



ALBERTA ALPINE

Alberta Alpine Ski Association

Physical Testing Protocol

Published
13/09/2016

Updated
10/10/2017

Developed in Conjunction with:

Alpine Canada Alpin
Alberta Alpine Ski Association
BC Alpine
Alpine Ontario Alpin
Ski Quebec Alpin
Canadian Sport Institute Calgary
Alberta Sport Development Centers
Peak Power Performance



ALBERTA ALPINE

OVERVIEW

This document provides an overview of Alpine Canada's nationwide physical fitness testing protocol. The goal is to implement system-wide standardized testing to ensure Canadian skiers are developing ski-specific physical fitness abilities as they progress through the athlete development pathway and to track progression of these athletes. This provides positive reinforcement on the importance of dryland training and physical preparation. This is important as physical fitness is critical for alpine ski racers of all ages both for on snow performance and injury prevention.

The tests were chosen based on their simplicity, validity and accessibility for all alpine ski racing performance levels from local ski clubs to the National program. It also assesses important physical fitness abilities for alpine ski racers like aerobic fitness, lower body muscle power, agility and coordination. There may be certain situations where teams have access to more sophisticated testing methods. This nationwide physical fitness testing program does not prevent the inclusion of additional testing. Instead, it provides guidelines and instructions to assess ski-specific fitness abilities that are important for all athletes in the development pathway and that can be implemented in virtually any town or city.

In order to achieve the end result of emphasizing the importance of physical fitness and the ability to track Canadian alpine ski racers as they progress through the athlete development pathway, two important considerations should be mentioned regarding the implementation of this testing protocol: (1) for this testing to have value, it needs to be implemented on a regular basis – ideally, testing should occur two times per year at the start of the dryland training period and as the athletes exit dryland training in preparation for on snow training; (2) the tests need to be repeated in the same manner from testing session to testing session – by carefully following the instructions you will ensure that the test results are not only comparable for a single athlete as he/she moves through the development pathway but also between athletes.

In summary, this represents a critical step forward in Canadian alpine ski racing. A development pathway is not a series of independent stops as a skier ascends the ranks to international competition. Instead, it should be one continuous effort on behalf of all stakeholders to provide a fun, cohesive and exhilarating experience for all athletes. Standardized physical fitness testing that is implemented across various stages of development contribute to this cohesive pathway. Thank you for your participation in the athlete development pathway and for supporting Canadian skiers on their journey to excellence.



ALBERTA ALPINE

MOVEMENT COMPETENCIES

Overhead Squat with Dowel

Equipment: Wooden or plastic dowel, 1 inch block or plywood, measuring tape.

Protocol: Measure the length of the leg of the athlete by taking the length from below the knee cap to the bottom of the athlete's foot. The athlete will stand with his/her feet apart to the length of the measurement with both feet pointing forward. Position a dowel on the top of the head and move both hands out until elbows come to 90°, and then fully extend the elbows and lockout directly overhead. Perform 5 squats as low as possible while maintaining overhead dowel position.

Scoring: Score out of 3 based on quality of the movement.

3: Upper torso vertical or parallel to shins, femur below parallel to ground, knees align over toes, dowel aligns over feet.

2: Elevate heels by 2 inches, upper torso vertical or parallel to shins, femur below parallel to ground, knees align over toes, dowel aligns over feet.

1: Upper torso not vertical or parallel to shins, femur not below parallel to ground, knees not align over toes, dowel not aligns over feet.

0: Pain while performing the movement.

Contraindications: Lower body injury that limits squat performance or upper body injury that limits overhead position with the dowel.

Table 1: Targets for Overhead Squat with Dowel

Age	Male	Female
14-16	2 to 3	2 to 3
17-18	2 to 3	2 to 3
19-20	2 to 3	2 to 3



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MOVEMENT COMPETENCIES

Single Leg Full Squat Test

Equipment: Box 75 cm or higher

Warm Up: Perform 2-5 repetitions each side of a bodyweight lunge.

Protocol: The athlete starts with one foot on the edge of the box. The athlete squats down on one leg to a count of three seconds until hip touches the heel, pauses for one second, and stands back up on the command of the tester until both the knee and hip are fully extended.

Scoring: Score out of 3 based on quality of the movement.

3: Upper torso vertical or parallel to shins, femur below parallel to ground, knees align over toes

2: Upper torso vertical or parallel to shin, femur below parallel to ground, but knee not completely align over toe

1: Upper torso not vertical or parallel to shins, femur not below parallel to ground, knee not align over toe.

