A Fresh Technique Approach for Me

Every once in a while it's productive for professionals of any sort to doubt themselves, even if they don't. It's a good check to see if there is research and experiment out there you've missed, or seen but haven't really tried. You can't really lose: if you find nothing of value, you're that much more confident in what you've been doing all along. If you find something new, you may just add an entirely new dimension to your understanding and your movement efficiency.

Frank Glazer, a professional concert pianist still performing at 92, describes doing that. After many years of playing, and WW II service, he imposed a period of study of technique which he now credits for having enabled him to continue his long career. “If I hadn't taken time out to stop playing and figure out how I could make the sounds I wanted in the most efficient way, I wouldn't still be playing the way I am today.”(*SunJournal*, Nov. 10, 2010)

The point is crucial to our advancing as a skiing nation, for it goes to the heart of our coaches' and athletes' preparation and even ongoing inclination to examine the notions behind what we do and become educated enough to stay current with international research in both movement theory in general and skiing technique in particular. I include athletes here because more and more of them are writing articles, making CDs and blogging enthusiastically, even more so than coaches. Both groups seem unaware that personal experience does not yet constitute reliable research. Athletes are often asked to conduct clinics, but that speaks more to their enthusiasm and generosity than their expertise as analysts. And lest I be heard simply as an old curmudgeon, I would add that similar cautions have been expressed in Norway. In fact, there are good reasons.

Why do I doubt the wisdom of using athletes, fine people that they are, as teachers? First, I cite the case of Vic Braden described in Malcolm Gladwell's book, *Blink*. For years a top tennis player and coach, Braden talked with the world's best tennis players about how and why they played as they did. “Out of all the research we've done with top players, we haven't found a single player who is consistent in knowing and explaining exactly what he does.....They give different answers at different times, or they have answers that simply are not meaningful.” (p.67)

And many of us coaches have observed that an athlete may explain technique in a normative way and at the same time clearly vary widely from it on the race course. Braden ran into the same phenomenon with analyzing Andre Agassi's forehand. Braden explains: “Almost every pro in the world says he uses his wrist to roll the racket over the ball when he hits a forehand.”(67) With precise digitized imaging, however, sensitive to an eighth of a degree, the real situation became clear: “But players almost never move their wrist at all....He doesn't move his wrist until long after the ball is hit. He thinks he's moving it on impact, but he's actually not moving it until long after impact..... People are going to coaches..…... to be taught how to roll their wrist over the ball, and all that's happening is that the number of injuries to the arm is exploding.”(68)

A case worth reading is that of former top marathoner, Alberto Salazar, in *The New Yorker*, Nov. 8, 2010. The article is called “The Perfect Stride.” First, he finally examined biomechanics and worked collaboratively with sprinters to understand his own technique and why it so quickly failed him with his inefficiency. In doing so he discovered the more complex and reliable laws of movement which allowed him as a coach to truly coach and develop another young star, Dathan Ritzenheim. What is exemplary for coaches and athletes alike is that Salazar was a heel-striker, and heel-striking became a

mantra for runners at the time. But it didn't work, and Salazar found out, and has said, fore-foot striking is more natural and efficient.

What Salazar put his mind (and ego) through in order to truly educate himself about the sport he loved and wished to help others with provides an example of what is largely missing in American ski coaching, from the USST down.

Not so differently, three years ago I decided to learn how to ski all over again, from a fundamentally different perspective. I put aside my years of effort to isolate and refine the details of technique and set out to radically simplify. My goal was not to throw away the convictions I had developed over so many years but rather to just try another approach and being more sensitive to modern movement theory and research. Along the way, because it seemed possible with that in mind, I might further harmonize the movement and go faster, what I had always been after. My thoughts also coalesced around a research article on sprinting technique in track, written by a German coach, who after many years of approaching technique on one set of biomechanical assumptions realized that there was a persuasive rationale for a different view. When a seasoned, well-educated German coach changes his mind, then I am not adverse to following his example.

First, I decided to think only of gliding and see if the body would enjoy that with more unified, trim, efficient, and above all thoughtless movement. It did.

The point of it all is to optimize glide and do so not by pushing with poles or by kicking harder but simply by stabilizing a point with the poles and swinging the leg(s) forward through them (or past it, as in the case of diagonal striding). The poles, after all, don't go anywhere. They do not go backwards past the body; the body goes forward past the poles. Think of a gymnast swinging beneath the bar, a pole vaulter, a child on a swing. There were also the analogies to kayaking, where expert prescription calls for pulling boat to paddle, as with swimming pulling body to hand.

With poling, peak tension is reaching at the very beginning of the stretch-shortening cycle, i.e. at the moment of contact with the snow. It pulls the hip/leg/foot through. A second moment of lower force push accompanies “skiing past the pole.” Any poling force curve shows these two phases of the poling movement.

