Build Skating Speed On-Ice & Off

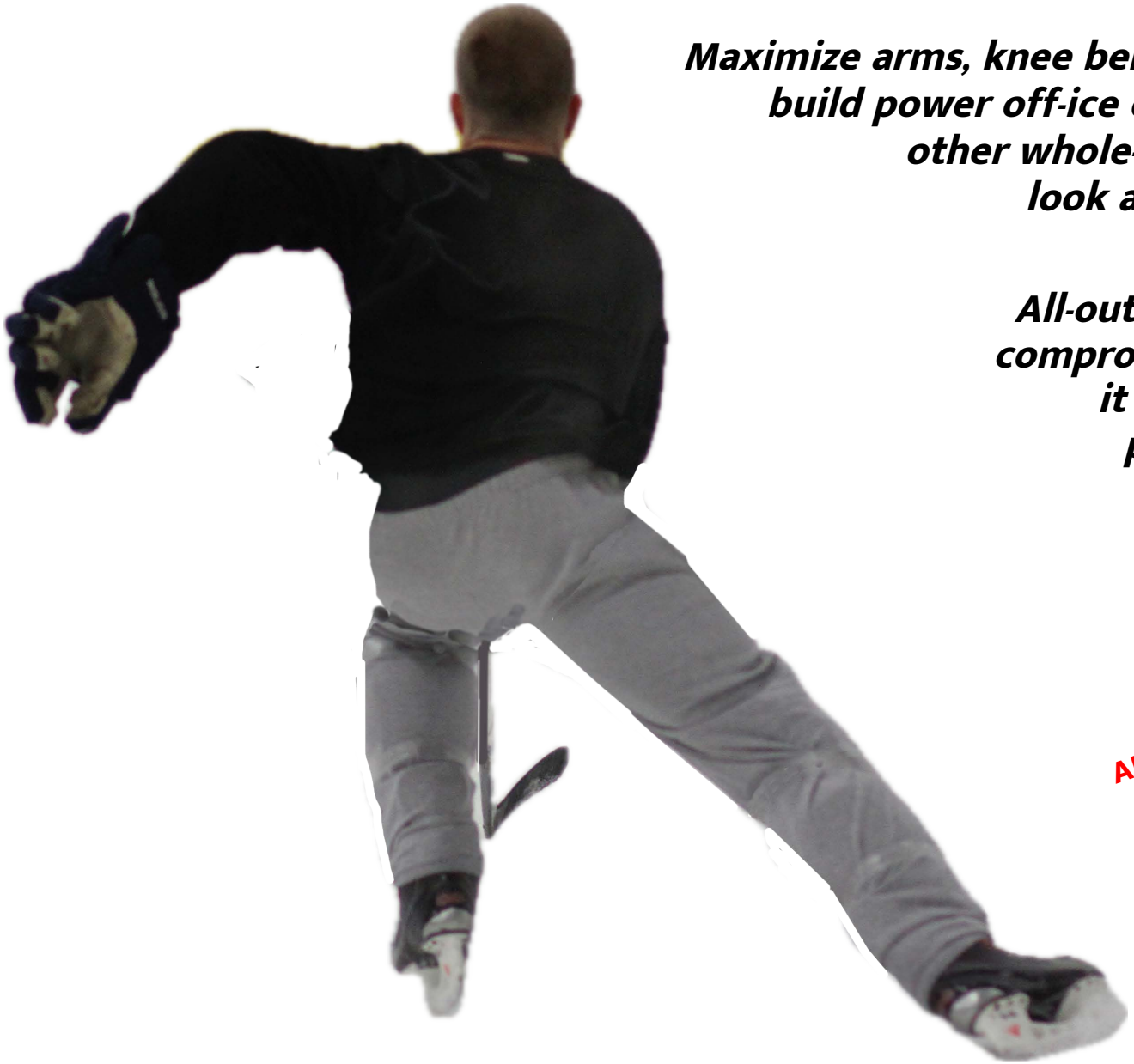
Quick strides for acceleration:

- *Short sprints uphill, downhill, and on a flat track.*
- *Overspeed practices on-ice.*

Wider, slower strides for high speed:

- *Maximize abduction force!!!*
- *Overspeed on-ice; some weight vests, some underload.*
- *Jumps, Slide board, other drills featuring abduction.*
- *Arms … naturally and vigorously across your body!!*

Abduction-Rotation-eXtension



Maximize arms, knee bend, explosive thrust; build power off-ice on a slide board and other whole-body exercises that look and feel like skating.

