



ALPINE SKIING

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STRENGTH AND CONDITIONING PROGRAM

The purpose of a strength and conditioning program for alpine skiers is to maximize lower-body strength, explosive power, a focus on low-velocity (primarily eccentric) force production, and developing the anaerobic metabolism, specifically developing the lactate threshold and lactate tolerance. The macrocycle for alpine ski racing can be broken down into 5 mesocycles: 1) active recovery, 2) off-season hypertrophy, 3) preseason strength, 4) preseason strength endurance, and 5) in-season maintenance and peaking.

Off-season: hypertrophy focus							
	MON	TUE	WED	THR	FRI	SAT	SUN
Wk1							
AM	Jump and speed	Strength (light upper) and mobility	Jump and speed	Eccentric overload (lower)	Jump and mobility	Off	Off
PM	Lactate threshold and strength moderate	Strength (heavy lower)	Recreational game	Lactate threshold and strength (heavy upper)	Strength (light)	Off	Off
Wk2							
AM	Lactate threshold, and jump and speed	Power	Eccentric overload	Late start and recovery	Strength (moderate)	Eccentric overload	Off
PM	Strength (heavy)	Strength (light upper) and mobility	Strength (heavy upper)	Jump and speed, and recreational game	Lactate threshold and mobility	Off	Off

Strength	Power	Strength and Balance
Light (2–4 sets × 12–15 reps)	2–4 sets × 1–5 reps	2–4 sets × 8–12 reps
Moderate (2–6 sets × 8–10 reps)		
Heavy (4–6 sets × 1–4 reps)		
Back squat or 1 leg barbell squat	Box jumps 3 × 10 (body weight)	Front squat on balance discs
Deadlift	Hurdle jumps 3 × 10 (body weight)	Stability ball dumbbell press
Bench press	Power cleans 4 × 4–8 (60–90% 1RM)	One leg squat on balance discs
Leg press	Squat jumps 4 × 10 (load <75% body mass)	Stability ball dumbbell rows
Cable rows	Dumbbell snatch 3 × 8 each side	Lateral lunges onto a BOSU ball
Back extensions 3 × 20	Numatic or band quick pull-downs (3 × 8–10)	Single-leg roman deadlift with curl to press
Stability ball lateral crunches 3 × 20	Lateral box lung jumps with dumbbells (3 × 8 each side)	Progression: Increase reps, then Increase sets and decrease reps. Increase load as technique improves
	Med. ball sit-up throws (3 × 15–20)	
	Med. ball rotational throws (3 × 15–20)	
Reps = repetitions.		

Jump training (2–4 × 10)	Speed training
Forward jumps	Accelerations 4 × 15 yd
Backwards jumps	Side-to-side lateral shuffle with direction change 5 yd or 2–3 shuffles per direction (6 × 4)
Lateral jumps	5 × 5 yd box agility course
Bounding	T-agility course
Lateral 45° skaters	30-yd cone slalom course (off set should be 10–40% of longitudinal distance)
1-leg forward jumps	Progression: as technique improves add resistances and assistance to drills

*5yd = 4.5m

Eccentric overload (without specialized equipment) (2–4 × 6 each side)	Eccentric cycle ergometer
2-leg concentric, 1-leg eccentric leg press	15–20 min
2-arm concentric, 1-arm eccentric machine chest press	60 repetition maximum
2-leg concentric, 1-leg eccentric leg extension	25–50 watt progression increments
2-arm concentric, 1-arm eccentric pull-ups (vary hand grip)	150–800 watt progression range
1-leg barbell roman deadlift	Gains seen in as little as 5 sessions
Glute ham raise (3 × 10–15)	
Progression: Start with 2 sets and increase by a set every 2–3 wk. Not recommended to do more than 4 sets	

