

L100 Skate Progression and Drills

These notes describe skate progression and drills for skiers at all levels, including novices. The progression and drills draw heavily on various USST materials, with modifications and extensions for teaching novice and youth skiers, and have benefitted from the feedback of numerous coaches and skiers.

Core Skate Progression

A. Without skis or poles

1. Stand in basic athletic position (BAP) (“keeper” position, tennis ready position):
 - Shin and back are parallel.
 - Pelvis should be tilted back
 - Ankles and knees bent
 - Shoulders relaxed and rounded.
 - Turn toes, knees, and hips outward.
2. Add forward lean from ankles with feet angled apart in skate position.
3. Rock in place (maintain connection through upper body, core, and legs – this should be a lateral motion of hips, not step, no lifting of feet), maintain BAP. Shoulders should be moving horizontally (“vertical zipper”)
4. Step from side to side:
 - Keep pelvis steady as if it were a bowl holding water. It should not tip forward-and-back nor side-to-side.
 - Maintain a “pelvic-tilt” with a constant stomach crunch.
 - Keep the hips at the same height above ground. No up and down motion.
 - Keep the body facing forward.
 - Push off to the side leaving leg fully extended
 - Keep a deep ankle bend on the weighted leg.
 - Maintain stable “shoulder-hip” rectangular panel (“vertical zipper”)
5. Jump from side to side.
 - Follow same directions as above for side-to-side stepping.
 - Focus on jumping laterally, not vertically
 - Land on squarely with hips over foot – you should be able to balance on one foot without further adjustment in the landing position.
 - Feel release and relaxation in the pushing leg at the moment the push is completed
 - Maintain stable core and “vertical zipper” throughout, even when considerable power is added

- Don't pull the un-weighted leg under the body when transferring the weight.
 - Skiers need to be able to master the transfer of weight from side to side with a good jump with no skis or poles. If they can't do this drill then they will not ski correctly. This is an easy place to correct flaws and a safe place (no fear of falling) to master correct BAP and movement.
6. Add in arm motion.
- Once the skier has mastered the correct lower-body movement then you can add in arms.
 - Arms should be held high in the "ready" position. The skier does a short, quick downward pole motion as they kick off to jump to the other foot.
 - Start with V2-alt timing, then try V2.
 - Pay attention to: landing with hips over foot, lateral jump, stable core, vertical zipper.

B. On Skis without Poles

7. Stand in basic athletic position (BAP) ("keeper" position, tennis ready position):
- Shin and back are parallel.
 - Pelvis should be neutral
 - Ankles and knees bent
 - Shoulders relaxed and rounded.
 - Turn toes, knees, and hips outward.
8. Add forward lean from ankles with skis angled apart in skate position. This should be like turning on a switch – as the weight shifts forward the skier starts to move forward. Younger skiers should continue this through to forward front fall. (Note: this step only works on snow, not roller skis.)
9. Rock in place (maintain connection through upper body, core, and legs – this should be a true rock, not step or lifting of feet), maintain BAP, "zipper vertical."
10. Combine leaning forward from the ankles and the rock to prevent the skier from doing the splits and turns this forward motion into skate stride.
11. Lateral push. Focus on "push from the heel" or "push from the middle of your foot." What is to be avoided is a forward stepping motion ("stepping forward"), or a backwards "climb the stairs" push. Another lateral-push mnemonic is to put the ski down next to or just behind the other ski.

12. Basic No-poles Drill and Extensions

Ski with no poles, with hands on hips or hands in front in "holding bowl of water" position. Mastering this drill is essential for proper skate technique. Focus items:

- Lateral push (cues: push from heel/push from midfoot).
- Have feeling of complete release and relaxation of lower leg after the kick: achieve "lateral kick and release." Ski and foot should feel floppy (released)

and relaxed) after the kick. This can be visualized as a “bounce” in the ankle, where the skier uses his leg as a spring.

