Poling Technique

The double pole is critical to the success of skate skiing.

Here's video analysis of a very good junior jackrabbit 4 skier:

- Double poling: L2T Tech Videos - Double Pole Side.mp4 (coachseye.com)
- Double pole front view: L2T Tech Videos - Double Pole Front.mp4 (coachseye.com)
- One step double pole: L2T Tech Videos - Kick Double Pole Side.mp4 (coachseye.com)
- One Step front view: L2T Tech Videos - Kick Double Pole Front.mp4 (coachseye.com)

Here's video analysis of a racing skier in the Train to Train phase (age 12-16):

- Double poling: T2T Tech Videos - double pole side.mp4 (coachseye.com)
- Front view double pole: T2T Tech Videos - double pole front.mp4 (coachseye.com)
- One step double pole: T2T Tech Videos - one step double pole side.mp4
- Front view one step double pole: T2T Tech Videos - one step double pole front.mp4

Here's video analysis of a competitive racer:

- L2C Tech Videos - Double-Pole - Side.mp4 (coachseye.com)
- L2C Tech Videos - Double-Pole - Front.mp4 (coachseye.com)
- L2C Tech Videos - One-step Double-Pole - Side.mp4 (coachseye.com)
- L2C Tech Videos - One-Step Double Pole - Front.mp4 (coachseye.com)

Helpful Drills and Skills

Double Pole Technique	
Ball Smash! *Use a slightly deflated soccer/volley ball or even a hat!* 1) Two handed grip on a ball. 2) Overhand throw the object directly down into the snow Focus on the sequencing of the body to maximise power	Skill Videos - Double Pole Drills Ball Smash.mp4 (coachseye.com)
Double Pole Pause: Focus on pausing when the double pole action is at peak before downward motion. Should reveal how high athlete is going with hands – aim for upper arms being parallel to the ground and the hands even higher towards up – level, but in front of their forehead.	Skill Videos - Double Pole Pause Drill.mp4 (coachseye.com)
Kick Double Pole Stationary Timing Drill: Get the timing and rhythm down before trying it in motion	Nov 2017 DH and other drills - KDP Stationary Timing Drill.mp4 (coachseye.com)
Kick Double Pole Moving Timing Drill	Nov 2017 DH and other drills - KDP In Motion Timing Drill.mp4 (coachseye.com)
Double Pole Uphill What's on the label is in the tin! Good drill to ID errors in double pole form. Having hips really forward makes this easier	Nov 2017 DH and other drills - Uphill Double Pole_ Hips forward(1).mp4 (coachseye.com)
Double Pole to Striding	Nov 2017 DH and other drills - Transitions_ Double Pole to Striding.mp4 (coachseye.com)

Appropriate Skills for FUN-damentals Stage of Development (ages 7-10)

Double Pole

❑ Most Important

✓ The hips, upper body and arms are well forward and high to load the poles on pole plant.
✓ The forward body position originates in well flexed ankles.
✓ The skier “falls forward” and “hangs on poles”.
✓ The skier pulls down on the poles, engaging the back, shoulder, core and arm muscles.

❑ **Very Important**
✓ Elbows are moderately flexed on pole plant, with the degree of flex increasing with the amount of force being applied.
✓ The elbow flexion increases as the poling action begins.
✓ Legs are slightly flexed on pole plant, with flex increasing noticeably – but not excessively – during the poling action.
✓ If the skier rises on the balls of feet, motion should be forward, not up.
✓ Arm recovery forward (not up) is aggressive, with shoulders leading.

❑ **Important**
✓ Upper body compression ends before the horizontal position.
✓ The upper body stays down until the arms are finished.
✓ The poles are planted in front of the bindings (or at the binding when glide speeds are lower or body position not as far forward).
✓ At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips.

One-Step Double Pole

❑ Most Important

✓ The leg push, stride and arm reach forward occur simultaneously, and are all snappy/forceful.

✓ As the leg push is initiated, the push leg is fully weighted, with weight shifting dynamically to the striding leg as the push ends.

✓ The skier is balanced on one fully weighted gliding ski – weight centred over the forefoot – during the free glide phase and as the poling motion is initiated.

✓ The poling action is as for Double Pole in several respects:

- The upper body and arms are well forward and high to load the poles for pole plant.
- The hips are high and forward, to the extent possible (though they will not be as far forward as in Double Pole).
- The skier "falls forward" and "hangs on poles".
- The skier pulls down on the poles, engaging the back, shoulder, core and arm muscles.

❑ Very Important

✓ There is a pre-load of the push leg before the push.
✓ Elbows are moderately flexed on pole plant, with the degree of flex increasing with the amount of force being applied.
✓ The elbow flexion increases as the poling action begins.
✓ Legs are slightly flexed on pole plant, with flex increasing noticeably – but not excessively – during the poling action.
✓ Arm recovery forward (not up) is uninterrupted, with shoulders leading.

