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Stretching for Downhill Skiing

by Thomas Kurz

Recently I was interviewed by a freelance writer for one of the ski magazines. The interview did not appear in the magazine; perhaps my answers were too factual for their readers or just for the editors. Below are the writer's questions on stretching for skiing and my answers.

■ **Question:** *Research shows that static stretching before skiing (or other dynamic activity) is not a good idea. Would you advise dynamic stretching (moving a joint through its full range of motion, starting slowly and getting faster) before a workout or a ski day?*

Answer: Yes.

■ **Question:** *When is the best time to do dynamic stretches?*

Answer: Twice a day—one session during the morning stretch and another during a warm-up for skiing or for another workout.

■ **Question:** *What kinds of dynamic stretches might be helpful for skiers? (They need reasonably flexible hips, obliques, abductors, and adductors. They use their quads and core a lot and their hamstrings and shoulders to a lesser extent.)*

Answer: Those stretches that increase dynamic ROM in movements typical for skiing and those that compensate for restrictions of ROM due to equipment (boots) or due to skiing posture. Specifically: extensions and abductions in joints of the ankle, knee, hip, spine, and arm (shoulder).

■ **Question:** *I have read that you advocate sets of 8 to 15 reps of dynamic stretches. Do you recommend a particular number of sets or just as many as one can do before feeling tired?*

Answer: Do as many as it takes to reach the desired range of motion. Gradually increase the amplitude of movements in each set.

The number of repetitions per set is 5 to 15. The number per session needed to reach the maximal range of motion in a joint depends on the mass of muscles moving it—the greater the mass, the more repetitions. A reduction of range is a sign to stop. A well-conditioned athlete can usually perform a set of 40 or more repetitions at maximal amplitude (Matveyev [Matveev] 1981).

Do leg raises in sets of 10 to 12 repetitions per leg. Do arm swings in sets of 5 to 8 repetitions. The total number of repetitions needed to reach the maximal range of motion increases with age. It may take 15 to 25 repetitions for 8-year-olds to reach the maximum range in shoulder and hip joints but 30 to 45 repetitions for 17-year-olds (Raczek 1991).

■ **Question:** *What other kinds of pre-ski warm-ups would be helpful for skiers?*

Answer: Warm up with movements similar to those performed when skiing—first without skis and then with skis on. A warm-up may also include corrective exercises that could be opposite to the skiing movements.

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■ **Question:** *Is static stretching important at all for skiing?*

Answer: It is important—to develop static range of motion adequate for comfortably holding the skiing posture and to prevent or remedy possible muscle shortening caused by prolonged holding of the skiing posture.

■ **Question:** *If so, when would be the best time to do static stretches?*

Answer: After the skiing and after an off-slope workout.

■ **Question:** *If you do static stretches at a separate time from a workout, do you need to warm up beforehand?*

Answer: For relaxed stretches, a warm-up is helpful but not necessary. For isometric stretches, it depends on how hard one intends to tense and stretch. Low-intensity isometric stretches can be done without warming up.

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Stretching for Downhill Skiing

(continued from page 1)

■ **Question:** *Why do you advise holding static stretches for 30 seconds?*

Answer: Because that is the most effective duration of a static stretch. One can stay in the stretch longer—a minute or two—but for increasing the range of motion, the most effective duration of relaxed static stretches is 30 seconds (Bandy and Irion 1994).

■ **Question:** *Would you recommend active stretching (using only antagonist muscles to hold the stretch) for skiers? Why or why not?*

Answer: I'd recommend static active stretches as one of the corrective exercises for posture defects caused by prolonged holding of the skiing posture.

■ **Question:** *One of your columns at www.stadion.com/column.html suggests that tight muscles could be an indication of an alignment issue or other problem. So would you not recommend just stretching as a remedy if someone has an overly tight muscle group? Or can being tight be what's causing the misalignment?*

Answer: Generally, the nervous system determines muscle tension, muscle tension aligns the bones (exceptions happen—for example, trauma), and bone alignment affects both muscles and nerves. To fix a problem, one has to find its primary cause. Therefore I suggest seeing a medical professional who knows how to diagnose and correct imbalances of muscle tension (e.g., a physician with similar qualifications to those of Dr. Kurt A. Vreeland, who worked for many years with the U.S. ski team).

■ **Question:** *If someone has adequate flexibility, is stretching still important? Or is stretching important only for people who are too tight to get*

into the positions necessary for the sport?

Answer: A person with adequate flexibility (i.e., range of motion) may need to do some stretches to maintain it and to remedy possible imbalances of range of motion and muscle tension. In this respect, flexibility training is no different from any other type of training. For example, would you ask if a person who has adequate strength (or endurance, or whatever) still needs to do strength exercises (or endurance exercises, or whatever)?