- Finish of kick should have complete leg extension (no retained knee bend)
- Complete weight transfer: hips and upper body come over to land on top of the glide ski.
- Core stability: vertical zipper, shoulders square in direction of motion (no upper body twisting or bending)
- Shoulders should be relaxed and gently rounded
- Hips in neutral position (shoulders over hips over balls of feet). Avoid the temptation to squat or lean over at the waist
- Start with low intensity, low tempo, long glides. Only add intensity once the basics are mastered. Be careful about increasing tempo – make sure weight transfer is complete.
- Additional pointers:
 - Keep pelvis steady as if it were a bowl holding water. It should not tip forward-and-back nor side-to-side.
 - Thrust the hip forward & up/maintain a “pelvic-tilt”. If skier squats, have them stop and stand in an erect position and restart drill.
 - Can also have the skier try the “Froggie” drill, where instead of stepping from side to side, they jump the feet back together as they glide in a good BAP. This will be considerably less work if you are in a good BAP, so doing relay races or other distance in this drill tends to help skiers find the good BAP on their own.
 - Keep the hips at the same height above ground. No up and down motion: the kicks should be lateral not vertical.
- Extensions:
 - Add in deep ankle bend on the weighted leg: forward position is achieved through ankle bend combined with forward/up hips and vertical femur. Cue: compress, kick, release.
 - Hold poles vertically held in front of face (hands at waist level). Focus on keeping poles vertical – same as keeping zipper vertical (no tilting).
 - Hold poles horizontally comfortably at waist level in front of you – balance poles on forefinger (don’t grasp). Use the poles as a feedback mechanism to see that shoulders are not tilting side to side or upper body rotating. Poles should stay horizontal and perpendicular to the direction of travel.
 - Try holding your hands in front of your face, elbows bent, like a boxer in a defensive posture. Ski along easily with only a slight kick and a long glide. Keep the hip on top or in front of the knee!

C. On Skis with Poles

13. Locked and Loaded Drill (“Robot Drill”).

- Assume the high-hands position at the top of V2 poling motion. (A good mnemonic is to say “Put your hat on.” The motion of pulling on a ski hat puts

the hands and arms in the correct spot). Then, the position is locked. No arm movement is allowed!

- The skier falls forward onto the poles (the load part) and pulls himself forward using the abs and drop of body weight. Many skiers tend to cheat and use their arms quite a bit – the coach must emphasize that the arms and shoulders are frozen in place. If done properly the athlete will really feel the abs, and especially the lower abs, pulling the hips under him. If done properly, speed over snow is quite slow because of zero shoulder/arm/waist follow-through.
- Cue: Pull your bellybutton up to your nose (good for keeping skiers from sticking out their butts)

14. **Locked and Loaded into V2 (“Robot into V2”).**

- This drill is the place to start when teaching novices V2 – it is about keeping the arm timing quick so it can match the legs.
- Start in Locked and Loaded for 5-7 poling motions, with very little body weight drop and no arm swing, then add in baby steps side to side in rhythm with the arms. Keep the footwork to a minimum so that the arms are driving the tempo – keep the motions tight.
- As comfort increases begin to stride but maintaining the locked and loaded/robot position. As comfort increases further allow follow through with arms and a larger stride.
- As the athlete increase adds in full upper-body motion, she should be doing the V2, but with full engagement of the abdominals. Hands should come up nearly to chin height, shoulder width apart, elbows 90° or tighter; arm motion is forward and backwards (no lateral motion) with swing from shoulders.

15. **Introduction to V2-alternate**

About half of new skiers will accomplish Robot into V2 as their first combined poling-striding skate experience, about half will not. The other route into skating is directly into V2 alternate.

- Practice the V2 alternate rhythm facing and in sync with the instructor, lateral weight transfer/step and poling motion while standing in place. Once this is mastered, start skiing at a very slow energy level, focusing on combined rhythm.
- Once the timing is mastered you can focus on hand and arm position and core engagement. Hands should be in the “high hands” position – “pinky in the eye” – slightly more than shoulder width apart, vertical forearms when fully “up”, elbows 90°. High hands in the right place facilitate core (upper abs) engagement with hips remaining forward.
- Rhythm should have rest phase of V2-alt in the “up” position, with hands never pausing in the “down” position. A common error among novices and intermediates is to pause in the “down” position, with the consequence that hands are late getting “up” and never quite make it for full crunch and power, and that arm power application lags kick power application. Cue: rubber mat in the plane of your hips, your hands bounce back up when they hit the mat.

16. Introduction to V1

- Adopt correct hand position for V1: in front of shoulder for hang arm, in front of sternum for lower arm.
- Practice crunch in this position.
- Start V1. This is most easily done at very low power, with very little follow through (think Robot Drill), on flats or very gradual uphill. Goal is to accomplish correct timing.
 - If having difficulty establishing V1 timing, have skiers take a single V1 step from a stop, using a single pole. The power application and body position should come naturally.
 - Additional timing drill: V1 with hang arm pole only, other arm should simulate poling motion. This helps get timing and upper body position right.
- Once timing is accomplished add in follow-through and progress to moderate uphill.
- Things to watch for:
 - Different skiers naturally will want to have left or right hands as hang arm. If a skier's timing is off – either obviously by 180° or the timing just seems awkward – having them switch the hang arm often solves the problem.
 - Make sure kick is lateral (cues: kick from middle of foot/heel push) – no stepping or walking up the hill.
 - Hips should come fully over the glide ski
- Extensions:
 - Practice V1 on the flats with low power and long glide – goal here is complete weight transfer (hips up and over the glide ski)
 - Feel nearly equal power from both arms – the upper body power should be a slightly offset double pole, not falling/collapsing on the hang arm
 - On moderate uphill, focus on ankle bend with vertical femur/hips forward. Knee compression combined with lateral kick and release yields the powerful skate kick.
 - Upper body rotation: Torso should have slight rotation during the V1 stroke (think pulling on rope/tug of war). The rotation should be modest, in synch with poling, using the slight twisting motion as additional source of power.