❑ Important

✓ Upper body compression ends well before the horizontal position (i.e. there is less compression than in Double Pole).
✓ Relative to the Double Pole, the upper body rises more quickly from its compression (to enable the body to be positioned for the pre-load, leg push and stride that occur at the beginning of the next cycle).
✓ The poles are planted well in front of the binding of the gliding ski.
✓ At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips.

Skills Progression

Jackrabbit #2 This technique should be practised a slight downhill slope with set tracks. • The skier pushes down the track for five metres using only the upper body • The skier reaches their hands forward to plant the poles • The pole tips do not come ahead of the pole handles when they are being planted • The upper body flexes at the waist just after the poles are planted to provide additional propulsion • The upper-body movement is completed by extending the arms to the rear • The legs remain fairly straight, but not rigid, through all phases of the movement	
Jackrabbit #3 This technique should be practised and assessed on flat terrain with set tracks. • The skier reaches the hands forward to plant the poles • When the poles are planted, the skier is leaning forward slightly, hands are forward at shoulder level, elbows are slightly bent • Poles are held at a small angle to the snow, pointing backwards. Pole tips are behind the pole handles when they are planted • The upper body flexes at the waist just after poles are planted to provide additional propulsion • As the upper body bends to a horizontal position, the arms start to extend, and follow through with a strong extension to the back • Immediately following the pole plant, the skier is obviously pushing on the poles with his/her upper body weight • The upper body movement is completed by extending the arms to the rear. The progression is upper body, then shoulders, then elbows. The elbows should not collapse in the initial phase of the pole motion • Legs remain relatively straight, but not rigid, through all phases of the movement • After completing the push, the arms and upper body are recovered forward at the same time to initiate another poling action	
Jackrabbit #3: One-step Double Poling This technique should be practised on a slight downhill with set tracks. • The skier stands in the Ready Position with body weight on the left ski • The skier pushes off the left ski, and transfers all of the weight to the right ski, while reaching forward with the arms to Double Pole • The skier then initiates Double Poling action while recovering the push foot forward • The skier glides on both skis, and then begins the cycle again, alternating the pushing leg (this time using the right ski)	

More Advanced Double Poling Technique

A full discussion of the biomechanics and form in double poling can be found in s.8.2.2 of the CCI-L2T On Snow reference material starting on page 268. Click here for the manual. The "101" version is:

Double Pole is used in conditions where the skier's velocity is high. Generally it is used on flat, gradual downhill and gradual uphill terrain. When executed by a fit and competent skier, Double Pole is the fastest and most powerful technique.

A cycle of the Double Pole can be viewed as comprising two phases: the propulsion phase; and the free glide phase:

Propulsion Phase. The propulsion phase begins with the movement of pole plant and finishes at the end of the pole push. The aim of the propulsion phase is to transfer the force produced by the back, upper body, abdominal and arm muscles into an increase in the forward velocity of the gliding skis.

Note:

- Upper body position at the time of pole plant is high and relaxed, and is forward to the point where the body would fall forward if the poles are not planted. The shoulders, hips and knees are all forward of the ankle. To obtain the desired upper body position, the ankle must be well flexed. In aggressive Double Poling, the skier's heels will leave the ski in the lead-up to pole plant (i.e. in the preceding free glide/recovery phase) to support the high and forward body position.
- The arms reach in front of the body. The elbows are pointing down and slightly outwards and the forearms are angled upward sharply. This arm position brings the latisimus dorsi and upper back muscles into play.
- The poles are planted in front of the bindings (or at the binding when glide speeds are lower or the position of the upper body is not as far forward).
- At pole plant, the shafts are nearly vertical, with grips slightly ahead of pole tips. Skier velocity will quickly put the pole at a rearward angle by the time the pull begins.
- The hips, knees and ankles are slightly flexed at the time of pole plant.
- From the relaxed position before pole plant, the pole is driven downward rapidly and forcefully. This is done with a quick, powerful contraction of the abdominal muscles, in conjunction with the use of the upper body's weight compressing from its high, forward pole plant position. The pulling down action is similar to "hanging on the poles".
- The torso compression ends before the torso is horizontal to the ground.
- The arm joints are used in sequence – shoulder, elbow and wrist. Early in the pull down and push back arm movement the elbow is more noticeably flexed, with the angle between upper arm and forearm decreasing to as little as 90 degrees. The arms straighten through the elbow and wrist at the end of the Double Pole motion. The thrust ends with hands pushing on the pole strap.
- Power generation peaks early in the propulsion phase and ends as the hands pass the thighs. The rest of the arm motion in this phase is largely follow-through.

The Free Glide (or Recovery) Phase. The free glide phase starts when the poles leave the snow and ends with the pole plant.

