the 20 Meter Dash test (sneakers and skates) (Figure 1). The order of the participants and the conditions of the tests executions (sneakers and skates) were randomized with the true random number generator\(^13\).

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\(^12\) MARTÍNEZ, E. Aplicación de la prueba de velocidad 10 x 5 metros, sprint de 20 metros y tapping-test con los brazos. Resultados y análisis estadístico en educación secundaria. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 2004, 4(13), 1-17. Disponible en: http://ccdeporte.rediris.es/revista/resvista13/velocidad.htm

The research was carried out during the competition period, inside the regular training hours (21:00 hours), on the multi-sport track (22m x 44m) covered with wood pavement where the daily practice took place and with the official equipment for the roller hockey competitions (skates and conventional rollers, shinpads, kneepads, shell, gloves and stick)

Or with sport clothing and sneakers, depending if the test was executed with sneakers or skates. Prior to the test the participants had a 15 minute standard warm up (low intensity race, joint mobility exercises and progressive changes of speed)

![Figure 1. Diagram of the study.](image)

During the test execution, the time when covering the 20 meters (sneakers and skates) was registered on a record sheet. Nevertheless, in order to get reliable times, the participants completed two test attempts (all the subjects executed the first attempt consecutively followed by the second attempt) and two observers controlled the time with a chronometer. For the analysis of the data was chosen the best time of the two attempts.

**Statistical analysis**

Descriptive and frequency statistic methods were used to describe the sample. The descriptive methods were used to calculate the mean, the standard deviation and the rank. To check the normality of the sample was executed the *Shapiro-Wilk* hypothesis test for samples fewer than 50 subjects. The Student-Fisher test was applied for samples related (t) in the continuous quantitative variables of time in the 20 Meter Dash. To calculate the correlation among times (sneakers and skates), was used the Pearson’s correlation coefficient (r). The correlation degree (r) was determined by the
Hopkins\textsuperscript{14} scale, where $r \leq 0.1$, trivial; $r > 0.1$ - $0.3$, small; $r > 0.3$ - $0.5$, moderate; $r > 0.5$ - $0.7$, large; $r > 0.7$ - $0.9$, very large; and $r > 0.9$ - $1.0$, extremely large. The significance level was established in $p < 0.05$. The results were registered as average ± standard deviation. For the statistical analysis was used the SPSS ® package (Version 20.0 for Mac; SPSS Inc., Chicago, IL, USA).

3. RESULTS

Table 2 shows the results of the 20 Meter Dash test. There were significant differences ($p < 0.05$) in the test results with skates and with sneakers, with a better performance with sneakers.

<table>
<thead>
<tr>
<th>TEST</th>
<th>MEAN ± SD</th>
<th>p</th>
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<tbody>
<tr>
<td>20 METER DASH</td>
<td>SNEAKERS</td>
<td>3.11±0.11 seconds</td>
</tr>
<tr>
<td></td>
<td>SKATES</td>
<td>3.19±0.07 seconds</td>
</tr>
</tbody>
</table>

SD: standard deviation; *Significant differences between sneakers and skates

Figure 2 shows that in the 20 Meter Dash test, during the execution on sneakers was registered a better time statistically significant ($t_{(9)} = -2.473; p=0.035$) compared with the time wearing skates.

Figure 2. Time of the 20 Meter Dash test: best significant records with sneakers (p<0.05).

Figure 3 shows that during the 20 Meter Dash test executed with and without skates (sneakers), the correlation between the two variables was moderate and non-significant (r=0.331; p=0.350).

Figure 3. Moderate and non-significant correlation in the 20 Meter Dash test by analyzing the time with sneakers and skates.
4. DISCUSSION

The aim of the present study was to discover if there was any relation between the speed capacity with skates and with sneakers in roller hockey players, since it has practical implications in the improvement of the sport performance. Globally, in the 20 Meter Dash test, the players had better records on sneakers. However it was registered a not significant relation in the speed capacity with skates and sneakers.

In regard to hypothesis number one, when comparing the time covering the 20m with and without skates, the results with sneakers (M:3,11 sec; SD:0,11) had a better significant record compared to the skates (M:3,19 sec; SD:0,07); t(9)= -2,473; p=0,035.

