

Carving Modern Slalom Turns

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Carving in the fall line, or as early in the turn as possible, is high on every slalom skier's list of tactical goals these days. Modern skis make this possible in more and more turns, provided the athlete has the technical chops to match.

Making skis carve early is relatively easy on moderate terrain and grippy snow, but when the hill tilts up and the snow gets really hard, exemplary technique is needed to make those arcs. The first pitch of the slalom hill at Alta Badia, where the pictures in this article were taken in December, fits that description well. Where most of the non-competitors were happy to make well-controlled linked side slips, the best racers in the field carved precise arcs with relative ease. Jean-Baptiste Grange won both runs, leading at every interval, showing everyone, as he has all season, how the best slalom skier in world does it. Markus Larsson had the 3rd fastest split time in this section of the course and is, I think, one of the cleanest skiers in the top slalom ranks. Matt, perhaps the first World Cup skier to really put modern slalom skis to good use and the current World Champion in the discipline, is currently 2nd in the World Cup slalom rankings.

The accompanying images can give us insight into the keys to early carving in such challenging conditions. The skier must get pressure on the ski early in the turn, and that pressure must be predominantly on the forebody of the outside ski. Also, the ski must be up on edge and the skier inclined into the turn as much as possible without putting undue weight on the inside ski. If this sounds like something from *How the Racers Ski*, Warren Witherell's landmark book from the 1970s, don't be surprised. Neither the laws of physics nor the biomechanics of the human body have changed since then. The biggest change has been the skis, which thing enable you to carve earlier and tighter arcs on hard snow. But most of the basic principles of carving have remained the same.



Figure 1. Jean-Baptiste Grange gets early edge and early pressure on the ski's tip, and just the right amount of inclination to get the outside ski carving.



Figure 2. In the same gates as Grange, Carlo Janka lets his hips drop and his torso come back in the transition. He consequently is back too far going into the turn, can't get good pressure on the ski's forebody when he needs it.

Getting early pressure in the tightly linked turns usually requires the skier to absorb the force at the end of the previous turn by flexing at the knees and hips, while subtly sliding the feet forward underneath the body. Then as the skier enters the new turn, he must extend to force the ski against the snow. Note that this is different from pushing the skis out to the side. Throughout, the athlete must keep forward from the waist and his hips from dropping too low, as we see Markus Larsson do. Otherwise he will have a trouble getting forward entering the next turn, as Mitja Dragic and Carlo Janka do in the accompanying images. A good rule of thumb here is to keep the shoulders ahead of the hips.

Getting pressure on the forebody of the outside ski in these turn requires the skier to move his body forward as it goes across his feet in the transition between turns. This is done by keeping the torso flexed forward from the waist while flexing the ankles, which moves the feet back relative to the body. This forward shift of balance through the transition must be made with precision if the skier hopes to arc the ski early in the turn.



Figure 3. Mario Matt keeps his shoulders ahead of his hips all the way through this sequence, as he gets his right ski up on edge early through a combination of inclination and knee angulation.



Figure 4. Mitja Dragic lets his torso come back from the waist in the third frame, putting him farther back on his skis in the fourth frame than Matt, and requiring him to pivot them farther across his direction of travel, thereby slowing him slightly.

Precision and fine judgment are also needed to establish just the right degree of inclination early in the new turn. That inclination is controlled by a combination of the athlete's fore-aft balance in that part of the turn and how steeply his upper body travels across his feet in the transition. The steeper that angle, the more forward he must be.

Finally, getting the ski on edge early in the turn is achieved through a combination of the skier's inclination and angulation, primarily at the knee. The sequences of Grange and Matt are good examples.

All these elements are clearly visible in the photomontages of Grange, Markus Larsson and Mario Matt. Larsson had the 3rd fastest split time in this section of the course and is one of the cleanest skiers in the top slalom ranks. Matt, perhaps the first World Cup skier to really put modern slalom skis to good use and the current World Champion in the discipline, is currently 2nd in the World Cup slalom rankings.



Figure 5. Markus Larsson keeps his upper body going forward as he slides his feet ahead between the third and fourth frames. The movement of the feet helps release him from the turn, while maintaining a forward posture from the waist enables him to control his fore-aft balance precisely as he enters the next turn.



Figure 6. Unlike Larsson, Dragsic's hips drop as his torso comes back, making it impossible for him to control his balance fore and aft and causing him to lose contact with the snow.

