



## Base training and injury prevention for Skiing

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### INTRODUCTION

Physical fitness is the foundation of elite skiing performance. Fitness allows elite skiers to perform skills under extreme conditions for sustained periods of time. Fatigue plays a major role in not only performance, but in causing injury. Achieving higher levels of fitness, therefore, is an obvious way to enhance your skiing performance. This article explains some essential concepts that you should use to build your summer training program and how to prevent injuries this season.

### WHAT TYPE OF TRAINING SHOULD THE SUMMER TRAINING PERIOD INVOLVE?

Base training and injury prevention are complementary and can be done in combination to prepare for skiing. Preparing for the physical demands of skiing should involve both high and low intensity training. Base



training predominately consists of aerobic training. This is essential in allowing your body to recover in between runs and to improve the quality of your training during the latter stages of your on-snow sessions. General guidelines include up to 5 sessions per week of at least 45 minutes, depending on your level. Ski racing, however, involves considerable anaerobic (high intensity) effort due to the duration, intensity and type of muscle contractions involved. So high intensity training should also be performed, particularly towards the end of your 'preparatory' phase of training over the summer. The more advanced your skiing, the more anaerobic training you should do, this will prepare you for the high intensity nature of racing or skiing difficult terrain.

#### WHAT CAUSES INJURIES AND HOW DO YOU PREVENT THEM?

Fatigue is one of the biggest factors in injury. It is not uncommon for skiers to get injured late in a training session when, muscle fatigue is setting in, concentration is starting to fade and the ability to read the snow conditions is reduced. US Ski Team members concentrate on building a huge aerobic and anaerobic base. Our philosophy is to train our athletes to compete and train. For example, a typical moguls run lasts approximately 25 seconds, however, a typical training session will involve 6-10 runs, a series of jumps, and skiing moguls only over a 4 hour period. Training for a 25 second event versus a 4 hour training session is very different. So this philosophy of also 'preparing to train' has resulted in significant improvements in the quality of training and improved overall performance and a reduced injury rate of US Ski Team members. USSA Sport Science advises at this time of the year, it is time to do your base training to get you ready for to complete the on-snow training session with high quality, to reduce the chance of injury and to improve the quality of your ski training.

#### PLANNING YOUR BASE TRAINING AND INJURY PREVENTION PROGRAM

Here are some important tips when planning your base training and preventive rehab training prior to and during the summer months:

- Cross Training is an excellent form of base aerobic training. Typical sessions last at least 45 minutes of low intensity work below your anaerobic threshold (the point where you get out of breath). Choose a cross training method that uses predominately the lower body to maximize the benefits and transfer of training to skiing. US Ski Team members prefer mountain biking, road riding, jogging. Swimming is also excellent cross training because it involves muscles from both the upper and lower body and works your cardiovascular system.
- Interval training is a great way to improve both stamina, strength and speed. US Ski team members prefer bike sessions/spinning for their interval training work. Consider the intensity, duration and



recovery time. For example, if training for moguls, you might have higher intensity, shorter duration exercise bouts with long rests to keep the intensity of the session high. Interval training for alpine skiing, however, would involve longer less intense exercise bouts to simulate the longer duration of ski runs. This form of training is essential for improving the body's ability to recover in between runs. Active recovery, walking, during sets also helps to improve the recovery process between exercise bouts.

- Strength training should occur all year round, but is also a focus in the summer months. This is an essential component in preventing injury and should involve predominately eccentric, concentric and Plyometric exercises. The muscles of the thigh should be targeted, particularly the quadriceps (front thigh). Eccentric or squatting/lowering/stepping/lunging exercises are excellent. While US Ski Team members perform considerable Plyometric exercises during their preparation period in the summer, this type of activity should be done with caution, particularly if you are a junior skier and have had injuries.
- Core stability and postural control is essential during skiing and is an important component of the preparation period. USSA Sport Science and Education have produced a comprehensive core training DVD called competitive core training if you need a core training program or exercise ideas.
- Static and ballistic stretches are important to keep good range of motion, important for getting into various tight positions as you make a turn. Stretching the muscles of the lower body is important, particularly the quadriceps, hamstrings, calves, adductors, gluteal and hip flexor muscles. Calf and ankle flexibility is especially important because of the position of the ankle in ski boots.
- Progressive overload during the summer training sessions is an important consideration. Don't go out for a 3 hours endurance session on day 1. Make sure that the training volumes start off at an achievable level and gradually progress each week. Try not to increase the training volume by more than 10% in a single week to avoid over training and to reduce the chance of overuse injury.
- Recovery sessions are super important to optimize the adaptation of your body and to get maximum benefits out of your training. See the sport science section of the USSA website for articles on recovery sessions and methods commonly used by US Ski Team members.
- Summer training sessions, particularly base sessions, can often last more than an hour and keeping fluids up is important to maintain session quality. Try to aim for 700ml per hour during the session and replace what you have lost in body weight with water or sports drink following the session.



#### WHERE DO I GET EXERCISES AND PROGRAMS FROM?

The sport science section of the USSA website (in the members section) has a number of dry land training programs for you to complete as well as articles on the muscles used during skiing and great exercises to work each one. Visit [www.ussa.org](http://www.ussa.org)

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