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Back Strength—Key to Improving Performance

*“Since we received the **Secrets of Stretching** tape, [Debra] has added an emphasis to that area [back strength]. In the same period, and without any technical practice, there has been a significant increase in the power/speed of her jump-serving. Since it was the only change she made to her training I have no doubt that it contributed to the improvement.”—Charles and Debra Richardson, 1996 Olympian, beach volleyball, Santa Barbara, California*

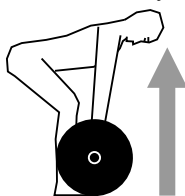
To jump higher, sprint faster, lift more, or grapple better you need a strong back.

Muscles that move your hips and legs are either attached directly to the spine or to the pelvis. Those muscles are the main power generators for jumping, kicking, punching, pushing, running, swimming, and lifting. They need a solid anchor in the form of a strong back. If your back is not strong enough, then you can't use the full strength of your limbs. How do you tell if your lower back needs strengthening? If it gets fatigued or tenses uncomfortably while you do your sport-specific exercises—it is too weak.

My favorite lower back exercise is the deadlift, and my rule of thumb for back

strength is lifting comfortably at least twice your body weight in the deadlift.

To do the deadlift the way I do it, stand with your feet not more than shoulder-width apart. Bend your trunk forward at the hips and bend your knees slightly. Make sure your whole spine, from the lower back to the neck, keeps its normal, natural curves. Do not arch your neck. Look at the ground in front of your feet. Grab the barbell with alternating grip (one hand palm forward, the other hand palm backward). Lift by straightening your hip joints. Keep your head in a neutral position, do not even let your chin jut forward. If it does, tensed muscles at the back of your neck will pull on already arched (hyperextended) neck vertebra, and that can cause you neck pains.



The video *Secrets of Stretching* shows more back exercises and tells you when to do them in a single workout and in your long-range training program.

Highlights

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Stretching clinic in Minneapolis

Thomas Kurz will conduct a stretching clinic in Minneapolis, MN, on October 18th and 19th. The clinic is hosted by Solid Impact Karate and held at the Regal Minneapolis Hotel. For more information call Scott at 612-224-6994 or 612-794-7309, or visit web page <http://solid.org/clinic.html>



Thomas Kurz, age 40, does a split with no warm-up at a recent seminar in St. Johnsbury, Vermont

We thank Mr. Mark Hall for sending us this photo showing the result of using our stretching method. Mr. Hall has fought in four Ultimate Fighting Championships. He operates Moo Yea-Do Karate and Street Combat Applications Training Center in Murieta, California.



Exercise, Nutrition, and Athletes

From this article, concluding a series of articles on nutrition and athletes' health and performance, you will learn how the intensity of exercise relates to nutrition and performance.

From the previous four articles on nutrition in issues of *Stadion News*, you know what and how much to eat to be health and to perform well.

But eating the perfect balance of the best foods is not enough to guarantee health and good performance. You need to exercise right. From this article you will learn how the intensity of exercise affects your ability to burn fat and so your aerobic endurance.

For the purpose of this article I will divide all exercises into aerobic and anaerobic.

Aerobic exercises are those you can do for hours without losing your breath or feeling fatigued because you burn mostly fat in the presence of a sufficient supply of oxygen. Anaerobic exercises are those you can't continue for more than a few minutes without taking a break because your muscles can't get enough oxygen to burn fat.

For an exercise to develop aerobic endurance, its intensity, as measured by your heart rate, must be at least 70% of your maximum but must not reach the anaerobic threshold. A convenient rule of thumb to help find that aerobic training zone is to subtract your age from 180 (Maffetone, P., 1994. *In Fitness and in Health*. David Barmore Productions). The result is the heart rate you should exercise at to stay in that zone.

Exercising at higher intensity puts you over the anaerobic threshold. Your muscles use more oxygen than your blood can supply to them and use more carbohydrate (glucose) calories than fat calories. When that happens, lactic acid starts to accumulate in the blood.

Aerobic exercises burn mostly fat and very little glucose. Anaerobic exercises burn mostly glucose and very little or no fat at maximum intensity (Sharkey, B. J., 1990 *Physiology of Fitness*. Human Kinetics, p. 279). Lactic acid produced in the muscles during anaerobic exercises seems to inhibit the action of epinephrine, a hormone that causes the release of free fatty acids from

adipose tissue, thus blocking the mobilization of fat for energy (Sharkey, 1990, p. 32).

