

Double Pole Technique: The foundation of Upper Body Movement in Skating.

Normal, Efficient, Double Pole:

The key to double polling, like many techniques in skiing, is weight shift.

The first frame shows the body in a neutral balance position as the arms return from the previous cycle.

To generate maximum force through the poles, the weight of the body is pushed forwards of the balance point under the middle of the foot. *Forward flex is at the ankle.*

The central core of the body is tensed and the weight of the body falls onto the top of the poles. The shoulders and arms are braced to take this load. Additional force comes from compressing the upper and mid abdominals. Once the abdominals are compressed, the final accelerating forces are applied through the shoulder, elbow and finally wrist joint.

It is important to follow through with the arm movement for two reasons: Stopping the arms requires muscle action which opposes the forward forces, reducing propulsion and doing wasted work. Stopping shortens the return arc, limiting the momentum that can be given to forward motion by the recovery swing.

The recovery swing follows a different path to the propulsion swing. The arms are thrust forwards and upwards as directly as possible, past the hips, back to the start position, providing momentum to drive the forward body lean.



Arms recover directly
Past hips, drive forward
Body in neutral balance



Arm swings forward
CG in front of ankle
Body moves forwards



Pole plant
CG well in front of ankle
Body weight committed



Upper body compress
No arm movement yet
Body stays above waist height



Follow through
with arms just to
range of motion.

Aggressive, Very Energetic Double Pole:

The key to double polling, like many techniques in skiing, is weight shift.

The first frame shows the body in a slightly forward balance position as the arms return energetically from the previous cycle.

In the second frame, the force of the forward and upward, arm and body recovery, has lifted the skier off his feet. Note that the downward body motion starts before the pole plant, building momentum for the backwards thrust. *Forward flex is at the toe.*

The central core of the body is tense and the weight of the body falls onto the top of the poles. The shoulders and arms are braced to take this load. Additional force comes from compressing the upper and mid abdominals. Lower abdominals are probably activated, causing the legs to flex.

The abdominal compression is shortened and the arm movement starts earlier to shorten the cycle time.

Final accelerating forces are applied through the shoulder, elbow and finally wrist joint, with a good follow through.

The recovery swing follows a different path to the propulsion swing. The arms are thrust forwards and upwards as directly as possible, past the hips, back to the start position, providing momentum to drive the forward body lean.

It is important to follow through with the arm movement for three reasons:

Stopping the arms requires muscle action which opposes the forward forces, reducing propulsion, doing wasted work and causing additional fatigue.

Stopping shortens the return arc, limiting the momentum that can be given to forward motion by the recovery swing.

Stopping prevents the momentary relaxation of the shoulder and arm muscles at the end of the natural movement. This relaxation provides some recovery for the muscles before the next contractions.

Expressing the technique in this way generates more forces and greater speed, but at the expense of efficiency and endurance.



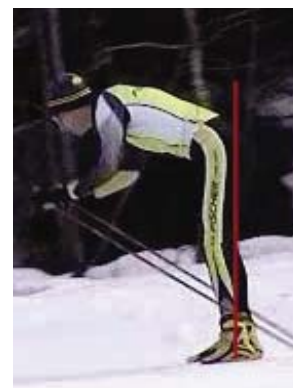
Arms recover directly
Past hips, faster, sooner
Body in forward balance



Arm swings forward
CG well in front of ankle
Body drives up and forwards



Pole plant
CG well in front of ankle
Body weight committed



Upper body compress
No arm movement yet
Body stays higher



Follow through
with arms just to
range of motion.