■ **Question:** *Many experts advocate individualizing a stretching program. Is it possible to suggest a stretching program that would apply to all skiers?*

Answer: Yes, it is possible to suggest a stretching program for all skiers. Here it is: Stretch those muscle groups that limit the ROM you need for skiing, and also stretch those that may become too tight because of your skiing or other activity.

■ **Question:** *I have encountered differing opinions as to whether being too flexible can cause injuries. What is your view? How would someone know if he or she is too flexible?*

Answer: A person is too flexible (has too much range of motion) and therefore prone to injury if he or she does not have adequate control over movements within his or her range of motion.

■ **Question:** *Some experts believe that stretching protocol should be different for different muscle groups. Do you buy into that theory, and if so, what are some of the differences?*

Answer: Any exercise, stretches included, should be done mindfully. That will take care of all the differences.

About some experts... I do not know them. For me to pay attention to any experts or their theories, I need to see results that are better than those achieved by people who use my book, *Stretching Scientifically*, or my video, *Secrets of Stretching*. To see what I mean, look at some of the people who have used my method and took the time to photograph themselves and mail me their photos, which are posted at www.stadion.com/testimonial.html.

■ **Question:** *With so many studies showing that stretching doesn't necessarily improve performance or prevent injury, why do experts still believe flexibility is important? Are there studies proving it, or is it just a logical assumption?*

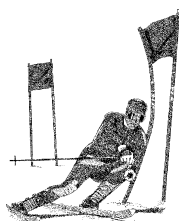
Answer: Flexibility means having range of motion. A person who doesn't have enough range of motion for a task can't perform it well and can even get injured. Stretching and flexibility are not the same thing. Stretching is an activity, and flexibility is an ability. Stretching at the wrong time or in a wrong way may impair performance or even cause an injury.

■ **Question:** *Do you have any other tips or information that would be important to include in the article?*

Answer: Breathe deeply when doing any kind of stretching. In relaxed stretches, imagine relaxation spreading all through your body.

For full references quoted in this article, see my book *Stretching Scientifically* (www.stadion.com/stretch.html).

Let us know what you think about our newsletter. Have you learned something that improved your or your athletes' performance or health? What would you like to learn more about? Write to us at news@stadion.com



Functional Training

by Thomas Kurz

Much is being said and written recently about functional training.

What makes training functional? For me, training is functional if it improves trainees' functioning in their sport or whatever physical activity they train for (e.g., fire fighting, life guarding).

Training is not functional just because it includes exercises in multiple planes of motion or on unstable surfaces (stability balls, rollers, wobble boards); or because it targets mostly the joint stabilizing muscles; or because it teaches athletes to handle their body weight mainly with body-weight exercises. At times it may be all of that or some of that. Some of these exercises may be included in training that enhances athletes' function, but most exercises have to be similar to actions in the sport (or other activity).

How about overstressing movements in transverse and frontal planes? In wrestling throws, specifically judo throws, the less twisted the thrower (*Tori*), the easier it is to complete the throw. At the same time, the more twisted the thrown person (*Uke*), the harder it is for him or her to defend or counter the throw. So the training needs to include both the exercises for increasing strength in the twisted positions and for resisting twisting forces (i.e., staying aligned with one's sagittal plane).

How about unstable surfaces? Practicing from time to time on a different surface than the ring mat (more wobbly or springy or spongy) may be good for a boxer. It may improve feel of the movements and balance, but most of a boxer's sport-specific training has to be done on a surface similar to that used in a match. What would happen to a boxer who did ALL shadow boxing and bag work standing on unstable surfaces? Very likely such a boxer would lose speed of punches, quickness of footwork, and a sense of driving the power from the ground.

How about targeting mostly the joint stabilizing muscles? Spending most of the strength training time on exercising the stabilizers to the detriment of prime movers does not make training functional. On the other hand, if our boxer did only sport-specific exercises (punching and resistance exercises that simulate punching), but not enough exercises for rotator cuff muscles,

shoulder blade stabilizers, and trunk stabilizers, then such training would not be functional either.

How about using mostly body-weight exercises and teaching athletes to handle their body weight? There are many sports in which athletes handle someone else's body (all varieties of wrestling) or some other object—in sports such as track and field throws, rowing, kayaking, weightlifting, and archery. Body-weight exercises are good, but not for every training task. For exceptional jumping ability and explosive power, short sets of weightlifting exercises with time limits (as described in *Explosive Power and Jumping Ability for All Sports*) cannot be replaced with single-leg squats or handstand push-ups because in those exercises one moves too slowly to develop explosiveness.

Even when the end goal is to be able to move one's own body at a moderate speed, using external resistance speeds up one's progress. For example, if a gymnast's goal is to do push-ups in a handstand (to be able to repeatedly do a handstand from a headstand), then the right weight exercises, at the right time, bridge the gap in gradual strengthening of shoulders and arms between push-ups with feet on the floor or on a stack of mats to vertical push-ups by a wall.

Here is a good definition of functional training: Functional training emphasizes training of movements, not isolated muscles (coach Juan Carlos Santana)—but the movements have to make sense (i.e., to be applicable in one's life and sport).

