Relationship Between Body Composition, Leg Strength, Anaerobic Power, and On-Ice Skating Performance in Division I Men’s Hockey Athletes

Jeffrey A. Potteiger, Dean L. Smith, Mark L. Maier, and Timothy S. Foster

Department of Kinesiology and Health, Miami University, Oxford, Ohio

Abstract

Potteiger, JA, Smith, DL, Maier, ML, and Foster, TS. Relationship between body composition, leg strength, anaerobic power, and on-ice skating performance in division I men’s hockey athletes. J Strength Cond Res 24(7): 1755–1762, 2010—The purpose of this study was to examine relationships between laboratory tests and on-ice skating performance in division I men’s hockey athletes. Twenty-one men (age 20.7 ± 1.6 years) were assessed for body composition, isokinetic force production in the quadriceps and hamstring muscles, and anaerobic muscle power via the Wingate 30-second cycle ergometer test. Air displacement plethysmography was used to determine % body fat (%FAT), fat-free mass (FFM), and fat mass. Peak torque and total work during 10 maximal effort repetitions at 120°/s were measured during concentric muscle actions using an isokinetic dynamometer. Muscle power was measured using a Monark cycle ergometer with resistance set at 7.5% of body mass. On-ice skating performance was measured during 6 timed 89-m sprints with subjects wearing full hockey equipment. First length skate (FLS) was 54 m, and total length skate (TLS) was 89 m with fastest and average skating times used in the analysis. Correlation coefficients were used to determine relationships between laboratory testing and on-ice performance. Subjects had a body mass of 88.8 ± 7.8 kg and %FAT of 11.9 ± 4.6. First length skate–Average and TLS–Average skating times were moderately correlated to %FAT ([r = 0.53; p = 0.013] and [r = 0.57; p = 0.007]) such that a greater %FAT was related to slower skating speeds. First length skate–Fastest was correlated to Wingate percent fatigue index ([r = −0.48; p = 0.027] and FLS–Average was correlated to Wingate peak power per kilogram body mass ([r = −0.43; p = 0.05]). Laboratory testing of select variables can predict skating performance in ice hockey athletes. This information can be used to develop targeted and effective strength and conditioning programs that will improve on-ice skating speed.

Key Words testing, speed, Wingate, skeletal muscle

Introduction

Ice hockey is a physically demanding sport that requires athletes to generate maximal levels of power and speed while maintaining balance when responding to on-ice movements of other players. This must be accomplished while participating in offensive and defensive strategies designed to maximize scoring opportunities for one’s own team and minimizing scoring opportunities for the opposing team. The merging of athletic skill and ability, proper physical conditioning, mental preparation, and appropriate nutrition intake with appropriate game strategies leads to successful performance on the ice during competition (6).

Various physiological attributes contribute to successful sport and athletic performance with the combined interaction of the aerobic and anaerobic energy pathways, muscular strength and power, flexibility, and balance being important to the success of ice hockey athletes (6). Consequently, the development of physiological profiles of these attributes helps in the selection of athletes who will perform at optimal levels during competition, assists in the identification of individual player strengths and weaknesses, and contributes to the development of successful sport-specific training programs (11). Skating ability is one of many important factors that contributes to successful performance in ice hockey athletes (6). In an effort to better understand the role physical attributes have in on-ice skating performance, several studies have been conducted that examine the relationship between laboratory measures of performance and on-ice skating speed. Individual measures and combined batteries of tests including body composition, standing long jump, vertical jump, 3 hop jump, side shuffle, drop jumps, 1 repetition maximum leg press, running sprint tests, and the Wingate anaerobic power and capacity test have been evaluated to determine their individual
or collective contribution to on-ice skating performance (1,3,8,19). Collectively, the available research suggests that some but not all laboratory measures may effectively predict on-ice skating performance in both men and women ice hockey players.

In an effort to further examine the relationship between selected laboratory measures of physical performance and on-ice skating speed, we had athletes from an National Collegiate Athletic Association (NCAA) division I Intercollegiate ice hockey team assessed for body composition and then perform a Wingate anaerobic power test, an isokinetic leg dynamometer test, and an on-ice speed skating test. Specifically, the purpose of this study was to examine relationships between the off-ice laboratory testing of body composition and leg strength and power, and on-ice skating speed in these division I men’s hockey athletes. We also attempted to identify the best predictors of on-ice skating speed from the measured laboratory variables. The results of this study provide additional information on the use of laboratory testing to predict on-ice skating speed and assist in the development of effective training and conditioning programs.

