

Abstract

Title:

The Impact of Hip Muscle Output Strength on Fundamental Skating Skills in League Ice Hockey Players

Objectives:

The primary aim of this study is to determine the extent of the relationship between the strength of hip muscle groups and skating performance in ice hockey.

Methods:

Twenty-two ice hockey players who are active in one of the three highest ice hockey competitions in the Czech Republic participated in the study. These players ranged in age from 20 to 30 years and had at least 18 years of training history. Their average body height was 180.56 ± 5.15 cm and weight was 81.35 ± 9.66 kg. As part of the study, they underwent a comprehensive battery of tests that included laboratory measurements and practical testing on the ice surface.

For the laboratory testing, three advanced instruments were used, the measurement methods: a DXA scanner for body composition analysis, a CYBEX Humac Norm isokinetic dynamometer, and a Force Frame VALD system. Anthropometric measurements including body height, weight, thigh circumference, hip range of motion, lower leg length, and epicondyle width were taken prior to testing. Players completed an individual warm-up prior to strength measurements to minimize injury risk and maximize performance.

During field testing, individual skating performance tests included tests of power-speed endurance (6 x 54 m), acceleration and speed (6,1 m and 30 m forward, backward), agility (Illinois), and change of direction (6 x 9 m braking). Algetiming PRO photocells were used to record times to ensure accurate recording of results. Each player had two attempts per test, with the better result used for statistical analysis. Prior to the skating performances, the players completed a warm-up on the ice then followed pre-test instructions to ensure the tests were performed correctly.

Results:

Four key statistically significant predictors ($p < 0.05$) were identified for basic ice skating skills, including tests such as 6x54 m, 6x9 m brakes, Illinois (Agility), and 30 m forward and backward sprints: Total body height ($\beta = -0.830$), extensor strength in the left lower limb at an angular velocity of 120 ($\beta = -0.670$), functional range posterolaterally in the left lower limb ($\beta = 0.761$) and posteromedially in the right lower limb ($\beta = -0.690$). Together, these predictors explained 60.9% of the variability in test results. Other significant factors included hip flexor strength on the left lower limb at an angular velocity of 60 ($\beta = 0.520$), percentage fat mass ($\beta = 0.540$), thigh circumference on both the left ($\beta = -0.210$) and right limbs ($\beta = -0.625$), and functional range anteriorly on the left lower limb ($\beta = -0.480$).

Conclusion:

Based on the results, we can conclude that hip flexor and extensor strength and range of motion play an important role in ice hockey skating performance. Furthermore, we can identify the parameters total body height, hip extensor strength, hip flexor strength, percentage of fat mass, lower leg circumference and ranges of motion (posterolateral, posteromedial, anterior) as suitable predictors to explain ice hockey skating performance.

Key words:

ice hockey, hip joint, on-ice tests, off-ice tests, isokinetic strength, isometric strength