- The recovery phase is not passive. Rather, with the shoulders leading the arms the skier brings the arms forward directly for the initiation of the next pole plant.
- The shoulders remain relaxed (i.e. not raised) during this movement; the back remains slightly rounded (i.e. no arching or hyperextension of the back).
- As the recovery begins, the weight is evenly distributed across the full foot of both feet. As the trunk rises and the arms swing forward, the hips shift forward and the weight shifts to the balls of the feet. When the arms reach their highest position, ready for pole plant, the

skier's trunk, hips and knees are all forward of the ankle, with the ankles flexed to accommodate this position. For aggressive Double Poling, the heels will lift off the ski.

- The return of the arms and the lifting of the trunk must be synchronized.

Body Positioning

Core

- The core muscles must be engaged. This allows the back and upper body to be slightly rounded throughout the Double Pole motion, though not to the point where the upper body is stiff. It also permits the core muscles to contribute to force production as the skier pulls down on the poles in the propulsion phase.
- The bend at the waist at the end of the poling motion must be slightly less than horizontal. This will keep the hips from falling too far back and will permit a rapid return to the high position for the propulsion phase. Rapid recovery is necessary to maintain the correct timing and rhythm of the technique. Stopping the downward movement of the upper body before the horizontal position also conserves energy, in that the trunk must travel a shorter distance to return to the high position.

Ankles and Knees

- A good bend at the ankles is necessary at pole plant to allow the skier's trunk to be high and forward. Also, the more bend in the ankles, the more forward the skier's body position can be, thus enhancing force generation. More bend in these joints is required with increasing ski resistance associated with steep uphills or slow snow.
- In aggressive Double Pole sequences, as the upper body rises in preparation for pole plant the ankle flexion will be so great and the body positioned so far forward that the heel of the boot lifts off the ski.
- Note that heel lift is not essential to a properly executed Double Pole technique; rather it is particular to a powerful version of the technique used in competitive scenarios. However, without the heel lift a skier will not be able to get the body mass as high and forward of the ankles, and poling power will be limited accordingly. There is only a shallow flex in the knees at pole plant. Knee flexion increases slightly as the poling action takes place.

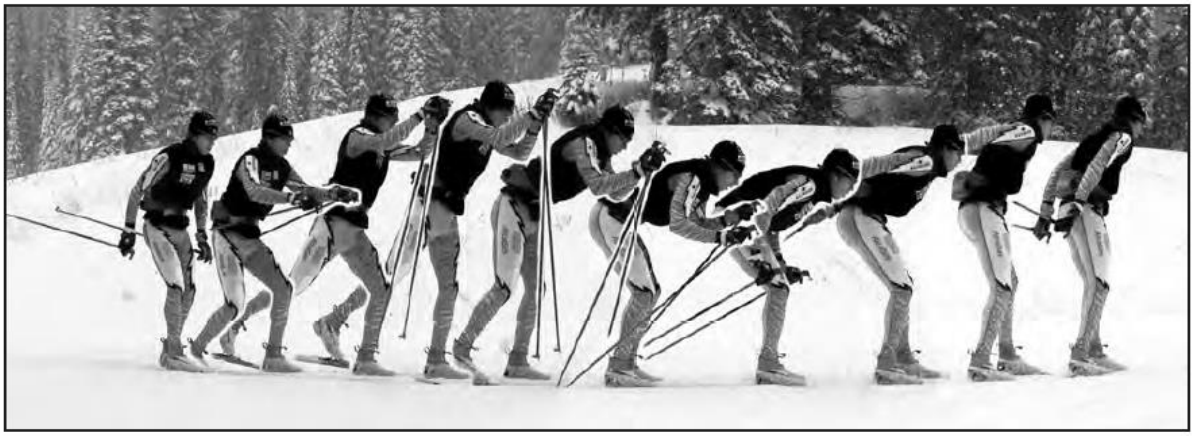
Hips.

- It is crucial that the hips be high and forward right over the balls of the feet at pole plant. The hip position moves slightly rearward as the poling action progresses, but this must not be over-accentuated.

More Advanced Discussion of One Step Double Pole

A full discussion of the biomechanics and form in one step double poling can be found in s.8.2.3 of the CCI-L2T On Snow reference material starting on page 275. Click here for the manual. The "101" version is:

One-Step Double Pole, or 2nd gear, is the technique used when the skier's velocity is too great for an effective Diagonal Stride and too slow for ordinary Double Pole. It is a powerful technique that incorporates both a strong leg push and a strong poling action. It is particularly useful for creating velocity and momentum. The skier should first be able to execute the Diagonal Stride and Double Pole techniques correctly, as the main components of these techniques are combined in One-Step Double Pole. However, on fast sections of the course, transition to Double Pole will normally be desirable. Once sufficient velocity is attained, Double Pole is more efficient, and will potentially generate more velocity.



A cycle of One-Step Double Pole can be viewed as comprising four phases: the leg push phase; the free glide phase; the pole-assisted glide phase; and the arm return phase. Key body positions mark the start and finish of each phase.