

Figure Skating, Olympic Gold, and Podiatry

Here's some useful advice on treating ice athletes.

By Robert Weil, DPM

Figure skating today involves some of our finest athletes. The amount of jumping and acrobatic moves has increased dramatically—not only that, but at younger and younger ages. The role of the foot in skating is very important. The foot and ankle act as the first shock-absorbing mechanism of the body. Tremendous forces are generated through feet, ankles, knees, legs, and spine when jumps are performed. Upwards of five times one's body weight can be involved. It becomes very important that foot problems and mal-alignment factors be recognized. For decades, I've been treating figure skaters for various foot and foot-related ankle, knee, and back problems. Often the fact that the feet affect other areas of the body surprises parents and coaches. Examples could be knee problems related to pronated feet or back problems related to cavus rigid foot types. Pay attention to the fact that the pediatrician, orthopedist, or therapist will not pay much notice to foot mechanics if the feet are not hurting. Due to the critical effect of foot function on skating precision and the balancing and acrobatics involved, minor problems and malalignments of the foot have a major effect on skating performance.

The foot and ankle act as the first shock-absorbing mechanism of the body.

To correct these adverse effects, custom orthotics are of great benefit to give the foot correct positioning (Figure 1). Some review of the biomechanics of the foot during skating is helpful. We're all familiar with pronation and supination during the phases of gait, heel contact, stance phase and propulsion or push-off. Pronation is a normal motion that allows the foot to loosen up and absorb shock when you initiate heel contact in walking or running, or begin to glide in your skate. Once the leg and body pass over the foot, ideally the pronation is changing to the stability and propulsive supination phase to propel forward. Excessive pronation causes the foot to remain loose and unstable during propulsion, causing everything from irritation and strain to the foot structures, to excessive lower leg tibial torsion and knee strain to inefficient power.

Custom orthotics are the best way to get the foot in the right position, supinating, at the right time. Biomechanical and alignment problems are very common with over 80% of the population having some minor to major mechanical imbalance. Pronated feet, supinated feet, bowed legs, knock knees, and leg length differences are not rare or unusual; they are common and need to be addressed accordingly. Figure skating, which requires the

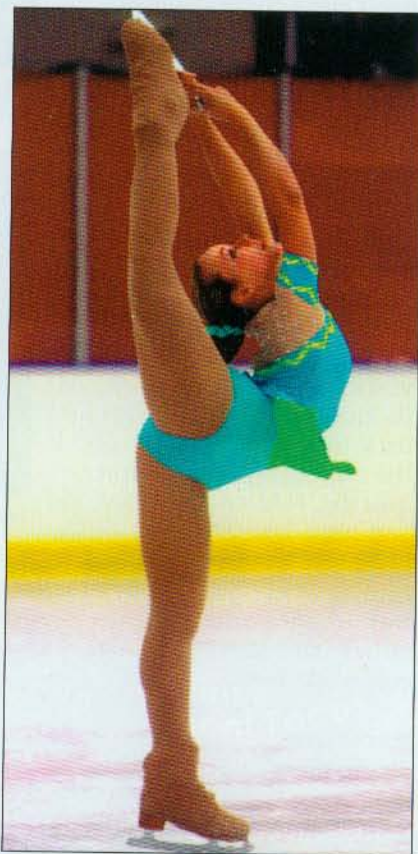


Figure 1: Orthotics help with balance and landing on one foot as seen with Madeline Stammen.

balancing of your body weight on a blade about 1/8" wide while raising the center of gravity a few inches off the ice, will quite often exaggerate any of these imbalances, especially if your blades are mounted or sharpened improperly.

Boot Selection

Determining which boot is best for a skater requires a knowledgeable boot fitting expert. Many fit-related problems can easily be resolved when the boot maker, fitter, and podiatrist work together. Boot-related fit problems can easily aggravate heel bumps, hammertoes or bunions. Often the "gold program" combines custom orthotics with a custom-fitted boot. Custom boots

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do not biomechanically replace the orthotics, but can give the all-important best fit. Speaking of fit—the orthotics need to fit in the boots. It makes real sense, doesn't it? But orthotics are often too bulky, wide, or don't allow comfortable fit.

