



HANDBOOK 2

Training for the ski racer

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Technical Tips 1:

Five Basic Technical Elements of Skiing and Racing

I thought that you might be interested in the following brief description of the current coaching focus on technical (technique) matters in Canada as outlined at the most recent seminar I attended in Banff. The C.S.C.F. has identified **5 basic technical elements** that we feel need to be present in a skier in order to achieve full potential.

- 1) Use of the pole (e.g. timing from a pole plant)
- 2) Upper and lower body separation (e.g. the aspect of counter rotation or resistance in the core to effect acceleration from the skis)
- 3) Carving on the outside ski (e.g. the use of momentum, angulation, inclination and effectively timed pressure to effect change of direction and decrease, maintain or increase speed)
- 4) Natural balance (rather than saying "centred" as effective balance is a product of the morphology and biomechanics of the skier and the capabilities and design of the equipment and is not static but needs to be adaptive)
- 5) Use of all joints

The sport of skiing is a complex one performed in an open (constantly changing) environment. The goal of the coach as a result needs to be to help the skier focus on what really matters to effect change while introducing the skier to as many experiences as possible so that they can learn to let the body self organise. Skills are part of the picture for sure. At the same time coaches and instructors in the past have been very guilty of being too centred on immediate feedback (a traditional behavioural approach) in their coaching style on the hill. We are now trying to encourage what is termed a decision training approach in more situations. The reason for this is that in skiing every turn is slightly different and the most fluid, fast or effective technique is the one that adapts to the circumstances of the moment and achieves the desired outcomes. Sometimes repetitive training results in achieving results but more often than not it limits the ability of the skier to react and adapt to the changes.

Train in 3D

The performance spectrum is:

- Technical
- Tactical
- Physical
- Mental/affective

Along a continuum from Initiation to Composing

Be sensitive to the windows of trainability in young kids. They need to be competent in all the technical elements by age 12.

Practical decisions in racing:

- controlling speed
- maintaining speed
- generating speed
- calculated risks on the line

The Coach Athlete Goal

- 1) As fast as possible
 - 2) Without falling down
 - 3) And without supervision
- OR
- 1) only the clock matters (there are no judges)
 - 2) use the max. potential of our skills without DNF or DSQ
 - 3) develop a personal strategy in course inspection

Speed

Controlling Speed:

- Increasing friction by using a wedge or turning the skis sideways or braking with pivoting
- Absorbing or no pressure
- Through aerodynamics (throwing out the parachute)
- Rounding out the turn

Maintaining Speed:

- Clean skiing or railing
- Absorbing pressure (e.g. retraction)
- No muscular contraction to add energy to ski
- Ski a conservative line

Generating Speed:

- adding impulse/pressure in the right direction (vertical/lateral balance)
- by resisting force in the ski
- by shortening the turn (j turn)
- by allowing the centre of mass to free fall
- tucking, reducing friction

Outcomes

- skiing with more than one way to ski
- skiers with cognitive skills
- making tactical/technical decisions faster
- skiers with intuitive skills
- reflexes, huge inventory of motor skills
- skiers where form follows function
- great competitive skills

Technical Tips 2:

The Relationship of line, in slalom/gs, to clearing gates

As we prepare for the remainder of the season at Masters its often a good idea to recognise what all great skiing has in common rather than what separates the disciplines (Slalom and GS) or what the obvious physical differences are between individuals. In an earlier article I mentioned what the CSCF has identified as the cornerstone of strong technique. In the two pictures below I want to draw your attention to the resistance to forces that is obvious in the outside (lower leg) of Anya Paerson in slalom and Benjamin Raich in GS.



Both are using the principle of separation (counter rotation) of upper and lower body in order to apply resistance against an edged and arcing ski. The way to tell is to look at the hip joint and not the upper body. Don't be fooled by where it appears the body is headed. This is a result of line.

The next point to observe is what the arms are doing. In slalom the underside of the basket on the hand opposite the pole in the snow (which is preparing to plant the skier's pole after the slalom pole) cross blocks the pole as a result of the skier's line through the course and to that gate. If the gate is not in the way then a block is unnecessary (you only clear when you have to and in preparation for a well timed pole plant). In GS the faster technique is to allow the pole to slip across the racer's shoulder and over the back rather than interrupting momentum and risking greater possibility of injury by contacting the hand or the elbow. At these higher speeds the athletes are usually wearing armour inside their suits on their backs as well as on their arms.



Opposite is a sequence of Anya again in a course. You can see the frames between where she has made a strong pole plant and the direction she was moving towards when she did it by the frame in which the pole shaft has suddenly moved backwards (what you won't see is the 1st gate). To make this easier to see and understand save this picture into My Pictures and then use the magnify function to expand the image. Look at how far across the slalom pole her upper body is in the second gate (last frame) as a result of the path her skis are taking her.

The point here is that you only need to clear (move it out of your way) a pole when its in your way. Hitting it because you want to rather than because you have to is a sure way to slow yourself down in the course.

(pics1,2: CBC; 3:Ron leMasters,)

Training Tip - "Hard First" Principle

by Pierre Ruel, CSCF Technical Director

Your first on snow camp is coming soon and you may be starting to plan it. Here is a different approach to consider. As you know the race season will be full of surprises; changing snow conditions, a variety of sets and hill configurations that will not be the perfect "boulevard" with a nice corridor. In other words, the on-hill reality presents difficult situations for young athletes to solve.