17. Comments on V1 and V2

- The skier should be feeling a pause before they place the ski on the snow – keep the drive going before moving into the glide phase. When the skier lands the hips should be over the glide ski. This is true for both V1 and V2.
- In all skate techniques, the skier should push off of a ski that is still moving forwards.

On Snow No-Pole Drills

Follow the Leader Drill

Competitive junior athletes, especially the boys, have a huge problem doing drills where they go slow and concentrate on good form and balance. Instead they race each other and immediately start thrashing like a bunch of hockey players fighting for the puck. So, we must harness their competitive spirit. Create small groups (3 or 4) of skiers of similar speed and ability. The leader tries to hold his or her glide as long as possible and the followers have to match the glide length. If you can out-balance the skier ahead or behind you then you “win”. Use a small loop and have the leader switch on each circle. One key skill to work on doing this drill is sticking out the kicking leg and using it as a counter-balance while balancing on the glide leg.

Boxer/Cheerleader Drill

Initiate the movement onto the gliding ski with a punching motion of both hands forward in the direction of travel. This drill is essential for training the correct timing of the V2. Don't swing the arms back, just let them come back to the starting position after each punch. This drill must be mastered for a proper V2.

Forward Kick Drill

This drill helps with a lateral kick, by getting the skier to think about a forward kick. Think of a soccer ball just in front of your binding, then flick your ski forward to kick the ball forward with your toe. Do this several times on one side while stationary, then on the other. On a flat surface start low power no-poles skating in which each stride has this forward flick. Remarkably, you will be moving forward in a skate despite having a forward kick.

Skate without poles Drill

Use normal arm motion. V1 up hills, V2 on flats and gradual ups, and V2 Alternate on flats and gradual downs.

V2 and V2-Alternate Drills

Wiggle-Wiggle

Doing V2-alternate, pause with your hands high to wiggle your fingers and to say “wiggle wiggle.” You should see your fingers wiggle out of the corner of your eyes. While wiggling make sure your hands are in the right place – the high hands position, with forearms vertical or slightly ahead of vertical and at “put on your hat” height. Saying “wiggle wiggle” also gets the skier to pause long enough to glide – they won't have time to say “wiggle wiggle” if their weight isn't fully transferred.

Hop Drill

In this drill the skier takes a hop and then as the ski lands does the pole motion and kick all together. This teaches the correct timing of simultaneous firing of all muscles in arms, torso, and legs for maximum speed.

Stratton Swing

For Advanced skiers: Once the skier has mastered the timing of the V2 alternate he or she will be looking for ways to apply more power to the stride to gain more speed. Better skiers open up their upper bodies with a rhythmic swinging motion as they ski. It's a difficult move and can easily make the skier put his or her butt backwards. Watch a World Cup Sprint video of Andy Newell or Sophie Caldwell to see it in action.

Ride the Glide Drill

To improve glide: On every third stride hold the glide position for a count of two.

V1 Drills

Hot Foot Drill

Start by standing in one place. Slide the feet one at a time along the ground in a quick motion like the ground is hot and you have to keep sliding your foot off the ground. The effect should be to make you do a very light slide on each foot. It's okay to move forward as you do it. This drill teaches the skier to feel the sensation of a gliding ski leaving the snow. During the full kick the skier should be pushing off a gliding ski and never leaving the ski "stuck in the mud". A mental image that works for some people is to think of trying to pop balloons by poking upward with the tip of each ski.

In a V position try sliding the skis forward. Using only forward motion kicks you should be able to move forward. It's a miracle!

Nina's Diagonal Stride Skate Drill

Skate without poles. Use your arms like in classic. When you step onto your left ski raise your right hand straight ahead with hand up to face height. Work on rhythm and glide. This is particularly effective for improving V1 because it gets the skier up and onto the ski instead of sitting back.

Lee Borowski's "The Drill" - Rush the Poles

When doing a V1 try to make the poles land before the foot (versus at the same time). This will force a more powerful, deep stride. This is an important drill for good skiers who lack power in their stride.