0: Pain while performing the movement.

Contraindications: Lower body injury that limits squat performance.

Table 2: Targets for Single Leg Full Squat Test

Age	Male	Female
14-16	2 to 3	2 to 3
17-18	2 to 3	2 to 3
19-20	2 to 3	2 to 3



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LOWER BODY POWER

Field Test: Standing Long Jump

Equipment: Tape measure, non-slip floor, masking tape, clearly marked takeoff line

Warm Up: Perform 1-3 submaximal repetitions.

Protocol: Place tape measure on flat ground on a non-slip surface. Place line of masking tape starting at 0 cm. The athlete starts with the heels lined up with masking tape line. The tester will issue the command “Jump”. Using a two-foot takeoff, the athlete will perform a maximal effort jump with the goal of maximizing the horizontal jump distance. The athlete will land on two feet. Measure the jump distance from the masking tape to the heel that is closest to the takeoff line.

The test consists of 3 maximal effort jumps with a 20-second rest in between jumps.

Scoring: The best jump distance.

Contraindications: Lower body injury that impairs vertical jump performance.

Table 3: Targets for Standing Long Jump

Age	Male	Female
14-16		
17-18		
19-20		



ALBERTA ALPINE

LOWER BODY POWER

Double Leg Vertical Jump Test

Equipment: Device with “My Jump” app or jump mat.

Warm Up: Perform 1-3 repetitions of each jumps.

Protocol: Setup device on flat ground. The athlete positions his/her feet inside the camera frame of the device. With the hands placed firmly on the hips, the athlete will perform 5 maximal squat jumps and 5 maximal countermovement jumps. Rest 2-3 minutes between the two types of jumps.

Squat Jump: The commands should be “down...hold...jump!” The hold position is performed from 90 degrees of knee flexion for a complete 4 second count. Upon jump command, there should be no bouncing motion coming from any part of the body. Jumps that do not start from a complete static position will be discarded and repeated.

Countermovement Jump: The commands should be “3, 2, 1, jump!” Upon jump command, the athlete squats down and jump as fast and explosively as possible.

The test consists of 1 set of attempt for each jump

Scoring: The maximal height of each jump is recorded.

Contraindications: Lower body injury that impairs vertical jump performance.

Table 3: Targets for Squat Jump

Age	Male	Female
14-16	30 cm to 35 cm	25 cm to 30 cm
17-18	43 cm to 48 cm	38 cm to 43 cm
19-20	55 cm to 60 cm	48 cm to 53 cm

Table 4: Targets for Countermovement Jump

Age	Male	Female
14-16	33 cm to 38 cm	27 cm to 32 cm
17-18	46 cm to 51 cm	40 cm to 45 cm
19-20	58 cm to 63 cm	50 cm to 55 cm



LOWER BODY POWER

Field Test: Penta Jump

Equipment: Tape measure, non-slip floor, masking tape, clearly marked takeoff line

Warm Up: Perform 1-3 submaximal jumps in a consecutive manner.

Protocol: Place tape measure on flat ground on a non-slip surface. Place line of masking tape starting at 0 cm. The athlete starts with the heels lined up with masking tape line. The tester will issue the command "Jump". Using a two-foot takeoff, the athlete will perform a five consecutive maximal effort jumps in a continuous manner. The goal is to maximize the horizontal jump distance. The athlete will land on two feet. Measure the jump distance from the masking tape to the heel that is closest to the takeoff line. In the event the athlete loses balance on landing, discard the result and repeat the test.

The test consists of 2 maximal effort trials.

Scoring: The best total jump distance.

Contraindications: Lower body injury that impairs vertical jump performance.

Table 4: Targets for Penta Jump

Age	Male	Female
14-16		
17-18		
19-20		



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UPPER BODY STRENGTH

Pull Up Test

Equipment: Neutral grip pull up bar.

Warm Up: Perform 1-3 repetitions.

Protocol: Athlete begins at full elbow extension and must pull his/her chin over the bar without kicking or swinging. The tester stabilizes the athlete between each repetition.

The test consists of 1 attempt.

Scoring: The maximal number of correctly performed repetition.

Contraindications: Upper body injury that limits pull up performance or a history of shoulder instability.