All-out speed should not be compromised every day, but it is – every drill where pucks slow you down … and develop a comfort zone slower than your fastest.

ADD ***Overspeed skating for playoff habits***

At high speed Sprinting & Skating are very different

Sprinting strides are mostly extension from the hips.
Skating strides require abduction-rotation-extension.
If your program doesn't feature explosive ABDUCTION, it is not planned adequately to improve skating speed

Skating strides are slower & wider at high speed compared to initial acceleration – just the opposite of sprinters.

Very seldom does a hockey player start from a standstill in a game, but there are several times in each shift when your 'next stride' requires maximum acceleration. Some skaters do this with quick feet; others use longer, wider strides with greater force (impulse). The quickest skaters do both.

When acceleration is needed, leg force is directed more behind you than when you are maintaining higher speed. In the first step from a standstill your force is almost straight back, and the skate blade is perpendicular to leg force, but as speed increases, (1) force is progressively more to the side, and (2) the blade is NOT perpendicular to the force (shown in the next diagram).

These adjustments allow slower strides (to the side) to maintain high speed.

Skaters using less abduction need extremely quick strides, and still could never maintain the fast skating speeds (29 mph in hockey, 35mph in speed skating). This will be explained shortly.

The bottom line for this chapter:

To lengthen your stride at high speed …WIDEN IT.

Exaggerate. Feel Efficient Power. High Speed Without Quick Feet.



Why do the fastest hockey players look effortless?

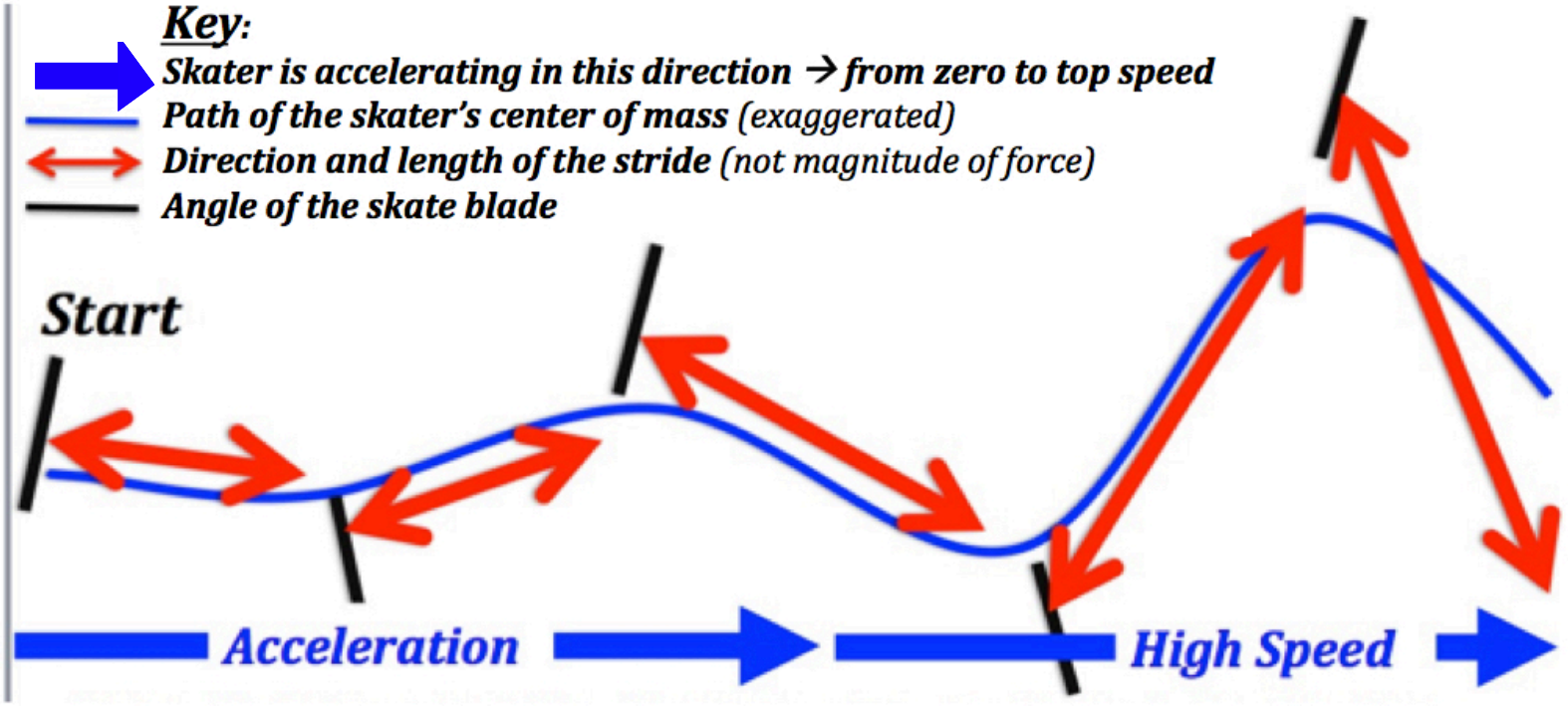
How do speed skaters maintain 35 mph with slow strides?