Skaters are often told that you must enlarge the boot to allow for the orthotic. The types of devices I've used allow comfortable fit in the presently-used skate boots. I routinely send a heel width drawing of the boot. Unless the boots are already too tight, using these uncovered polypropylene orthotics with non-slip zero degree extrinsic heel posts work great. Most young skaters move the orthotics into their sneakers and back into their skates easily. If the skater plays other sports requiring side-to-side running and jumping, then they probably need a second pair of orthotics where bulk doesn't matter, but for everyday sneakers and shoes, the same pair works well.

Excessive Pronation

Excessive pronation in skating is very common. More than 2/3 of the foot, knee, and postural problems with young growing skaters are over-pronation-related. The excessively pronated foot will cause not only

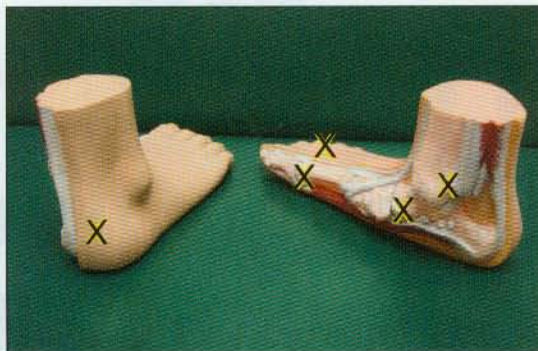


Figure 2: Common problem areas with pronated foot.

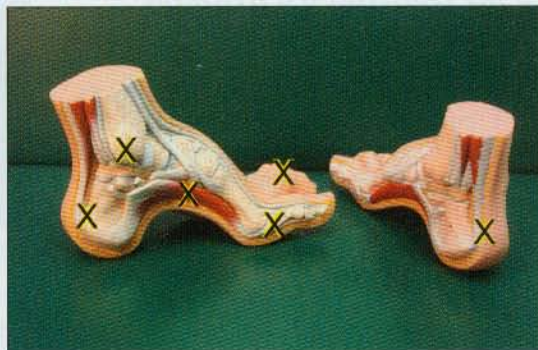


Figure 3: Problem areas with cavus foot.

strains, fatigue, and bone rubbing problems in skates, but rotation, torque and shock problems to the areas noted above. When these above areas are consistently sore and aggravated, the foot is the first area we look at. The foot itself is especially prone to irritation to areas like the back of the heels, insole, arch, navicular area, great toe, and ankle bones with excessive

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pronation (Figure 2). Often, trying to "lock" the foot into rigid position with even custom boots will be counterproductive unless an orthotic is used for proper alignment and position.

The high arch cavus foot also presents its own concerns (Figure 3). Proper fitting orthotics are also very helpful. Years ago, it was common to assume that cavus feet "not needing arch support" didn't do well with orthotics. Properly done, orthotics work well; they just need to be flexible enough. Figures 4 and 5 show a typical skating orthotic and its fit in the boot.

I've seen and used orthotics in skates with intrinsic heel posts. Proper extrinsic heel posts are more effective in orthotic performance and do not pose a fit problem. I've also seen and used full shoe top covers. Besides taking up room and requiring removable insoles, top covers are fine, especially if the skating orthotics stay in the skates. Using the same uncovered orthotic always allows multiple use of the same pair, especially in young kids 5-12 or so. It's easy to use the same orthotics. Ice skater Evan Lysacek used the same pair in shoes and skates until he was 13. Non-slip heel posts work great, and naked flexible polypropylene to MPJ's. Of course, second pairs of orthotics can be used in shoes for convenience (especially for moms worried about misplacing them), or if slightly wider orthotics are needed for other sneakers and shoes.

