



## V2 Alternate

V2 Alternate is the third gear in the skating transmission. It is used in gradual terrain where V1 and V2 would over rev the engine. All skate techniques have small variations that make them more versatile over different terrain. This is especially true for V2 and V2 alternate. The V2 alternate and a V2 alternate / V1 hybrid is being used on steeper and steeper uphill terrain.

### Introduction

There are several important factors that play a key role in properly executing the V2 Alternate (V2 alt) technique. To make the discussion easier they have been broken down into body position, timing and power. Each of these components plays an integral part in executing the technique successfully. It is important that the athlete perfect each component to be successful.

### Body Position

Body position in all sport is important for enabling the athlete to apply power to each motion effectively and efficiently. For this reason body position in V2 alt is similar to other ski techniques as well as other sports.

**Feet:** Center the weight across the whole foot, with a bit more over the ball of the foot. If the weight is too far forward onto the toes it will dig the front of the ski into the snow and plow. If it is too far back it will force the hips back and make the skier carry a lot of weight on the quadriceps. The skier's weight will shift toward the forefoot as the ski is set down and will quickly shift back across the whole foot for the majority of the push phase of the skate. At the end of the push the weight will again tend toward the front of the foot but most of the power comes from skating off the whole foot.

**Ankles:** The bend in the ankles is vital to positioning the skier in a powerful pushing position and into a position that prevents the ski from stalling out as it moves across the snow. The degree of bend at the ankle is dependent primarily on terrain - the steeper the terrain the more acute the angle at the ankle. Also the more force the skier is attempting to deliver the deeper the angle will be.

**Knees:** The angle at the ankle must be closely mimicked by the angle at the knee in order to keep the skier's weight positioned over the feet where the force can be directed through the ski to the snow. Generally skiers struggle to get the proper angle at the ankle rather than at the knee. What results is a knee angle smaller than the ankle angle, which places the skier's weight behind the feet. This loads a great deal of weight on the quadriceps and diminishes the amount of force applied to the push. The skier can think of driving the knee forward or pressing with the knee to accomplish this position.



Here is a quick contrast of the three techniques: In the V1 technique the skier maintains a lower position throughout the skating cycle. In, V2 the skier will use a higher position in general and, especially when moving fast, rise up on a straighter/straight leg prior to the skating push. In the V2 alt technique a combination of V1 and V2 leg positions are used. (see timing).

**Hips:** The hips must be over the feet. When it comes to body position this is accomplished with knee drive, maintaining the proper ankle and knee angle, and keeping the upper body in a "C" position.

**Core/Back:** The upper-body, from tailbone to head, should form a soft "C" shape. Think Neanderthal man, big foot, gunslinger. Do not think of the Queen of England or of the postural advice of your parents. This "C" position will help keep the hips over the feet, relax the lower back as well as position the muscles of the core to apply force to the poles. This "C" can be very shallow leaving the skier quite upright or rather pronounced, thereby putting the skier in an aggressive forward position. The depth of the "C" is also dependent upon terrain with most skiers adapting a more up-right shallow "C" position as the terrain becomes steeper. In V2 alternate this "C" shape tends to be less extreme than in V1.

Folding at the waist into an "r" position is the most common error skiers tend to make. This forces the hips back and generally increases the angle at the ankle.

**Shoulders:** Shoulders should be rounded leaving the arms hanging free and loose in front of the body. Even skiers who ski in a very shallow, upright "C" position should have a forward attitude at the shoulder. This position allows for a smooth pendulum swing of the arms as well as a good position from which to apply both body weight and force to the poles.

**Arms:** In the neutral or starting position the arms should hang loose from the shoulders. The angle of the arms at pole plant should enable the skier to apply maximal force with the core and back, and the weight of the upper body to the poles. This means that the arm will be close to and generally less than 90 degrees. At pole release the hands should be low. The follow through of the arms is dependent upon speed (and terrain). The faster the skier is moving the longer the follow through can be – but doesn't necessarily need to be. Keep the follow through short enough to help keep the hips high and to return to the poling position again as quickly as the terrain dictates (see timing). The V2 alt technique uses a poling position and motion very similar to the classical kick double pole. This is true with the return of the arms as well. In V2 alt the return of the arms is timed with the skate from the non-poling side just as it is timed with the kick in kick double pole.

## Timing

In all techniques the whole body works together to transfer the weight from ski to ski and down the track. In V2 alternate, the method of propulsion on the poling-side is exactly the same as it is in V2. The upper-body and lower body compress together to transfer weight to the gliding ski. However, in



V2 alternate the skier does not return to a high position on the gliding ski but stays in a relatively low position. The return to the poling-side is accomplished from this lower position with a skating push aided by the momentum of the arms swinging up, forward and back over to the poling-side ski. The synchronization of this forward arm swing and skate push is integral to the effectiveness of this technique.

V2 alternate and V1 are similar in that there is a poling side and a non-poling side. That is why it is called V2 alternate. Skiers use the V2 on the poling side but the advantage of this technique occurs on the non-poling side. While the skier is gliding on the non-poling side ski the arms are behind them. The skier rides that ski in a relatively low position. From this position the arms swing dynamically forward in synchrony with a powerful skate push back onto the poling side ski. The synchrony of the dynamic arm swing and skate push is what makes this technique so fast. On the poling side the whole body returns to the high position to initiate the double pole and skate-push that will take the skier back to the non-poling side. While the V2 alternate utilizes the double pole on only one side it is symmetrical in that the upper and lower body work together powerfully on both sides.

