Q & A July 2004: XC Ski Training - Following the Norwegian Yo-yo

by Lee Borowski

Question: Check out the articles by John Aalberg on the new Norwegian training method at http://www.fasterskier.com/index.php and let me know what you think. Pete Vordenberg, US Ski Team Coach.

(Note: While Pete's e-mail was the inspiration for this month's topic, the following has been tailored for the Silent Sport reader, who probably has not read the article on the "new" Norwegian method, and in fact may not be familiar with the "old" Norwegian method.)

Note to reader: You can find this series of articles, starting in the News Archives of the fasterskier website, beginning with "Training: All of them have trained wrong," Sun Oct 19, 2003.

First some background on the "old" vs. "new" Norwegian spring through summer ski training methods: The "old" method consisted of easy distance training, with hard interval sessions once in a while.

It is this general training method that researcher Ulrik Wisløff now calls worthless, saying "What use do you have from distance training other than recovery? Probably nothing… It may be a nice thing to do if you have time and enjoy being outside, but it gives minimal or no training effect."

Instead, Wisløff suggests a "new" method that has at least three interval sessions during a normal training week. He states that one factor is more important than any other, namely Max VO2, and claims that "research has shown that the best skiers have a higher max VO2, and interval and only interval training can improve this." Note: Max VO2 is a measurement of how many milliliters of oxygen per kilogram of body weight per minute a person "burns" while exercising at the highest intensity - well above the pure aerobic zone.

But he gets even more specific, claiming these productive workouts "must be 4 x 4 minutes interval sessions (at intensity of 90 – 95% of maximum heart rate)." Why 4 minutes (exactly)? "Intervals shorter than this won't get enough time in the desired heart rate zone. Any longer, and it is too

difficult to keep up a high enough intensity."

Wisløff does recommend some longer sessions, but those should be done at race pace. All easy workouts are for recovery only.

Now to my answer: Any of you who have read my book, Optimal Ski Training, know I don't think very much of long slow training as a way of becoming a fast skier. And if that is all Jack does, Jack will be a very dull and slow boy. So I completely agree with the "new" Norwegian method that slow workouts are for recovery and improvements come from the more intense sessions.

To ski fast, two things are more important than anything else. First and foremost is speed at the Lactate Threshold (LT). [Note: This is arbitrarily chosen for training purposes as the average pulse in a well run hour race or time trial.] Second is the ability to tolerate and then recover from temporary high blood lactates - a must since XC ski racing usually takes place in very hilly terrain.

In fact, even some of Norway's past legends trained using this philosophy. For example, Norway's greatest skier ever (Bjorn Daehlie) credits his success to training at and above the LT on a year round basis. He said that was how each year he was able to leapfrog over skiers who had been faster the winter before, until he ultimately leapfrogged enough to become many-time World and Olympic Champion.

Now let's look specifically at the "new" Norwegian Method. It is just as extreme as the "old" way, but in the other direction. It relies only on short 4 minute intervals and is very adamant about the duration. First, in the real world of infinite variables with people of all different genetics and environmental backgrounds, it is impossible to prove that this is "the one best way."

Second, the intensity for these intervals is in the zone just above the LT. Without a doubt, training in that zone has been shown to be the most efficient way to raise the Max VO2. My reservations on the whole concept of the "new" Norwegian method is that they relate everything to Max V02. The research I've seen has shown that Max V02 is most quickly improved by hard intervals, but then the law of diminishing returns sets in and it plateaus - yet skiers are still able to continue to ski faster by

improving their speed at the LT.

But even then, Max VO2 isn't the whole story. If it was, Frank Shorter and Bill Koch both would have been told to quit and take up another sport. Why? Both had Max VO2s of around 65, which are a lot less than the 90s that some athletes have recorded. The moral? Max VO2 isn't the whole story. Some athletes are just more efficient in their use of oxygen. One great example of LT zone training is Lance Armstrong. Lance's coach, Chris Carmichael, claims one main reason for Lance's great improvement is his "safe" training - just under the LT, gradually pushing up his aerobic speed and power. It should be noted that the LT for long distances is lower than the LT for an hour. Therefore, Lance's hill repeats were at a pulse much lower than that suggested by the "new" Norwegian 4X4 minute repeats.

So the main conclusion I'd like to make is that it is foolish to put all of your eggs in one basket and go completely to either the "old" or the "new" Norwegian method of training.

So how do we cover all the bases? Develop our own Max VO2 to it's ultimate? Have the ability to recover from lactic acid bursts and keep going? Become as fast as we are capable at race pace? To me the answer is simple. Structure your workouts so that all elements are covered.

When Luke Bodensteiner (many times past National champion, Olympian, and now director of the US Cross Country Ski Team) was in town last Christmas, he made a statement that summarizes this nicely. Luke said "The best off season workouts I've ever had were those done on roller skis on the hilly roads of Wisconsin - where I used those hills to naturally bring me to race pace." Note: When Luke trained "back home," he consistently improved every year from age 13 through 19 and was the perennial age group, and finally, senior US champion.

So let's try to summarize this training method in a short paragraph. The heart of this program is the LT workout (We called this Medium Plus in the old days). The objective is to let the hills create the intensity to accumulate time in the 10 beat zone just below the LT. In fact, the intensity should be high enough to bring the skier

above the LT at the tops of hills. The goal (by autumn) is one hour in the sub-LT 10 beat zone and 5-20 minutes above. These workouts can vary in length from 1.5 to three hours, depending on the the skier and the terrain. These numbers are only approximations and certainly not cast in concrete.

I've found that, while some athletes can tolerate two or three of these workouts a week, one is all that is needed to SAFELY reach individual potential. Luke did one of these a week and it was plenty. This program also includes two LT minus workouts a week all summer, short speed pickups, as well as time trials (and maybe formal intervals) in the fall. Note: For more details see my book Optimal Ski Training.

So why is this workout so effective? First it develops speed and power in the "racing zone" at and just below the LT. The faster you can go aerobically, the faster you'll race. Second, it has plenty of time in the zone just above the LT, which is the most productive in developing the Max VO2. Third, the ability to tolerate short bursts of lactic acid is developed at the tops of hills. Fourth, the most important zone for technique improvement is at race intensity. Fifth, the natural interval structure allows plenty of recovery between hills. Sixth, these workouts are long enough to develop the full benefits of distance training.

But finally, and maybe most important, this workout is fun. This is the training that most citizen racers enjoy as it is a lot like "just skiing." You get to feel speed and some exhaustion on the hills, yet this isn't excessive and you've recovered by the time the next hill rolls around.

A couple of suggestions. If you have less time, you just have to train faster to get the desired time in the LT zones. If you have no hills, you must get creative.

But what if you wanted to incorporate the two Norwegian styles, both "old" and "new?" I suppose you could do that. You could devote some sessions each week to the following: 1. The zone at and just under the LT. 2. The 4X4 minute interval sessions. 3. Long slow distance. The mix is up to you.

After all, there are many ways to train in the desired zones. Take your pick. But only LSD or only 4 minute intervals (with very little distance) are not, in my opinion, smart ways to train.