To understand, we'll review some amateur geometry-physics that relates to watermelon seeds and sailboats.

Ask:
How do sailboats move faster than the wind?

Below is a diagram of Skate-blade angles (/) relative to Stride angles (<—>) as a skater accelerates from a standstill to Top Speed.

At faster speeds a sprinter needs super-quick feet, but a skater's stride gets longer, slower, and wider.



During the first couple strides the blade is perpendicular to the force ←→ to produce maximum acceleration. Then it is oriented at an obtuse angle as speed is increased and acceleration is no longer a priority.

Do not try to explain this to a beginner; this is done naturally.

Sailing faster than the wind while tacking –
or skating at top speed with slow strides, it's similar geometry-physics.

Sailboats can move faster than the wind, if their sail is not perpendicular to the wind. Similarly, skaters can maintain high speed with slow strides, if their force is to the side (hip abduction), and the skate blade is not perpendicular to the force ..... Why is this?



We will use a couple examples; but first, consider that when the priority is acceleration, you push more straight back, and the Earth pushes you straight ahead.

Skate blade perpendicular to the force, yields maximum acceleration.

At top speed, the legs could not move that fast, so a system is needed that:
(1) does not require super-quick feet, as is required of sprinters at high speed;
(2) allows force to be used for maintaining high speed with little need for acceleration.

A slow, but great force to the side maintains high velocity if the blade is not perpendicular.

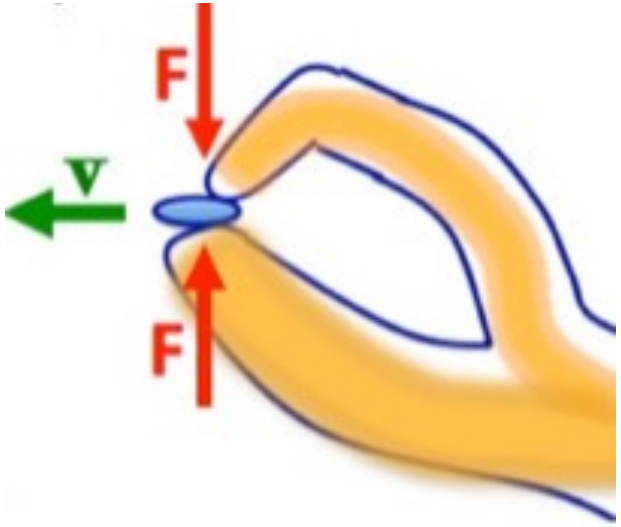
That's the need. Now for a couple examples before we skate.

Example: ***The great Watermelon seed attack***

Trust me, there was a day when watermelons had seeds, and math students brought a few to class to 'squirt' at the teacher (me) if he got carried away with a boring proof at the black board.
You ask, "What's a blackboard?"

Well, they went the way of watermelon seeds and dinosaurs.