Anaerobic endurance (lactate threshold)	Anaerobic hill (lactate tolerance)	Anaerobic exercise (lactate tolerance)
Mode: Run, cycle, swim, rowing	(1–3 × 30–60 sec efforts with 3–6 minutes rest)	(1–4 sets × 10–60 sec efforts with 30–60 sec exercise break, and 8-min circuit rest)
Interval length: 1–6 min	Forward jumps	Skiers edge
Repetitions: 6–8	Lateral Jumps	1 Leg Hops over a line or bungee
Intensity: approximately 4 mmol/L HR or ventilatory threshold	45° bounds	V-Up (Lying supine, simultaneously raise the torso and legs off the ground and reach towards the feet with the arms, while balancing on the hips)
Rest: 1:1 plus time to resting 2 mmol/L HR	Sprint/run	2-step lateral shuffle
		Box jumps
		Lateral box push-ups
		Russian twists
		Tuck jumps
Progression: Increase repetitions, then decrease repetitions while increasing length by 30–60 seconds	Progression: Add hill and/or resistance (tire drag). Increase time duration followed by sets. When increasing sets and also decrease duration by 10 seconds. Progress every 2–3 wk	Progression: Increase time duration by 10 s followed by sets. When increasing sets also decrease duration by 10 s. Progress about every 2–3 workouts

Mobility (2–4 × 10)	
Deep bodyweight squats	Start standing in an athletic position with hands in front of the body. Lower the hips down to a deep squat position without extensive external rotation of the femur and maintain heel contact. Some individuals will not have the dynamic mobility to do this without the trunk falling backward and should thus start by holding an object in front of them to maintain balance and proper position while dynamically stretching. Progress from using a heel lift to no heel lift and then to an unstable surface such as a foam pad, balance disc, or BOSU ball. Arm progressions start by holding onto an immovable object in front of the body, holding a medicine ball in front of the body, free hands in front of the body, hands over head, holding dowel over head, and to holding a medicine ball over the head.
1-leg squats on bench	Stand on a box that is longer than the leg length, lower the hips down to a deep squat position or to the limits of the range of motion, while avoiding internal hip rotation during the eccentric phase and the heel lifting off the ground. Progressions are the same as for deep squats.
1-leg ground squats	Standing on the ground, lower the hips down to a deep squat position or to the limits of the range of motion, with one leg and hold the other leg in front of the body in an extended position. Avoid internal hip rotation during the eccentric phase and the heel lifting off the ground. Progressions are the same as for deep squats.
Lateral hurdle ducks with hip abduction dynamic mobility	Set a hurdle about even with the greater trochanter of the femur. Start standing next to the hurdle and laterally lunge under the hurdle with as little rotation of the upper body as possible. Stand up on the other side, raise the inside leg, closest to the hurdle, and laterally extend it over the hurdle in a slow controlled movement, without allowing the femur to externally rotate. Come back to a 1-leg standing position and then laterally lunge under the hurdle to the other side and repeat the inside leg lateral extension over the hurdle.
Lunges with hip mobility	Start in a lunge position, single leg squat into a single leg roman deadlift position. Rotate the back leg around to the front while maintaining a straight horizontal leg, lunge, and repeat on the other side.
Lunge with spine rotation and lateral rotation	Start with a right foot forward lunge, then add hip flexor stretch with right arm flexion over the head, then twist the core and extend the left arm to the ground, such that there is a straight line from the left hand, through the shoulders and to the right hand. Then, reset with hands on hips with a neutral spine and continue with a walking forward lunge to the left foot and repeat on the other side.
Hip abduction on side with leg on wall, internal rotation of bottom leg	Start with lying on the left side of the body with a neutral hip and spine. Raise the top leg without rotation in an extended position as high up on the wall as possible, and scoot the body as close to the wall as possible, bending the bottom leg, but keeping the foot on the wall inline with the spine. With internal rotation of the lower leg, pull the upper leg off the wall for a count of 4–6 seconds. The key is to not let the top leg externally rotate, or spine to flex forward.

Recovery

20–40 minute easy aerobic exercise (cycle, jog)

5 mobility exercises (2–3 × 6–8)

10 core endurance exercises (sit-ups, oblique crunches, back extensions, planks, etc)

*If there was no strength training in the last 3 days add 2 lower-body, 2 upper-body strength exercises and 3 auxiliary strength exercise (2 × 10)