Evan Lysacek

When I first met Evan Lysacek, I had no idea I was looking at a future Olympian, let alone the champion gold medalist. After all, Lysacek wasn't even a teenager yet. I was doing foot and alignment screenings at a

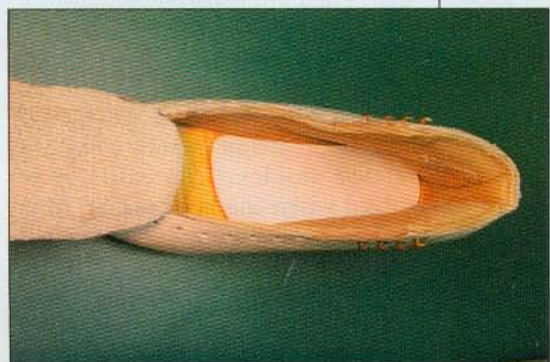


Figure 4: Proper orthotic fit in boot. No medial or lateral phalanges.

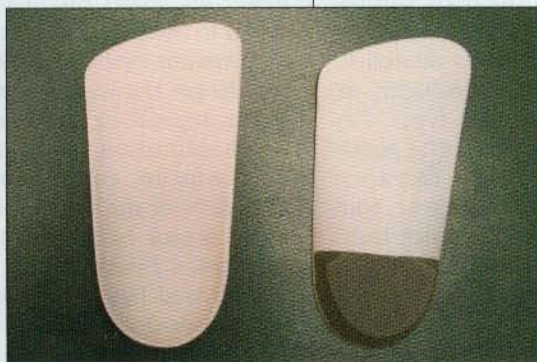


Figure 5: Very flexible polypropylene (usually 1/8") Note non-slip heel posts at zero degrees.

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Candy Brown Burek, a past skating champion and well-respected coach and patient, was for the past few years paying close attention to orthotics and training the foot and ankle, and she introduced me to Evan. He was 10 years old and was very talented, already doing double jumps. I was already using orthotics and skates for over 10 years with great success with many of Candy's skaters.

Excessive pronation was noted and the orthotics were started. There were two goals: prevent problems and enhance performance. I find that most growing kids get 18-24 months before they grow out of them. The orthotics were updated three times for Evan, most recently this past summer. Evan always felt "the orthotics are

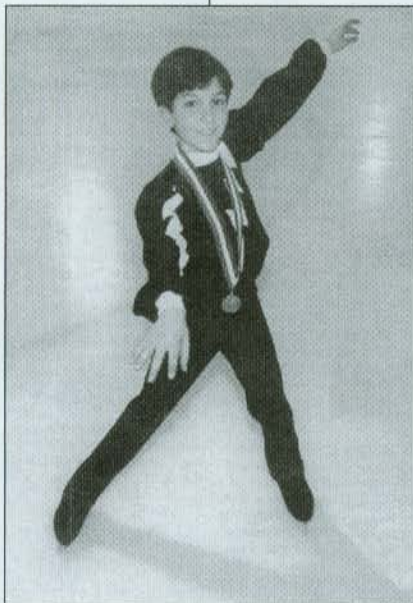


Figure 6: Evan at 10 yrs. old when we introduced orthotics.

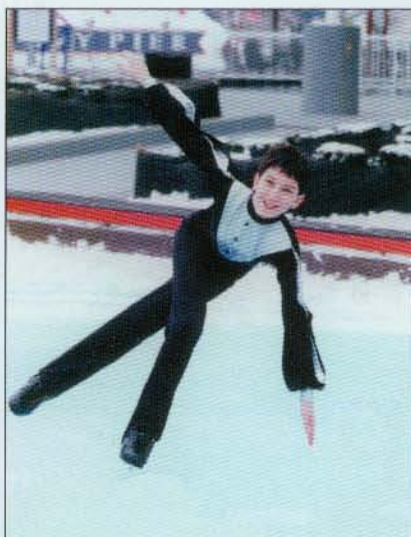


Figure 7: 13 yrs. old, Evan continues his champion's "Edge." Note the alignment—Foot, ankle, knee.

in serious adults, or younger figure skaters. These chronic injuries can, but often don't, have any specific incident. They tend to hand on and become persistent if not addressed. Trying to skate through these problems is a mistake and can often lead to more problems and extended downtime. Young growing bodies add to the challenges. Commonly, there are four categories involved:

grees, with forgiveness provided by crepe shock-absorbing posts. Always include exercises to strengthen the foot and ankle. Simple equipment (rubber bands, balance boards, or Bosu pads) works great. That's the magic combo—orthotics and foot exercises (Figures 9-12).