**METHODS**

**Experimental Approach to the Problem**

All subjects were tested after 5 weeks of a preseason strength and conditioning program that was directed and monitored by the Miami University Intercollegiate Strength and Conditioning staff. Testing occurred during the first week of October, immediately before regularly scheduled ice hockey practice began for the 2008–2009 season. This was a team of highly skilled athletes who participated in the NCAA Frozen Four Championship finishing as National Runners up.

All subjects were tested at the same time of the day to control for diurnal variations. Subjects were tested on 3 separate occasions with at least 48 hours between testing days. On the first day of testing, subjects reported to the Health and Human Performance laboratory where they were measured for body mass and body composition. Immediately thereafter, subjects were tested for anaerobic power using the Wingate 30-second anaerobic power and capacity test. On the second day of testing, muscular force production was measured using an isokinetic dynamometer. On the third day of testing, subjects reported to the ice arena and performed an on ice measurement of skating speed using a sprint skating test. The same research technicians administered each individual test. The measurement of these dependent variables was then used to examine the relationships between the off-ice laboratory testing of body composition and leg strength and power, and on-ice skating speed.

**Subjects**

Twenty-one male (age 20.7 ± 1.6 years) members of the men’s university varsity ice hockey team who played the position of forward or defense participated in this study. All subjects read and voluntarily signed a written informed consent document and completed a health history questionnaire in accordance with guidelines set forth by the Human Subjects Institutional Review Board at Miami University. Subjects refrained from any prior exercise on the days of testing.

**Body Mass and Composition**

Height was determined using a stadiometer, and body mass (BM) was measured using a calibrated electronic scale. Body composition was assessed using air displacement pithymography (Bod Pod, Life Measurement Inc., Concord, CA, USA) according to the manufacturer’s instructions. All subjects were tested 2 hours postprandial, voided before testing, and were measured wearing only compression shorts. Percent body fat (%FAT) and BM were used to calculate the amount of fat mass (FM) and fat-free mass (FFM) for each subject.

**Anaerobic Power**

Immediately after completing the assessment of body composition, the subjects were tested for anaerobic power using the Wingate 30-second anaerobic power and capacity test (2). All subjects performed a 5-minute warm-up of low-intensity cycling with the flywheel resistance equal to 1 kp and pedal speed equal to 60 rpm. At minutes 1–4, subjects performed a submaximal (75–90% of maximal effort) sprint of 5-second duration. After completing the warm-up, subjects were given a 5-minute recovery period before performing the test. Anaerobic power and capacity were measured using a calibrated Monark computerized cycle ergometer (Model 894E) with the flywheel resistance set at 7.5% of individual BM. Subjects began the test by increasing the pedaling velocity over a period of 5 seconds against an unloaded flywheel. When the cadence reached 120 rpm, the computerized cycle ergometer automatically dropped the weight loaded pan, and the resistance on the flywheel was increased. Subjects were allowed to rise out of the cycle ergometer seat to a standing position during the test. Recent research has shown no difference in peak or mean power in elite level speed skaters during performance of a Wingate test when in the standing or seated position (20). Power output was recorded in 1-second intervals during the entire 30-second test. The following variables were calculated from the collected data: peak power, peak power per kilogram body mass, peak power per kilogram FFM, average power, average power per kilogram body mass, average power per kilogram FFM, average power for 0–5 seconds, average power 5–10 seconds, and percent fatigue (PF) from the following formula: ([power drop/peak power] × 100).

