

SPORT-SPECIFIC CONDITIONING CONSULTANTS

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- PERFORMANCE NUTRITION - SPORT-SPECIFIC CONDITIONING - ATHLETE DEVELOPMENT- PERFORMANCE PSYCHOLOGY -

Plyometric Training to Reduce Knee Injuries in Skiing

Written by: Eric MacLean

Skiers of all abilities are at risk of sustaining traumatic knee injuries including tears of the Anterior Cruciate Ligament (ACL). Skiing related knee injuries may occur when the skier performs a sharp uncontrolled turn, or lands from a jump with their knees too far in the rear (their skis come out from under them), or knees too far apart. Skiers participating in a ski-specific plyometric training program may be able to reduce their risk of sustaining a skiing related knee injury, as these types of programs have shown to reduce knee injury rates in basketball and soccer athletes.

The key to participating in an effective plyometric training program is landing mechanics. Common landing errors are landing with a hyper-extended knee, landing with the knee rotated inwards or outwards relative to the ankle, or landing with the knees well in front of the toes. When landing, you want to feel like you're landing softly, absorbing your body weight by coordinating the flexion of your ankles, knees and hips (this is referred to as triple flexion). Decelerate by dropping into a squat stance, when reaching 90° of flexion in the knees, extend the knees and hips to push out of the squat.

Due to the athletic stance used in most downhill or free-style skiing, where the knees and hips are almost always in a position of flexion, it is recommended to perform your jump training reps in both this semi-squat position, and from the full standing position. If you are training from a semi-squat stance, be sure to focus on hip, hamstring, and quadriceps stretches post work-out to avoid chronic tightness.

Plyo training is effective for skiers as it activates the stretch shortening cycle (SSC), or muscle stretch reflex, providing a spring-type, absorption mechanism within the muscle. The SSC allows for greater efficiency in joint loading, where the absorption of ground reaction and impact forces exerted on the skis and body are transitioned into mechanical energy and are directed back into the skis and slope, saving the supportive structures of the knees (ACL, MCL etc.). This requires coordinated knee and hip flexion and extension, and balanced strength within the quadriceps, hamstrings and glutes. Strength training and plyometric jump training develop this muscle strength and co-contraction coordination.

The program (Table 1.0 *below*) should be part of a comprehensive pre-, and in-season training program. Perform 1-2 times a week, allowing for 48-72 hours rest between. Rest between each set should be 1-1.5 minutes. Perform this work-out before your lower body strength training. The

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goal of this program is to improve your jumping and landing mechanics to reduce your risk of sustaining a knee injury while on the slopes.

Squat Jumps: feet shoulder width apart, in slight ankle, knee and hip flexion, drop into a squat, and jump up through triple extension landing softly.

Double Leg Cone Hops: Continuous double leg jumps over a cone (front to back & side to side)

Depth Jumps: http://www.performancetrainingsystems.net/Depth_Jump.php

For more information on training to reduce knee injuries in skiing contact us at www.performancetrainingsystems.net/Contact.php

For more information on plyometric exercise in athletic conditioning program please refer to <http://www.performancetrainingsystems.net/Resources/Final%20-%20Plyometric%20Paper.pdf> – Original PTS Work

Table 1.0

Warm-up (jog / bike)	5-10min.
Squat Jumps	2sets x 30seconds
Double Leg Cone Hops (front, back, side to side)	2sets x 30seconds
Multiple Cone Hops (front, back, side to side)	3-5 sets
Lateral Bounding	2-3sets x 10- 15 reps
Depth Jumps	5-10 reps
Perform 1-2 days / week, with 48-72 hours rest between each session.	



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