Table 5: Targets for Pull Up Test

Age	Male	Female
14-16	4 to 6	2 to 4
17-18	6 to 8	3 to 5
19-20	8 to 10	4 to 6



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AGILITY AND ANAEROBIC CAPACITY

Hex Jump Test

Equipment: Standard hexagonal obstacle, stopwatch.

Warm Up: Perform 1 revolution per side.

Protocol: The athlete starts with both feet together inside of the hexagonal obstacle. At the start command, the athlete jumps laterally across the starting 20cm hurdle and back. Turn and jump over the next hurdle over and back for 2 full revolutions.

The test consists of minimum 2 attempts and maximum 3 attempts in both clockwise and counter-clockwise directions. All attempts in clockwise are performed first, then counter-clockwise follows. An attempt is considered disqualified if the athlete makes contact with the hurdles.

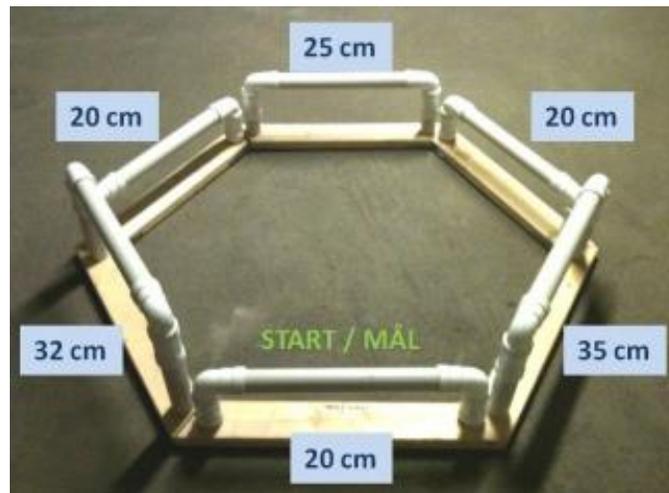


Figure 1: Setup for hex jump test.

Scoring: Record time from start command to the completion of two revolutions when both feet return to the inside of the obstacle. Best times in each direction are summed up and the sum is recorded as the final score.

Contraindications: Lower body injury that limits jumping performance.

Table 6: Targets for Hex Jump Test

Age	Male	Female
14-16	23 s to 20.1 s	23 s to 20.5 s
17-18	22 s to 19.7 s	22 s to 19.7 s
19-20	21 s to 19 s	21 s to 19.3 s



AGILITY AND ANAEROBIC CAPACITY

90-Seconds Box Jump Test

Equipment: Box Height Age Dependent (See Table 8a below)

Warm Up: Perform 3-5 jumps each side. Technical feedback should be provided during the warm up.

Protocol: The athlete starts by standing on top of the box. Upon start command, the athlete jumps down laterally to one side and back up, then jump down laterally to the other side and back up. The aim is to get as many repetitions as possible in the time allotted. The athlete is not allowed to step up onto the box.

This test consists of 1 attempt.

Scoring: Each jump to the top of the box counts as a repetition. Record the maximal number of correctly performed repetition.

Contraindications: Lower body injury that limits jumping performance.

Table 7a: Box Height and Test Duration

Age	Male	Female
14-16	35 cm, 60 s	30 cm, 60 s
17-18	40 cm, 90 s	35 cm, 90 s
19-20	40 cm, 90 s	35 cm, 90 s

Table 7b: Targets for 90-Seconds Box Jump Test

Age	Male	Female
14-16	80 to 100	67 to 89
17-18	94 to 106	78 to 92
19-20	100 to 110	84 to 94



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AEROBIC FITNESS

20m Shuttle Test

Equipment: Tape Measure, speaker, audio device with Léger beep test, large open space that is 30 meters in length

Warm Up: Perform dynamic warm up and static stretching for 10 minutes.

Protocol: The athlete will follow the instructions on the audio device, and run at the sound of the beep until the athlete is no longer to complete a level. The testers must watch the athletes carefully and only give athletes 2 opportunities to reach the marked end points should they fall behind. When the athlete falls short of the line twice in a row, the test is stopped.

Scoring: Record the last stage completed.

Contraindications: Lower body injury that limits running performance.

Table 8: Targets for Léger Beep Test

Age	Male	Female
14-16	10-1 to 12-2	9-5 to 11-6
17-18	11-4 to 13-7	10-6 to 12-7
19-20	11-6 to 13-10	11-1 to 13-2