**Muscular Strength**

On the second day of testing, subjects reported to the laboratory for the measurement of muscular strength using a calibrated Humac Isokinetic Dynamometer (Stoughton, MA, USA). All subjects performed a 5-minute warm-up of low-intensity cycling with the flywheel resistance equal to
1 kp and pedal speed equal to 60 rpm. At minutes 1–4, subjects performed a submaximal (75–90% of maximal effort) sprint of 5-second duration. After completing the warm-up, subjects were given a 5-minute recovery period before performing the test. Subjects were seated on the isokinetic dynamometer with the testing leg secured by Velcro straps and the upper body secured by a harness system. The fulcrum of the lever arm was adjusted to bisect the center of the knee joint. The bottom of the lever arm was secured at a position just superior to the ankle. Subjects were allowed 3 practice repetitions of increasing intensity (25, 50, and 75% of maximal effort) followed by a 60-second recovery period. During testing, subjects performed 10 repetitions of concentric muscle actions at 120°/s using the quadriceps and hamstrings (i.e., leg extension and leg curl). Subjects were tested using both the right and left legs, with the order of the legs randomly assigned. The following variables were calculated (in N·m) for both muscle groups (quadriceps and hamstrings) for both legs (left and right): peak torque, peak torque per kg FFM, and total work.

**On-Ice Skating Speed**

On the third day of testing, subjects reported to the ice arena. Subjects were tested while wearing full ice hockey equipment but without their ice hockey sticks. The repeat skate sprint test (RSS) requires subjects to perform 6 maximal effort sprints with a 30-second recovery between trials (15). Figure 1 illustrates the RSS and the points at which the skating time were recorded. Subjects were given 5 minutes to perform an individualized warm-up and then a rest period before testing. To start each trial, the subject stood with both skates behind the goal line and on command sprint-skated to the goal line at the other end of the rink. Once both skates had crossed the goal line, the subject immediately stopped, turned, and sprint-skated back toward the starting goal line. The time required to go from the starting goal line to the opposite goal line, a distance of 54 m, was recorded as first length skate (FLS). The time required to skate from the starting goal line to the opposite goal line and then back to the near blue line, a distance of 89 m, was recorded as total length skate (TLS). All times were recorded manually using a digital stop watch by the same 2 research assistants. The average of the 2 times for each sprint was used in the data analysis. After completion of testing, the following variables were determined: fastest FLS (FLS-Fastest), fastest TLS (TLS-Fastest), average of the 6 FLS (FLS-Average), and average of the 6 TLS (TLS-Average). Average linear momentum (LM) was calculated for FLS-Fastest (FLS-Fastest-LM), TLS-Fastest (TLS-Fastest-LM), FLS-Average (FLS-Average-LM), and TLS-Average (TLS-Average-LM) using the following formula: LM (kg·m·s⁻²) = BM (kg) × skating velocity (m·s⁻¹). The fatigue index (FI) for the FLS (FLS-FI) and the TLS (TLS-FI) was calculated as follows: ([fastest skating time – slowest skating time]/fastest skating time) × 100 (15).

**Statistical Analyses**

Mean and SDs were calculated for all variables. To quantify the strength and direction of the many bivariate relationships, Pearson correlation coefficients were calculated. Statistically

---

**Table 1.** Physical characteristics of the subjects ($n = 21$).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>20.7 ± 1.6</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>181.9 ± 7.8</td>
</tr>
<tr>
<td>Body mass (kg)</td>
<td>88.8 ± 7.8</td>
</tr>
<tr>
<td>% FAT</td>
<td>11.9 ± 4.6</td>
</tr>
<tr>
<td>Fat-free mass (kg)</td>
<td>78.1 ± 6.6</td>
</tr>
<tr>
<td>Fat mass (kg)</td>
<td>10.8 ± 4.7</td>
</tr>
</tbody>
</table>
significantly correlations were observed with \( p \leq 0.05 \). To establish the ability of the laboratory measures to predict on-ice skating speed, multiple regression analyses were conducted using stepwise forward selection. Separate regression analyses were run for each of the on-ice criterion variables. Our goal was to identify a limited number of laboratory variables that account for the greatest variance (i.e., \( R^2 \)) in on-ice skating speed and therefore optimize the prediction of on-ice skating speed. At each step in the forward selection, a \( p \) value of \( \leq 0.05 \) was the statistical significance criterion to enter variables. All analyses were conducted using SPSS version 16.0.

**RESULTS**

The mean and SDs for the physical characteristics, anaerobic power, isokinetic force production, and on-ice skating speed are reported in Tables 1–4, respectively. The subjects were physically fit, with high levels of anaerobic power and capacity, high isokinetic force production, and fast skating speeds.

