Enhancing recovery from Training and Racing

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A year round training and competition schedule can be very physically demanding on a World Cup skier. As a result, ski racers are now using recovery strategies to help them return to their normal physical and mental state as rapidly as possible after races.

Recovery strategies are mainly used to minimize the muscle soreness and fatigue experienced after heavy training and racing. These methods ensure that skiers have consistent and high quality training sessions and are fresh and rested for every race. There is now increasing scientific evidence supporting the benefits of recovery strategies to enhance performance, which is why US Ski team members now regularly incorporate recovery training into their preparation.

There are a number of new recovery techniques that have recently become popular with skiers. These include getting plenty of rest and sleep, doing active recovery sessions, incorporating good nutrition and rehydration practices, wearing compression garments after training, doing pool recovery sessions and ice baths, getting a massage and practicing sport psychology-based relaxation techniques.

Rest and Sleep
Many of the body's regenerative processes occur during sleep. The extent of an athlete's recovery from heavy training has been shown in recent studies to be effected by the hours and quality of sleep. For example, growth hormone, responsible for many of the natural rebuilding processes in the muscles following exercise, is produced by the body in the first 10 minutes of sleep. Studies have also shown that more sleep is not necessarily better and that athletes should go to sleep and rise at the same time each day in order to keep biorhythms constant. At least 8-9 hours of regular sleep each day is recommended for elite skiers.

Active recovery
US ski team members now use active recovery immediately after and between ski runs to improve the removal of waste products and to prevent the daily build up of fatigue. The most common form of active recovery is cycling or spinning on a stationary bicycle. Spinning has been shown by USSA sport scientists to be the most effective mode of active recovery after skiing. Typical protocols include 20-30 minutes of low intensity spinning interspersed with short high intensity bursts to promote the removal of lactic acid from deep muscle tissues.

Nutrition and rehydration
Eating foods rich in carbohydrate and drinking plenty of fluid is very important for replacing essential body fuels, particularly muscle glycogen stores. Studies have shown that skiers, particularly those that are training more than once per day, should eat and drink immediately after training (within 10 minutes of completion). Skiers should aim to replace 150-200% of the fluid deficit lost during training or racing. In addition, skiers should also make use of sodium rich food and fluids in recovery, have a moderate intake of caffeine-containing fluids (as they promote urine production and thus reduce overall fluid retention) and avoid alcohol consumption and practices that further promote sweat production e.g. hot spas, saunas or sustained sun exposure.

Compression garments
Compression garments or sports tights are often worn by skiers after training sessions. They are said to improve recovery processes and reduce muscle soreness. In fact, a recent study published in the Journal of Science and Medicine in Sport showed wearing compression garments after eccentric exercise (such as skiing) accelerated the repair processes inside of the muscle. Skiers often wear compression tights immediately after training sessions for up to 3 hours. They are also regularly worn on long flights to reduce fluid retention and prevent deep vein thrombosis (DVT).

Pool recovery
Hydrotherapy has become probably the most commonly used recovery protocol in recent years, particularly by elite skiers. Pool recovery sessions, which includes gentle exercise and stretching in the near weightless aquatic environment promotes the removal of waste products, improves range of motion and reduces inflammatory responses after the eccentric muscle contractions of skiing. Skiers commonly complete a pool session lasting 20-30 minutes as soon as possible after heavy training sessions or races.

Ice baths
Although they don't seem enticing, ice bath therapy (or cold water immersion therapy) is also a favorite and proven technique used by skiers after heavy training sessions and between race days. Ice bath therapy has been shown to reduce the inflammation and muscle damage and is claimed by athletes to reduce neural fatigue. The most common ice bath technique is to immerse the lower body into a 54 degrees F ice bath for up to one minute. Skiers repeat this process between 3-5 times.

Massage
Massage has also been used by skiers immediately after races to reduce fatigue, promote venous return and to reduce muscle tension and soreness. Light, fast, flushing-style massage has been shown to be the most beneficial method for optimal recovery after ski racing.

Sport psychology methods
Recovery is not just physical, it is also mental. Psychological techniques such as meditation and relaxation techniques are often used by elite skiers to restore their mental state after heavy training sessions or extended periods of international competition and travel. US ski team members work closely with sport psychologists to find the best techniques that work best for them to achieve optimal mental recovery.

For more information on recovery and optimizing skiing performance, visit the sport science section on the USSA website at www.ussa.org.