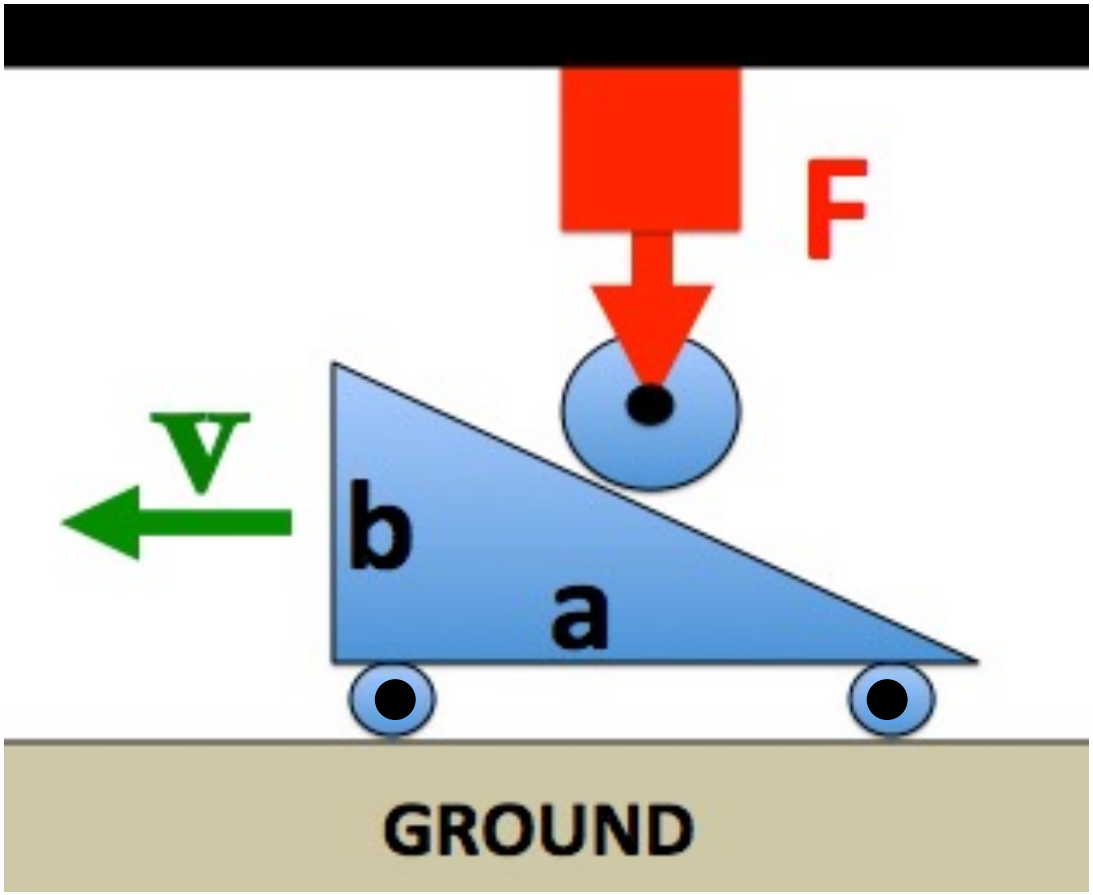
The seed accelerates to high speed when squeezed between finger and thumb (because F=m•a), even though the Force is applied slowly.



Great force yields great acceleration.

An analogy shows how a force perpendicular to your direction produces greater speed than the force itself

Imagine a piston is secured to the ceiling, and pushes down with a slow but irresistible force on its own wheel. This moves the wedge to the left, because the wedge also has wheels.



Here's the geometry:

While the piston Force moves distance 'b,' the wedge moves distance 'a.' In other words, the velocity of the wedge is greater than the velocity of the piston force in this case.

$$a > b$$

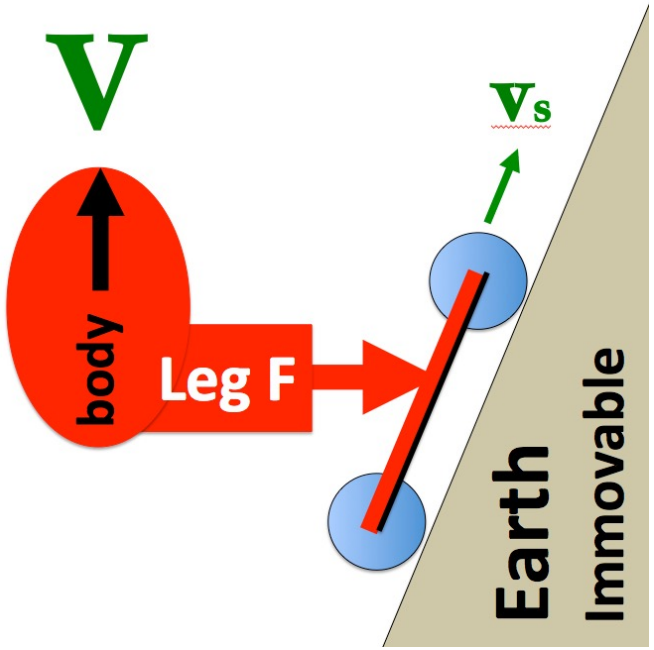
Similarly, a sailboat can move cross-wind faster than the wind, because the sail is not perpendicular to the wind.