We classified the various tests into 4 categories: on-ice variables, anthropometric variables, isokinetic variables, and Wingate variables. A matrix of intercorrelations, which presents the correlation coefficients for pairs of variables, is shown in Table 5. Not surprisingly, the on-ice skating performance variables were strongly related to each other within a category. For instance, FLS-Fastest times and TLS-Fastest times were strongly correlated \((r = 0.85; p = 0.001)\), indicating that FLS-Fastest times could account for approximately 73% of the variance in TLS-Fastest times and vice versa. Likewise, FLS-Average times and TLS-Average times were also strongly correlated \((r = 0.89; p < 0.001)\). Measures of linear momentum had several fair correlations \((r = 0.25–0.50)\) with skating times and skating fatigue indices. Finally, skating times were in several cases moderately correlated \((p = 0.50–0.75)\) with skating fatigue indices. An example was that TLS-Fastest was significantly correlated with TLS-FI \((r = −0.68; p = 0.001)\).

On-ice skating times (FLS-Average and TLS-Average) were moderately correlated to %FAT \((r = 0.53; p = 0.013)\).
<table>
<thead>
<tr>
<th>Variables</th>
<th>On-ice</th>
<th>Anthropometric</th>
<th>Isokinetic</th>
<th>Wingate</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLS-F</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLS-F</td>
<td>0.53</td>
<td>0.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLS-A</td>
<td>0.29</td>
<td>0.41</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>TLS-A</td>
<td>0.36</td>
<td>-0.26</td>
<td>0.07</td>
<td>0.20</td>
</tr>
<tr>
<td>FLS-F-LM</td>
<td>-0.35</td>
<td>-0.35</td>
<td>0.06</td>
<td>0.14</td>
</tr>
<tr>
<td>TLS-F-LM</td>
<td>-0.17</td>
<td>-0.11</td>
<td>-0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>FLS-A-LM</td>
<td>-0.08</td>
<td>-0.06</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>TLS-A-LM</td>
<td>-0.52</td>
<td>-0.34</td>
<td>0.33</td>
<td>0.54</td>
</tr>
<tr>
<td>FLS-FI</td>
<td>-0.66</td>
<td>-0.68</td>
<td>0.13</td>
<td>0.33</td>
</tr>
<tr>
<td>TLS-FI</td>
<td>-0.03</td>
<td>-0.05</td>
<td>0.14</td>
<td>0.12</td>
</tr>
<tr>
<td>BM</td>
<td>0.00</td>
<td>0.07</td>
<td>0.29</td>
<td>0.34</td>
</tr>
<tr>
<td>HT</td>
<td>0.24</td>
<td>0.37</td>
<td>0.53</td>
<td>0.57</td>
</tr>
<tr>
<td>%FAT</td>
<td>-0.12</td>
<td>-0.10</td>
<td>-0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>PT-Q-R</td>
<td>-0.03</td>
<td>0.00</td>
<td>0.02</td>
<td>0.13</td>
</tr>
<tr>
<td>kg FFM</td>
<td>0.09</td>
<td>-0.11</td>
<td>0.14</td>
<td>0.21</td>
</tr>
<tr>
<td>TW-Q-R</td>
<td>-0.02</td>
<td>-0.08</td>
<td>-0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td>PT-Q-L</td>
<td>-0.20</td>
<td>0.14</td>
<td>-0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>kg FFM</td>
<td>-0.25</td>
<td>-0.24</td>
<td>-0.13</td>
<td>0.01</td>
</tr>
<tr>
<td>W-5 s</td>
<td>-0.28</td>
<td>-0.18</td>
<td>-0.18</td>
<td>-0.06</td>
</tr>
<tr>
<td>PF</td>
<td>-0.48</td>
<td>-0.17</td>
<td>-0.37</td>
<td>-0.11</td>
</tr>
<tr>
<td>W-P-P</td>
<td>-0.30</td>
<td>-0.25</td>
<td>-0.43</td>
<td>-0.28</td>
</tr>
</tbody>
</table>