Given the interactive mutual dependency of our legs on each other (we don't have two legs but rather one pair, as with scissors), long a principle of movement known to postural research, the one will deliver the right force/action curve to facilitate the other coming through to glide. And that gliding foot will land in an optimal relationship to the speed at hand and with a pendulum curve which touches the ground/track parallel to its plane. It won't “dig” and have to be driven through with bending the knee further, picking the foot through.

Weight shift is accomplished in natural synchrony with the forward swinging leg. As with poling, the leg suddenly become stable and fixed simply acts as a support for the other leg to swing past. That is how movement works: making a step forward begins with shift onto a support leg. The amount of force applied, and how that force is initiated and shaped, in both arms and legs, depends at once upon the speed under way and the intent of the skier to go faster. The speed desired/intended elicits the appropriate force/speed in the “kicking” leg/foot.

The swing phase of the leg(s) forward is optimized by initiating it with a pelvic tilt from the sacroiliac joint (base of the spine), not the hip joints. This flexion both moves the hip joint slightly forward and even may elevate it a little, with the result that the motion curve of the foot/ski more surely contacts the snow without hindrance, digging or jamming. It also flexes the spine at the center of mass in such a way that both dynamic balance and weight transfer to the gliding ski happens without thinking. It also engages the torso muscles evenly and totally in harmonizing upper and lower body.

I have stopped thinking about "weight shift." The most persuasive indication of the "softness" of this movement is the absence of stress on the lower legs and the freedom of the ski down the track.

This movement complex naturally maintains the hips high enough and in easy balance forward to back to facilitate complete ankle/foot flexibility, alternating dorsi- and plantar flexion (toeing down), the latter which is done completely and early in the movement cycle. It is the key to generating natural spring-loaded speed and maintaining the overall harmony of the movement. It is also critical to maintaining the tension-release cycle in the lower legs which, of course, forms the basis of their total and efficient energy application. (Pushing off a "whole foot" is like working with a peg leg.)

Whereas this approach is quite easy to learn with skating and double-poling, diagonal striding requires a particular change of perspective from the traditional picture of diagonal as right hand forward with left ski, left with right ski. One reason given for this diagonal pattern was that it facilitated weight shift onto the gliding ski, so the arm headed somewhat toward the opposite ski tip.

The different sensation is best grasped first through ski walking or bounding. Instead of focusing on the hand/arm coming forward, focus on the combination of the hand/arm and foot/leg of the same side. The pole fixes in the ground/snow; the leg/foot swings forward past it. It is as if the bottom and top of an open "C" or "G" closed on each other and passed by. The hips rotate forward to follow the gliding ski, as the same side arm rotates slightly back in its follow-through.

The best way to feel the difference in movement quality is by contrast. Hill bound easily thinking of right hand-left foot, left hand-right foot. Then change to right hand-right foot (closing on each other), left hand-left foot closing. The difference is subtle but distinct; the total movement has a different feel and rhythm, as if it were a little extra put into a dance step, a slightly different timing.... and a critical one for gliding.

Such same-side visualizing facilitates the pelvic tilted swing forward of the leg, and the foot naturally touches the ground/snow a little further out front without extra effort or drive. In fact the effort is less for the same overall speed. (See "Pelvic Tilt and Claw-Kicking")

The gliding foot also then initiates the "kick" further in front and earlier, and more distinctly as a split-second initial clawing action back rather than a down motion as off a diving board or plyometric jump. The kick is faster and may feel a little lighter, more soft and rounded than sharp and "powerful." As sprint runners have found, the movement much be early and a clawing back just to keep up with (or "catch")the speed of the ground coming toward the runner/skier and keep up or add speed. It also is the only way to engage to hamstrings effectively, the key muscle group in generating speed. Germans and Russians have called it simply "grasping space."

I don't think much about "kick" any more either.

This motion is as natural as a cheetah chasing an antelope. Or you can demonstrate the principle with a bike turned upside down on it handles. Begin to spin the wheel with your hand. You begin by vigorous grasp and power, but as the wheel accelerates, the hand must quicken to keep up. But it cannot add both speed and high frequency very long. At greater speed the radius of the arm-hand must lengthen to create greater speed of its swing at the hand; it must ready a full swing and then strike the wheel at both a shallow angle (relatively light touch) and speed just slightly faster than the wheel. This what the foot/leg must achieve with the snow.

Weight shift takes place automatically; the non-poling hand/arm swings forward in response to speed and terrain; the kick takes care of itself. Acceleration of the whole causes all the elements of the movement to quicken evenly. Simply adding power to one part almost always costs speed before very far. Emphasis on a single part also runs the risk of warping the movement as a goal-oriented whole-configuration and for that reason costs efficiency. Think of concentrating on a specific part of a dance step and how it “misses” the music. Quickness, on the other hand, begets the power necessary to sustain itself. The speed feeds itself and is the body' spontaneous response to terrain, fitness and the speed environment itself. The the body perceives and acts as a whole, harmonious movement.

In modern systems-dynamic movement theory this is called perception-action coupling. A more through discussion of modern movement theory and research is contained in my translation portions of *Modelle der Motorik* by Jürgen Birklbauer. (See website table of contents)