When a skater abducts, and the nervous system subconsciously chooses the optimum blade angle, the skater can maintain great speed without quick feet.

This is an overly simplistic analogy, ignoring friction and other factors but is intended to show that a sailboat can move faster than the wind.

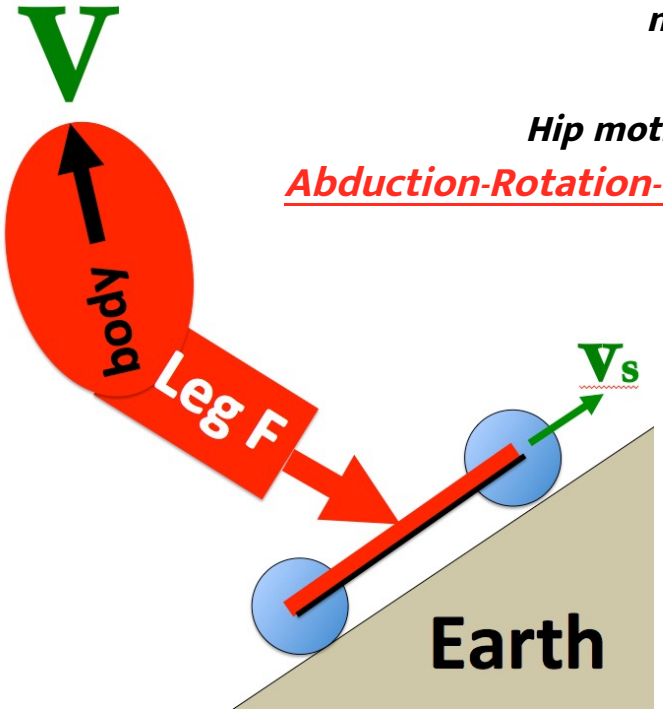
But, skaters constantly change the direction of leg force and blade angle – by FEEL – not by conscious thought.

At high speed, leg Force for any single stride is initially almost perpendicular to the direction of travel, and you adjust the skate blade so it is oblique to the force. In this way, a slow, but strong leg Force moves the skate at high velocity (V_s). At the same time, in order to stay ahead of your skate, you rotate your pelvis (below right), & extend your leg backward from the hip so ($V > V_s$)



Arm-shoulder swing opposite the right leg, starts your body rotating to the left for the next stride.

*Hip motion is **ARX**:*
Abduction-Rotation-eXtension



*It's a **feel** thing.*

*Don't **punish** children with these details.*
*Just train **ARX** off-ice to do this efficiently*



Hydrofoil Sailboats can exceed 50 mph in winds less than 20. It's all about the angle of the sail compared to the angle of the foils.

Watch speed skaters. Slow strides, yet 35 mph is maintained.

Train for hip Abduction-Rotation-Extension off-ice.



Many females we've tested did not abduct like speed skaters. They lost potential speed trying to go fast by pushing straight back. Training targets: (1) more powerful abduction, (2) allow left/right movement of the entire body, (3) natural arm swing across the body.

Acceleration



Great skating habits, wider strides, and explosive strength begin in dryland training



Summary:

1) When you are skating at relatively high speed, force is initiated to the side from the hip. As you move past the ice you'll rotate the leg and extend more to the rear (ARX).

2) Any time – at any speed – when acceleration is needed, the force is directed more toward the rear.

3) Arms and shoulders are force multipliers;

* ***do not restrict them except when training to carry/pass pucks.***

4) To LENGTHEN your stride you must WIDEN it.

* ***Preparing for this off-ice makes you a faster skater.***

5) There must be explosive ABDUCTION (with rotation-extension) in lower body workouts. Side-to-side jumps and slide board reps are excellent, as are resisted side lunges. But, add fast movement with sprints and jumps.

6) To improve skating speed, train for repetitive one-legged power.