**Table 5.** Bivariate correlations between on-ice skating performance and off-ice measured variables.*†

*FLS = first length skate; TLS = total length skate; FLS-F = FLS fastest time; TLS-F = TLS fastest time; FLS-A = FLS average time; TLS-A = TLS average; FLS-F-LM = FLS fastest time linear momentum; TLS-F-LM = TLS fastest time linear momentum; FLS-A-LM = FLS average time linear momentum; TLS-A-LM = TLS average time linear momentum; FLS-FI = FLS fatigue index; TLS-FI = TLS fatigue index; HT = height; BM = body mass; % FAT = percent body fat; PT = peak torque; TW = total work; PT-Q-R = PT quadriceps right leg; PT-Q-L = PT quadriceps left leg; PT-Q-R-kg FFM = PT quadriceps right leg per kg fat free mass; PT-Q-L = PT quadriceps left leg; PT-Q-R kg FFM = PT quadriceps left leg per kg fat free mass; TW-Q-R kg FFM = TW quadriceps right leg per kg fat free mass; TW-Q-L = TW quadriceps left leg; W-5 s = Wingate peak power at 5 seconds; PF = Wingate percent fatigue; W-P-P kg FFM = Wingate peak power per kilogram body mass.

†$r$ indicates a magnitude of 0.43 is significant at $p < 0.05$. 
Wingate test, and the subjects with the best FLS-Average skating times were those subjects that produced the greatest peak power per kilogram body mass during the Wingate test. On-ice skating times were not significantly correlated to any isokinetic dynamometer variables. Skating fatigue indices were not significantly correlated to any predictor variable. Measures of linear momentum were significantly correlated to many of the predictor variables including those from the isokinetic dynamometer and the Wingate test. This was expected because of body mass influencing several of the isokinetic force production and anaerobic power and capacity variables.

The multiple regression analysis predicting FLS-Fastest yielded PF on the Wingate test as the only significant predictor variable, $F_{1,19} = 5.77$, $p = 0.27$. The multiple correlation coefficient was 0.48 with an adjusted $R^2$ of 0.19 indicating that conservatively, 19% of the variance in skating speed for the FLS was predicted by percent fatigue on the Wingate test. For the regression analysis of the criterion variable FLS-Average, %FAT was the only significant predictor variable, $F_{1,19} = 7.42$, $p = 0.13$. The multiple correlation coefficient was 0.53 with an adjusted $R^2$ of 0.24 indicating that conservatively, 24% of the variance in the FLS-Average was predicted by %FAT. Similarly, the multiple regression analysis predicting TLS-Average yielded %FAT as the only significant predictor variable, $F_{1,19} = 9.23$, $p = 0.007$. The multiple correlation coefficient was 0.57 with an adjusted $R^2$ of 0.29 indicating that 29% of the variance in the TLS-Average was predicted by the subject’s percent body fat. Separate multiple regression analyses using TLS-Fastest and both skating fatigue indices (FLS-FI and TLS-FI) as criterion variables yielded no statistically significant predictor variables.

![Figure 2. Correlation between First Length Skate–Average time (FLS-Average; top) and Total Length Skate–Average time (TLS-Average; bottom) with percent body fat. For FLS-Average, $r = 0.53$; $p < 0.05$; $y = 0.25$ (%Fat) + 7.7. For TLS-Average, $r = 0.57$; $p < 0.05$; $y = 0.044$ (% Fat) + 13.89.](image-url)
DISCUSSION

The subjects in the current study were experienced, elite level ice-hockey players. The physical characteristics of body mass and %FAT compare favorably to other university level ice hockey athletes (9) and National Hockey League Entry Draft ice hockey players (4). The anaerobic power and capacity measures we report in the current study fall into the elite category for male intercollegiate athletes (21) and are higher than previously reported for male ice hockey players (4,8,14,19). The differences between our Wingate anaerobic power and capacity data and that reported previously could be partly because of allowing subjects in the current study to rise out of the seat to a standing position (12,16) during performance of the Wingate test, although recent work with elite speed skaters showed no difference in anaerobic power between seated and standing positions (20). We were unable to locate any leg isokinetic force production data from previous research in ice hockey players to compare to the current study. The data from the current study are similar to isokinetic force production in young French (17) and Swedish (13) professional soccer players. Similarly, it was difficult to make comparisons of on-ice skating speed with previous studies because of different distances being used to measure skating speed. The distances covered by university and Junior A hockey players in the study by Watson and Sargeant (19) were similar for the FLS (54.9 m) and TLS (90.4 m) to the current study FLS (54 m) and TLS (89 m). We report faster skating times for both the FLS and the TLS. It is important to note that fatigue index from the current study for both the FLS (16.1 ± 4.0%) and TLS (14.0 ± 4.2%) is similar to that reported by Watson and Sargeant (19). In conclusion, the subjects in the current study had very high levels of anaerobic power and isokinetic force production, and fast on-ice skating speeds.