Acute and Chronic Injuries

Trauma happens and acute injuries needing immediate attention would include the famous R.I.C.E. principles. Proper evaluation and treatment would then follow.

It's usually overuse injuries

1) *Training errors on or off the ice.* Too much, too soon, etc. Often too much jumping is the culprit.

2) *Biomechanical and alignment concerns.*

3) *Incorrect boot and blade placement*—often boot fitters will move the blades medically to "correct pronation," but this can cause problems above in knees and hips. When orthotics are used, keep the blades neutral.

4) *Boot-fitting problems.* Working



Figure 8: Ready to win 2009 World championship

with an experienced boot fitter is crucial. Punching out areas of the boot around bony prominence problems is helpful and they know how to do it.

Everything seen in podiatry from bunions, hammertoes, Haglund's deformity, accessory navicular, soft tissue problems, tendonitis, fasciitis, etc. is seen in figure skaters. Orthotics are always helpful; and NSAIDs, physical therapy, strengthening, boot adjustments and changes all can be important. Nail problems are often fit-or motion-related and are treated accordingly. As always, some foot problems are surgical, but I see them rarely.

Working closely with the skater, parents, and the coach is important. Often, some backing off, recovery and rest are needed, along

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Proper extrinsic heel posts are more effective in orthotic performance and do not pose a fit problem.

an enormous help with my back and feet." (Candy, by the way, has used orthotics in her skates for 30 years, and says that she "wouldn't be without them.") (Figures 6-8).

Once foot growth is over, these orthotics are good for at least five years or more. I've always, without exception, used zero degree extreme rear foot extrinsic posts with skates. Extrinsic posts allow the rear foot to function around zero de-

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with treatments to put a stop to these overuse problems. The doctor needs to explain this to all involved. Work with trainers and physical therapists when possible. They are valuable members of your team.

Orthotics are always helpful along with physical therapy, boot adjustments, etc. when something hurts—heels, arches, shins, knees, etc. Feedback from the skater, parents, and coaches indicate that performance, edging, balance, and power improve. Optimum alignment and foot mechanics should always help—and they do! We need to be proactive with serious skaters. We don't need trouble or problems first.

It is the podiatrist's responsibility for orthotics to be comfortable and fit well. On occasion, adjustments are needed, but overall, compliance is great. Orthotics should feel good, reduce overuse injury problems, and enhance performance. And then—there's Olympic gold medalist Evan Lysacek (Figure 13). ■

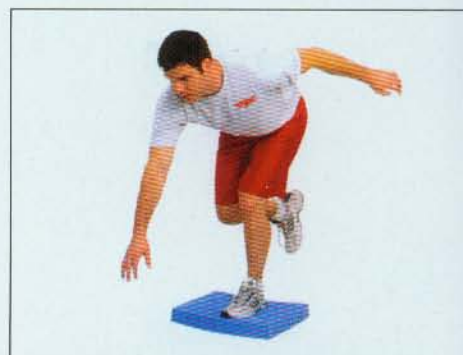


Figure 9, 10, 11, 12: Proprioception, rubber bands and the dynamic ankle resistance device (DARD) are great ways to strengthen feet, ankles, and lower extremities.

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Figure 13: On the bus for Evan Lysacek day 3/26/10—Mission accomplished.

Dr. Weil is in private practice in Aurora, IL and with Gajda Health Plus Network in Palatine, IL. He has hosted "The Sports Doctor" radio show weekly in the Chicago area for the past 15 years and regularly discusses sports medicine topics in all areas, emphasizing podiatric principles. Dr. Weil has written monthly newspaper columns for a few local papers over the past 3 years. Working with world noted Kinesio therapist Bob Gajda over the past 30 years has provided Dr. Weil with a virtual who's who list of athletes in all sports at all ages and levels. To listen to some past radio shows or to check out some past Sports Doctor articles go to Sportsdoctor-radio.com.



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