V1

V1 is the first gear in the skating transmission. It is used when climbing steeper hills where V2 or V2 alternate will only bog the engine down. All skate techniques have small variations that make them more versatile over different terrain. Where this is especially true for V2 and V2 alternate, it is not as true for V1 which is an uphill technique. As skiers become stronger it is reserved for only very steep up hills.

Introduction

There are several important factors that play a key role in properly executing the V1 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 V1 is similar to other ski techniques as well as other sports.

Feet: Center the weight across the whole foot, with slightly more than half of the weight toward 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 angle 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 accompanied by an aggressive angle behind the knee in order to keep the skier's weight positioned over the feet where that 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.

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. High hips position the femur bone nearly vertical, thereby supporting body weight on bone structure instead of on the musculature.

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 either very shallow leaving the skier upright, or rather pronounced putting the skier in an aggressive forward position. The depth of the "C" is dependent upon terrain. Most skiers will adapt a more up-right, shallow "C" position as the terrain becomes steeper.

Folding at the waist into an "r" position is the most common error skiers 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 as well as the weight of the upper body to the poles. This means that the hang arm will be no greater than 90 degrees at pole plant. The push arm should be slightly lower and more forward, placed in a similar position to diagonal stride. The angle is much bigger. 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. Because V1 is used in steep terrain it is most likely that follow through will be short and hand return immediate.

Remember that the V1 technique uses an offset position of the hands. The high hand belongs to what's called the hang arm. The hang arm delivers most the poling power. The hand should be close to the head at the initiation of the poling motion. The other hand is planted lower. Be watchful that this hand does not creep too far across the skier's body.

Timing

In all techniques the whole body works together to transfer the skier's weight from ski to ski and down the track. The V1 technique is described in terms of the hang arm. If it is the skier's left hand that is placed high and next to the head at the start of the poling motion, the hang side (also called poling side) is the left side.

On the poling-side the entire upper body and poling-side leg push simultaneously down and over to transfer weight to the non-poling side. There is little to no time spent inactively gliding in the V1 technique. As soon as the skier's weight is shifted onto the non-poling side the arms begin to swing back up and forward as the skier begins the push-skate back onto the poling side. When the skier transfers weight back to the poling side the poles and poling-side ski meet the snow simultaneously. While for some skiers the poles plant a little earlier than the ski, and for others the opposite is true, for most it is simultaneous. In all cases the push from each leg is as equal, smooth and powerful as possible and the use of the upper-body is dynamic through a relatively shallow compression and short follow-through.

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.

Power is developed on the poles through the application of body weight to the poles. This happens through the dynamic use of core, back and to a lesser degree the arms themselves. A lot of power comes from the upper body in the V1 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 not only works together, but the work of one complements and aids the work of the other.

Power to the skis is achieved through 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. The biggest error in V1 power application is a weak-side – strong-side approach. This means relying on the poling side to build momentum or power and using the non-poling side as a recovery side. This results in a loss of momentum on the recovery side. It is much more efficient to maintain momentum than to build it, loose it, and build it again. This is similar to what cyclists call peddling in squares – where you only apply force on the down stroke. The best cyclists apply force around the whole circle resulting in smooth continuous power and often (as in the example of Lance Armstrong) at a higher cadence.

While the cyclist peddling in squares can still rely on the downward bound leg to apply force while the upward bound leg "rests" the skier has nothing to maintain momentum with while on the "recovery side". Generally the weak-side approach means the skier will stand up or peg-leg on the recovery side leg. The weak-side ski decelerates as the skier stands up on it. To correct this the

skier must focus on driving with the non-poling side knee as soon as that ski hits the snow and until weight is transferred back to the poling side. The skier may look as this concept as a volley of the body weight back and forth, like a tennis ball, in which the legs are the rackets. Being dynamic with the return of the arms to the poling side and synchronizing that arm swing with the skate will help maintain momentum on the non- poling side.

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.

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 is especially true in the V1 technique because it is used almost exclusively in steep terrain. One 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 the skier 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.

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 – 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

- Four Square
- Hybrid
- Minson's Last Dance
- Saddle Feet
- No Pole

Conclusion

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