If we compare the results wearing skates with the scientific literature, we find that Martín\textsuperscript{15} had better records (M: 3,06 sec in forwards and M:3,08 sec in midfielders) with players of the Spanish national team. Likewise, Yagüe\textsuperscript{16} had better results with skates (M:3,13; SD:0,07) in a team of La Liga (top Spanish competition) and 3,25±0,10 seconds in a First Division team.

This last result was similar to the one obtained in our research. On the other hand, the 20 Meter Dash executed with sneakers by players of the Spanish research carried out by Martín\textsuperscript{17} had also better records (M:3,01 in forwards and M:3,02 in midfielders) compared to the ones in this paper.

Thus, the higher the sport level, the better the registry, since if the results extracted from several studies are analyzed and compared, it can be affirmed that as the category decreases, the speed times with skates gets worse. Likewise, in soccer there is evidence that as the level increases, the speed capacity is higher in short distances, compared to soccer players of minor categories\textsuperscript{18}.

\textsuperscript{15}MARTÍN, R. Batería de tests para la evaluación y control de la condición física de jugadores de élite de Hockey sobre patines. Red: revista de entrenamiento deportivo, 1989, 3(2), 24-34.
\textsuperscript{17}MARTÍN, R. Batería de tests para la evaluación y control de la condición física de jugadores de élite de Hockey sobre patines. Red: revista de entrenamiento deportivo, 1989, 3(2), 24-34.
If we focus in the execution of the 20 Meter Dash test with and without skates, we detect a better significant registry in the execution with sneakers. That fact would coincide with the results obtained by Martín, which according to Riverola would be explained by the big biomechanical differences between the foot race and skating and due to the technical tactic of the start with skates, where the arms have less implication due to the holding of the stick.

Apart from observing a higher speed capacity with sneakers than with skates in the studies analyzed, it has been detected that the times obtained with skates by players of the Spanish national team (unlike those reported in this study) are slightly worse than the times registered with sneakers. It seems that these minimal differences come from the high technical of the elite players when skating.

Last, in regard to hypothesis number 2 and following the Hopkins correlation magnitude scaffolding was observed a moderate and non-significant correlation in the 20 Meter Dash test \((r=0.331; \ p=0.350)\). There is no evidence of further studies establishing the correlation in the execution of a same test with skates and sneakers to compare the data.

Nevertheless, the records obtained show that the better the player, the higher the technical level when skating. In addition, the results seem to indicate that the speed capacity on skates is not only conditioned by the maximum strength and the explosive force, but also by technical factors. This fact would strengthen and be in tune with


19 MARTÍN, R. Batería de tests para la evaluación y control de la condición física de jugadores de élite de Hockey sobre patines. Red: revista de entrenamiento deportivo, 1989, 3(2), 24-34.


Yagüe's research, which proved that roller hockey players obtain better records in the explosive force test, but contrary to what happens in most collective sports, it does not imply better results in the 20 Meter Dash test.

One of the limitations of the study is the scarce number of participants.

It would be interesting to study the speed capacity with a larger sample. Also, the study could be repeated comparing different categories of roller hockey. Further studies would include the use of photocells to measure the time of the execution of the test with more precision. On the other hand, it would be interesting to study the correlation between the jumping capacity and the speed capacity with skates.

5. CONCLUSIONS

The records (in secs.) of the 20 meter dash test are better when it is executed in sneakers.

The correlation of the results of the 20 Meter Dash test with and without skates is moderate and non-significant.

Practical Application

The results of the present paper show that the sport work executed out of the court (with sneakers) has little relation with the real situation of the actual game in roller hockey. Therefore, it is recommended that most of the training content of the hockey player develops with skates. The aerobic work in initial training phases or specific work to prevent injuries could be exceptions. The same results can also seem to indicate a need to improve the speed capacity on skates, since in both, the study and other results analyzed, the speed capacity on sneakers is higher. As it is such an important

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aspect in a sport like roller hockey, we think necessary to dedicate more time to work the speed capacity more specifically.

Finally, and taking into account the results, is demonstrated the importance of having a refined displacement technique with skates to achieve more efficiency. That confirms the importance of beginning to practice the sport at an early age.

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