Successful performance in ice hockey requires athletes to develop well-rounded fitness including high levels of anaerobic power, aerobic endurance, muscular strength, power, and endurance (4,6). On-ice skating speed is one of the many important factors contributing to successful performance, and improving skating speed should be a focus of training and conditioning programs and a criterion measure for selection of athletes to competitive teams. The major findings of the current study suggest that the following laboratory measures can be best used to evaluate and predict on-ice skating speed and skating power in men’s intercollegiate ice hockey players: percent body fat, isokinetic force production in the legs, and anaerobic power. Our results from the isokinetic testing and the Wingate anaerobic power test support those of previous studies in that the ability to produce force and power is very important for successful performance in men’s ice hockey. For example, Burr et al. (4,5) demonstrated that leg power, as measured by a vertical jump test, was moderately correlated with National Hockey League Entry Draft selection order. Also, Watson and Sargeant (19) found significant correlations ($r^2$ of 47.6%) between a 40-second Wingate anaerobic capacity test and the RSS test in University and Junior A level hockey players. Farlinger et al. (8) demonstrated that 35 m on-ice skating speed could be predicted by a 30-m sprint, 3 hop jump test, Wingate mean and peak power, and vertical jump height. The correlation matrix presented in Table 5 illustrates the statistically significant relationships between anaerobic power and force production in the legs and several measures of skating speed.

It is interesting to note the moderately strong relationship between percent body fat and measures of on-ice skating speed (Figures 2 and 3, Table 5). It is our belief that because the subjects in the current study are a homogeneous group of elite hockey athletes that any factor that would reduce skating speed would be an important contributor to skating ability. Excess body fat, as would be represented by a higher percent body fat, would effectively reduce skating speed by contributing to the mass that must be moved on the ice but not contributing to force production. Other investigators have also demonstrated the ability of a body index score

![Figure 3. Correlation between First Length Skate–Fastest time and Percent Fatigue. $r = -0.48$; $p < 0.05$; $y = -0.21$ (Percent Fatigue) + 8.2.](image-url)
Predictors of On-Ice Skating Performance

(which included a measure of lean body mass) (4) and body composition (18) to predict draft entry and transition into the National Hockey League.

The findings of the current study and those previously published (1,5,7–9,19) should be useful for athletes, ice hockey coaches, and strength and conditioning personnel wishing to develop effective training and conditioning programs for ice hockey players. As part of the complete training program, ice hockey athletes should be regularly engaged in activities that promote increased force and power production in the legs. The use of prolonged endurance activities that hinder development of force and power production should be minimized because these types of activities have been shown to hinder development of force and power production in muscle (10).

There may be several limitations of the study worth discussing. First, the measures of on-ice skating times were made using handheld stop watches as opposed to electronic timing devices. The effect of this potential limitation is minimized by having multiple timers who were experienced at measuring skating speed. A second limitation could be the level of motivation of the subjects for performing the Wingate anaerobic power and capacity test and the Repeat Skate Sprint test. Both of these tests are physically demanding and considerably fatiguing. We believe, however, that this group of intercollegiate athletes was highly motivated for each test and therefore performed to their maximum capabilities. Finally, there may be concern about the lack of familiarity with performance of the isokinetic dynamometer test. We attempted to minimize this during testing by having each subject perform 3 practice trials with each leg before data collection occurred. We also believe that the high level of motivation for the subjects to perform well helped minimize any limitation brought about by an unfamiliarity of the test.

Practical Applications

The results of this investigation indicate that coaches and strength and conditioning professionals can use laboratory testing of select variables to assist with assessing and increasing the on-ice skating speed of elite level ice hockey players. This information can be valuable for monitoring and predicting skating performance when ice hockey athletes do not have access to a skating facility. Information from the laboratory measures can also be used to develop effective strength and conditioning programs that will alter body composition and leg strength and power in a manner that will improve on-ice skating speed. Specifically, strength and conditioning programs that promote a low percentage of body fat and high peak power will best facilitate improvements in on-ice skating speed. The improvement in on-ice skating speed should contribute to the overall development and improvement of performance in highly trained male ice hockey athletes.

References