Rather than sequencing from simple to complex situations for your first days or camp on snow, try something different this season. Challenge your athletes to solve very complex, safe situations first; stretching technical, tactical, physical and mental abilities right from the start. Present complex information or situations early in the season rather than later. In addition to listening to the coach, athletes will watch each other in order to help them learn performance requirements. This helps the athlete learn how to analyse skiing skills and strategies on their own.

For example, for the first set of the season, set a long course, non rhythmical with hard combinations and with a lot of technical, agility and co-ordination demands. This way you will note their skill level quickly. You will also know the complexity of and where you should focus your next training block (technical, tactical, physical and/or mental). Most importantly, you will not set the skill acquisition limits of your athletes (levelling from the bottom).

This approach leaves room for talented athletes to be challenged, solve problems and improve skills by pushing their limits.

To learn more on the "hard first" principle, attend one of the CSCF seminars or courses this winter. CSCF facilitators have been trained to help you understand and more confidently use this approach.

GS TECHNIQUE

GS racers used to ski a rounded line around the gates — a tactic considered faster even if the overall distance travelled was longer. But the sidecut in current GS skis has enabled racers to ski straighter from gate to gate, making sharp, hooking turns right at the gate rather than long, rounded ones.

"I'm working at taking a more direct line," Mancuso says. "Sometimes it doesn't look as pretty. But it's fast." It's also risky. Miller, for example, skis a straighter line than almost anyone does. He also skis off-



course more than anyone. Julia Mancuso led both giant slalom runs Friday and won the gold medal in the final women's alpine event of the '06 Olympics.

In measuring ski-racing talent, giant slalom is the gold standard. Downhill skiers can make up for technical deficiencies with a gritty defiance of fear. Many top slalom skiers are specialists — quick-footed dancers who don't even bother skiing other events. But to win in GS, you've got to be a great, intuitive, well-rounded athlete — someone like Austrian Benjamin Raich or American Bode Miller, the top two skiers in last year's overall World Cup standings who were also the top two GS skiers. The correlation between GS excellence and overall excellence is no coincidence.

Coaching Tip - Random and Variable Training

by Michel Paquette - Head Coach Sport Étude Mont Ste Anne - Performance Level CSCF Course Conductor

It is well known that when it comes to coaching, the physical and technical sides play an important role. There is also a psychological side to how an athlete is trained. More recently, studies have shown that involving the cognitive aspect during practice sessions significantly improved performance. J. N. Vickers of the University of Calgary worked in this area and called it *decision training*. Several coaching tools are suggested in order to solicit decision-making. I propose that you explore two of those tools: *variable practice* and *random practice*.

In ***variable practice***, it's all about coaching a skill by requiring a variety in executing it. The activity, according to recent studies, must be as close to a competitive context as possible. Among other things, it must involve decision-making of a tactical nature. For example, let's say that you want to coach the line on a GS course. The coach designs a relatively inconsistent course (realistic variation, called *intelligent variation*) that you could come across on a race day. This will force the racer to analyse each turn in order to take the best line each time. For each run, the coach may change a few gates in order to force the racer to analyse the situation each time. Even if the racer inspects the course before going down, an analysis and a decision will have to be made several times for each run. The traditional training sequence for line involves repeating the same type of line from top to bottom and, during a subsequent training session, the coach chooses to have another type of line executed. According to Vickers' studies, the athlete learns during the first few turns and then becomes less active on the cognitive level because the tactic is identical from one gate to the next. However, constant variation of the line creates a continuous analytical and cognitive effort for the athlete. This is beneficial in the long term.

Random practice involves combining several skills while practising. The combinations must be smart ones, meaning that they have to be realistic by being close to the competitive context. The goal is to coach the athlete to combine different skills in optimal fashion, which has to involve his/her cognitive level.

Let's say that you want to coach the skill of skiing down over moguls by planting the pole. The traditional method would require that you coach planting the pole during the first training sequence and then coach going down over moguls once the pole plant has been mastered. According to Vickers, the coach can combine both skills during the session in order to obtain better long-term results. So right from the start, the coach uses the mogul run by requiring the pole to be planted.

J.N. Vickers makes no mention of the skill level that athletes must possess during *decision training* sessions. However, the examples of her study clearly show that the initiation and acquisition steps are acquired, meaning that the athlete knows the skills involved and is able to reproduce them. It's important to note that traditional, sequential methods provide better short-term results. But decision training is the better choice because performance results are more permanent. You have to know that coaching using *decision training* may require up to 12 sessions to develop one skill. That is the equivalent of at least 6 weekends for a club. The lack of short-term results doesn't mean that the method doesn't work. Just the opposite, if the coach perseveres a little longer, he/she will enable the athlete to better retain what has been learned. Furthermore, because the sessions are closer to a competitive context, there is less of a chance of the athlete having a poor performance during races. Several professional coaches will say that this method is far from new. They're right. What's new is that first of all, data has been gathered and secondly, the analysis of that data shows that this method improves athlete performance.

References:

Dr J.N. Vickers (2000), *Decision Training: A New Approach to Coaching*.