As in V2 the push from the upper-body must be dynamic and powerful and the depth of compression variable depending on terrain. The skate push with the legs must also be dynamic and from a high to low position. On the non-poling side the arm swing is always a dynamic and non-stop motion.

The biggest mistake in the V2 alternate technique is a matter of timing. On the poling side skiers will often attempt to pole down the skating leg (like a one-legged double pole), complete or nearly complete the poling motion and then begin the skating motion and weight shift to the other leg. To correct this the skier must remember that the whole body works together at all times to transfer weight from ski to ski and down the track. On the non-poling side skiers tend to make the same mistake they make in V1. They use the non-poling leg for a rest break. This not only kills momentum in the glide but also does not enable the arms or leg to work together in shifting weight back to the poling side. The arms will not swing dynamically from the follow-through position, and the skier will simply fall back over to the poling side rather than skate back over to the poling side. This "variation" of the V2 alternate is very common and steals all power and speed from the technique.

## **Power**

Power results from force applied quickly. Power relies on being in a position that allows both the application of a skier's strength and the application of that strength over a short period of time. The above description of body position aims to put the skier in that position. Timing allows power development while maintaining the forward momentum of the skier.

The effective, efficient and repetitive application of power to the skis and poles is the goal of learning proper technique – including body position and timing. Once the skier can grasp the idea of proper body position it must be ingrained through repetition. This repetition will also develop the strength it takes to maintain this position and develop power from it. The practice of proper timing will help develop the speed of force application.



## CROSS-COUNTRY TECHNIQUE FUNDAMENTALS

Power is developed on the poles through the application of body weight, as well as the dynamic use of core and back. To a lesser degree, the arms also add power themselves. A lot of power comes from the upper body in the V2 alternate technique. Some skiers rely more on the upper body than others. A common mistake is to let the use of the legs suffer by focusing too much on using the upper body. Ideally, as is the case with all techniques, the whole body works together where the contributions of the upper body complements and aids the work of the lower body, and vice versa.

In the V2 alt the upper body also contributes power to the technique in the arm swing. When the forward swing of the arms is timed with the skate push on the non-poling side and is dynamic and quick, the skate will be more dynamic, quick and powerful.

Power to the ski on the poling side is achieved through a drop of weight down on to the ski from a high position into a push position similar to that used by speed skaters. Whereas in the classical diagonal stride the ski must stop for the kick, in skating the skis must never stop. Therefore the skier will not spend time on a straight leg, but will glide with proper angles at the ankle and knee and then use the rise onto a straight leg as a quick countermovement to the skate push.

A large part of power development comes from weight transfer. This could easily be put in the "body position" section. Optimally the entirety of the skier's weight must be over the gliding / pushing ski for the skier to both glide with relaxed balance and apply maximal power to the skate. In skating weight transfer is achieved through the shifting of the hips from side to side. Many focus exclusively on shifting the weight with the upper body. This can result in a tipping or twisting of the upper body but no real weight transfer. The body's mass is best moved by shifting the hips from side to side.

In all skate techniques complete weight shift (where the skier is actually directly on top of the ski at the beginning of the push phase) can compete with the need to shift weight more quickly to avoid bogging down on steeper terrain. This can even be true in the V2 alt. While it is a technique where complete weight transfer is mandatory at high speed it is still used in uphill and even steep terrain by strong skiers. Just like in the V1 a good way to accomplish both good weight transfer and maintain momentum is to keep the feet in a wide position (never letting the feet come close together). When this is the case the skier's body will stay inside the feet and they will never be directly on top of the ski. Weight shift will still be effective however so long as the hips are shifting from side to side and pushing against one ski and then the other.

On faster terrain the skier should seek complete weight transfer. At the start position of the technique the skier will be completely over the poling side ski. While many skiers begin transferring their weight prior to initiating the skate/poling motion, the way to maximize power is to begin the initiation of the poling motion and skate with the weight directly over one ski. This will feel like the weight is dropping directly down on the ski and poles. This drop initiates the immediate transfer of weight to the other ski.

On the non-poling side the knee must continue to drive forward until the skier has completed the skating push. A variation on this technique allows a slight countermovement rise on the non-poling



## CROSS-COUNTRY TECHNIQUE FUNDAMENTALS

ski and then a quick drop down into the skate push position. This variation is used at cruising speeds and is very rhythmical and relaxing.

### **Training/Racing**

Technique is the tool you use to apply your fitness to the sport. Technique is the screwdriver, fitness is what you use to turn the screwdriver, ski racing is the job you are trying to accomplish. With technique training you are simply trying to develop a good tool to help you get the job done. But fitness comes first. If you are fit enough you can drive the screw into the board with no screwdriver at all. There are many examples of skiers with inefficient technique winning even World Cup ski races – in other words skiers who can drive the screw with no screwdriver (crude technique) – they do this with fitness. All technique work must be done in conjunction with and as an addition to preparation aimed at aerobic, anaerobic or strength oriented training. Do not mistake having a nice tool chest with being a good carpenter.

### **Drills**

- Speed Skater
- The Train

### **Conclusion**

Proper body position enables proper timing—both of which enable effective, efficient application of power.