So you see that if you exercise too intensely, at too high a heart rate, you burn mostly glucose and prevent your body from burning fat. This will limit your endurance because fat has twice as many calories per gram as glucose and you have more grams of fat stored than carbohydrate. An average person (not overweight) has from 50,000 to 100,000 kcal available from stored fat in adipose tissue (Sharkey, 1990, p. 278). The same person has 1500-2000 kcal available from glucose stored as muscle glycogen (325 grams), liver glycogen (90-110 grams), and up to 20 grams of glucose in the blood (McArdle, W. D., Katch, F. I., Katch, V. L. 1991. *Exercise Physiology*. Lea & Febiger, p. 9).

The upper limit for glycogen storage in the body is about 15 grams per kg (2.2 lb.) of body weight. This amounts to 1100 grams for an average-size man (McArdle, Katch, and Katch, 1991, p. 10). Eleven hundred grams of glycogen gives 4400 kcal—still a small fraction of the 50,000 or even 100,000 kcal available from body fat.

If you exercise anaerobically, apart from limiting your performance by not using the fat, you will get problems caused by using glucose as a main source of your energy. These problems are:

1) Low blood sugar with resulting physical and mental fatigue and moodiness. Remember that blood glucose is the sole source of energy for nerve and brain metabolism (Sharkey, 1990, p. 278).

2) Excess accumulation of lactic acid, which adversely affects the nervous system, disturbing coordination, causing depression, anxiety, even phobias and suicidal thoughts. High levels of lactic acid may aggravate heart disease (Maffetone, 1994, p. 36).

Excess lactic acid interferes with utilization of calcium, so even though you have all the calcium you need, your cells become calcium-starved. This causes muscle tightness and morning stiffness (Maffetone, 1994, p. 100).

3) Increased production of free radicals that may contribute to inflammatory con-

ditions, heart disease, cancer, and speed the aging process (Maffetone, 1994, p. 168).

Aerobic Deficiency Syndrome

What happens to you if you do too little aerobic exercise or too much anaerobic exercise? According to Dr. Maffetone (1994, p. 38) this is what happens:

1) You get fatigued both physically and mentally.

2) You crave sweets or stimulants such as coffee because anaerobic exercises lower your stores of glucose and make it difficult for you to burn fat for energy. This, in a catch-22, makes you dependent on glucose for energy. If you depend on glucose for energy, you are bound to experience symptoms of unsteady blood sugar levels, such as moodiness and shakiness, unless you do eat often.

3) You get exercise injuries. Remember that lactic acid, produced when you derive most of your energy from carbohydrate (glucose), worsens your coordination. Using up muscle glycogen for energy instead of fat causes local fatigue. Fatigued muscles do not work right and get injured.

4) You catch colds and other infections.

5) You have difficulty waking up in the morning and do not want to get up.

6) You gain fat or can't lose it.

7) If you are a woman you get PMS and menopausal symptoms because normal function of the hormonal system depends on aerobic activity and proper fat metabolism.

What are causes (other than an insufficient amount of aerobic exercise or too much anaerobic exercises) for the above symptoms?

1) Not enough or the wrong kind of fats in your diet (see *Stadion News*, Winter 1996).

2) Too much carbohydrate in your diet. A high carbohydrate diet increases lactic acid production, which means lower oxygen utilization during effort.

In a study conducted at Ohio State University elite swimmers trained anaerobically for eighteen days.

For the first nine days the swimmers ate a high carbohydrate diet (83% carbohydrate) (continued on page three)

Exercise, Nutrition, and Athletes (continued from page 2)

drate), for the next nine days they ate a lower carbohydrate diet (43% carbohydrate) and more protein. They produced more lactic acid during exercise when on the high carbohydrate diet. This means that a high carbohydrate/low protein diet lowers oxygen utilization during effort. At SUNY Buffalo athletes exercised aerobically and those who ate a higher protein-to-carbohydrate diet had a higher VO_2max and greater endurance (Barry Sears, Ph.D. *Triathlete*. December 1995, p. 6).