V1 Saddle Drill

USST uses the analogy of sitting on horseback in a saddle to convey proper V1 position and weight transfer. Here's a drill they showed to Alex Jospe at a clinic: Use four different ways of skating up a short hill (no poles):

- Click heels going up the hill (causes you to stall out)
- Take a big step up the hill (causes you to put the heel down first)
- Keep the feet really wide (getting better)
- Keep the feet wide but putting down the toe first

V1 on Both Sides

Competent skiers should be able to V1 with the poles landing on either side. Do easy repeats on a small hill with the poles landing first on the left for the whole repeat and then on the right for the whole repeat. If everyone masters this then have them switch halfway up.

V4

Tap and raise the poles, then plant the poles during V2 (i.e., two pole plants on each side). Aim is to reinforce the pause component with high hands in the V2 rest/up position. Also reinforces balance, weight commitment (glide), and coordination.

Agility Drills

Figure 8 Drill

Place two cones (or other markers) 10 meters apart (conveniently this is 5 ski lengths when on snow). Have skiers do 3 full figure eights around the cones for time. Great for agility and control.

Frisbee Relay Drill

Create 2 person teams and have elimination sprint races where they skiers have to throw the Frisbee back and forth 3 or 4 times. This will develop total body awareness and the "swivel-head" necessary for surviving a tight sprint situation.

Jump the snake drill (roller skiing)

Use a chalk line, a parking line, or a crack in the pavement, and have the skiers jump over this crack while rolling. They should start by planting the poles in the

pavement and using their poles to help launch themselves over the line. They will progress to jumping without poles, and then trying it on one foot. This serves to practice their agility, but more importantly, to teach them an important obstacle avoidance skill for rollerskiing in the real world.

Human Slalom

In groups of 4-6, skiers skate in a line, without poles, spaced about 6 feet apart from each other. The skier in the back will slalom through the line of skiers until they have reached the front. Skier should first try this drill while stopped, and then can progress to skiing slowly as they each slalom through. This drill teaches agility and awareness of a skier's surroundings in a mass start environment.

Drill Checklist

Drill	
BAP with no skis or poles	
Jump side to side with no skis or poles	
BAP with skis and forward pressure, no poles	
BAP, pressure, rock, no poles	
Ski with no poles just rocking with soccer kick	
Same but with arms high	
Follow the leader	
Boxer/Cheerleader	
Forward kick	
Stable upper body with poles as guides	
Skate without poles	
Locked and loaded (Robot)	
Wiggle-wiggle	
Hop	
Stratton Swing	
Hot foot	
Nina's diagonal stride	
Ride the glide	
V1 Saddle	
V1 both sides	
V4	
Figure 8	
Frisbee relay	
Jump the snake	
Human slalom	

Definition of Terms

V1: So named because you pole only to one side so the marks left in the snow show only one set of pole plants for every two ski marks (the “V”). Both poles and one foot are set down at the same time. Remember these keys:

- Push equally to both sides with the legs – there is no “strong” or “weak” side
- Kick laterally from midfoot/heel, not back
- Initiate kick with a deep ankle bend. At 30 degrees the skis just float up the hill
- Kick should end with complete extension, engaging glutes as hips move on top of glide ski (the complete extension will need to be compromised on steep climbs)
- Keep the skis sliding throughout the kick – don’t let the foot “die” in the snow
- Keep pelvis steady and tucked – no tilting
- Slight upper body rotation (“pulling on a rope”)
- Upper body power should be flowing through both hands (think DP)
- Keep upper body upright. Compress just the top part of the torso like a stomach crunch when poling. Don’t drop or rotate the shoulders.

V2: Named because you pole on each kick leaving two pole-plant marks in the snow for every ski mark. Remember:

- Body should be in essentially upright position (BAP) – not squatting/butt out.
- Shoulders over hips, hips moving laterally during kick landing on top of glide ski
- The deeper the ankle bend then the easier you will balance and the more power you will have for your kick.
- Kick sequence: compress/kick/release, finish kick with complete extension
- Compress just the upper torso when poling (think DP)
- Hands come up to approximately mouth height
- Kick laterally – from midfoot/heel.
- Push the hip forward over the ski for maximum glide
- “Fire your guns” to keep the pelvis tucked and driving forward
- Upward motion of the poles must be *quick!* (cue: bounce off rubber mat at hips)

V2 Alternate: So named because we use the motion of the V2 in the legs, but only pole to one side. Initiate the technique by a large arm swing and a commitment to gliding on one ski. Remember:

- Again, initiating with ankle bend is the key to balance and a long glide
- Kicking laterally is hard, but key to maintaining momentum
- Keep hips square to the direction of travel