Another good definition, paraphrasing coach Mike Boyle: Functional training is about using knowledge of functional anatomy to select exercises that prevent injuries and improve performance.

Combine that knowledge of functional anatomy with attentive observation and you will run truly functional training sessions.

If in an exercise you see poor posture, grimacing, excessive tension, extra motions, or poor control, check the function (strength and activation) of stabilizers for this exercise. If weak, strengthen these muscles and lower resistance or pace of movements in the exercise to the point at which stabilizers can handle it.

Even a beginner with little practice can use his or her prime movers to move parts of the body into positions at which unprepared stabilizers are ineffective.

So, how do you strengthen the stabilizers?

First, by doing exercises that make them tense more than other muscles—that is, the exercises in which the usual stabilizers become primary movers.

Second, by not doing exercises that weaken them with form or resistance that is beyond their capacity to function effectively.

This is why rational sports training begins with systematic strengthening of all stabilizers through general strength exercises. At all stages of the multiyear training process, and in all periods of a yearly training program, correctly trained athletes keep their stabilizers in good shape with various general exercises.

But there is more to functional training than just preventing injuries. Another aspect is preparing for peak performance. This requires understanding the purpose as well as the mechanical and physiological principles of actions trained for.

With a good understanding of what really matters in the activity, you can select or design exercises that are relevant and arrange them in the most effective sequence and proportions.

Faced with stagnating development of discus throwers Tsveta Khristova and Svetla Mitkova, their coach, Peter Rakhmanliev, reexamined their training. He decided that speed matters more in discus than previously thought, so he put more emphasis on it. He rearranged periodization of their training and reduced the volume of weights lifted and throws made, as well as acceleration runs, hurdles, and jumps. Thanks to that reduction in volume, the quality and intensity of work was increased. Consequently, results of his discus throwers improved considerably. Tsveta Khristova went from 65-meter throws to over 70-meter throws, and Svetla Mitkova went from under 67-meter throws to over 69-meter throws. They also had fewer injuries than when on the old program.

Even though the coach did not introduce new exercises, his changes made their training more functional.

Q and A on TRAINING

■ *I'm encountering a certain amount of confusion over the correct way to train my abdominals and by extension my entire core area for the best possible results. I'm wondering whether you can help clear the matter up for me.*

The training I am involved in is purely recreational and consists of breakdancing/gymnastics and powerlifting. Having recently recovered from hernia surgery, I feel it necessary to start from the beginning in order to build my whole core up again. I have been reading your articles and others, reading books by various authors, and listening to the advice of strength/fitness people I respect. However, this has led to a certain amount of confusion, which I am hoping you might be able to shed some light upon. So far my program for rehabbing would look something like this:

1) Crunches, up to two sets of 100 reps. This would be to strengthen the connective tissue and condition the abs for the loads imposed during subsequent exercises.

Once two sets of 100 reps could be performed (and only then), I would move on to . . .

2) Sit-ups, up to two sets of 100 reps. These would be performed in the same way I would perform crunches except I would curl up and then straighten up at the top of the movement, lifting my lower back off the floor.

Only after achieving this would I move on to . . .

3) Back extensions on the floor, up to two sets of 100 reps. These would start as upper body only, then progress to upper and lower body with arms by the sides, then arms straight.

Next would be . . .

4) Back extensions on a bench with weight, up to about 10 reps with about 25 kg (approx. 1/3 my body weight).

Only when I had performed all of the above tasks in a progressive order would I then begin squatting and deadlifting again. During this time, I would perform various weighted abdominal exercises (with perhaps some overhead squats) and continue training my lower back with such things as stiff-legged deadlifts, good mornings, and so on.

I would keep the reps low and sets high to maintain volume. My goal here would be to increase strength without putting on too much extra mass and to make my whole core area "rock solid" yet flexible and dynamic. So I expect I would be adding twisting movements, specific oblique movements, and static active exercises for my upper body (for breakdancing holds [freezes]).

Upon increasing my strength to where I feel comfortable, I would also begin retraining gymnastics/breakdancing techniques such as flares and various low-stress, non-twist aerial maneuvers before progressing to the more advanced maneuvers I was attempting before I had my surgery.

Since I feel that, presently, I am a long way from this stage, my plan here is less specific.

I would really appreciate your thoughts and opinions on this rehab plan, especially on the correct way to perform crunches, and your 'rebutals' to the other prescribed ways you may disagree with.

Sounds like a good plan. As for the exercises with weights, like the back extensions on the bench, my advice is to start with zero kg and progress gradually. Back extensions on the floor (your no. 3) are best done by lifting either the upper body or the lower body (more difficult). Lifting the upper and the lower body together is not healthy for many people. 30 reps of back extensions per set is enough.

Keep your spine's curvatures neutral during all lifts. Neutral spine curvature means that your spine's curves are like they are when in a correct upright posture.

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