3) Not enough or the wrong balance of vitamins B₁, B₂, B₆, C, and E, and of minerals zinc, sodium, and copper (Maffetone, 1994, p. 34).

Aerobic Excess

Can you do too much aerobic exercises and not enough anaerobic? Yes! If you do only aerobic exercises for a few months your fitness may plateau and then regress. You may feel less energetic and see that you start gaining fat. To balance your body's chemistry, do two or three anaerobic workouts per week (Maffetone, 1994, p. 39). You need both aerobic and anaerobic exercises because you have both slow-twitch, or aerobic, muscle fibers and fast-twitch, or anaerobic, muscle fibers. The slow-twitch, aerobic muscle fibers make up from approximately 30% (in sprinters) to 90% (in endurance athletes) of your muscles (McArdle, Katch, and Katch, 1991, p. 361).

Anaerobic training without any aerobic exercises increases the percentage of fast-twitch fibers and decreases the percentage of slow-twitch fibers, but only the slow-

twitch fibers can burn fat! (McArdle, Katch, and Katch, 1991, p. 362). If you do enough aerobic exercises, you burn mostly fat during your performance so you can spare muscle glycogen for the really fast actions.

But I need to be fast!

To keep your exercise aerobic your heart rate will have to stay close to 70% of your maximum. For many athletes that is low compared to what they are used to. Many athletes, especially karateka, judoka, and wrestlers, are used to working at a heart rate of 180 bpm or higher instead of 180-less-age. If you work out like that, you will find it difficult to move at your normal pace while keeping your heart rate within aerobic training zone. You will say that this is too slow and you are going to get out of shape and lose all your speed. Don't worry. Let me give you an example of this system at work.

Triathlete Mark Allen started running at a heart rate of 180-less-his age with an average speed of one mile per 7:15 minutes. He ended up running his average mile in 5:20 and being six-times Ironman champion and world record holder. Running a 5:20 mile is moving pretty fast. If you look at fighters you see that for most of the time in the ring or on the mat they are moving much less than someone running even a slow 8-minute mile. So why are they so tired? Because they are trained mainly anaerobically, so it is difficult for their bodies to use aerobic energy. They produce lots of lactic acid, which further impairs their performance.

The second reason for their fatigue is that they are too tense. The better the technique and the tactical skills, the less tense the athlete can be and thus save energy.

If you are an athlete from any technical sport, you will have to initially slow down your exercise pace. Your fit-ins, if you are a grappler, or your shadow, rope, and bag work if you are a boxer or kickboxer, will be done at a slower pace initially. But as you stick to this program you will notice that your pace picks up while your heart rate stays within the aerobic training zone.

The benefit of this is that when your opponents are running out of steam or even outright "bonking," you are still strong, relaxed, and in control.

To learn more about training and nutrition, order *In Fitness and in Health: Everyone Is an Athlete* by Dr. Philip Maffetone. Send check or money order for \$17.95 (shipping is included) to: Stadion Publishing Company, Inc. P.O. Box 447-N Island Pond, VT 05846, U.S.A.

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Self-Defense Tip

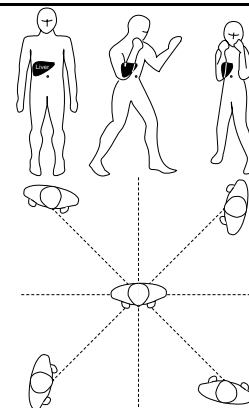
Here is what you must do when facing strikes and kicks. Put your arms "on guard," your left leg forward to keep your liver (which is on your right side) further away from the attacker. A good shot to your liver could temporarily paralyze your diaphragm, or even cause internal bleeding, or rupture your gall bladder (which without surgery leads to death). Protect the liver with your right elbow, but since you need to protect your face and neck at the same time, hunch to your right so your right fist shields your right jaw. Leading with the left lets you protect face, neck, and solar plexus with your left shoulder and arm while your right arm performs the same service for your liver, the right lower part of your

face, and the right side of your neck.

Use minimal shifts of your forearms and elbows to block punches or, in the worst case, to shield yourself with elbows, forearms, and fists.

Position yourself at a 45° angle off anybody's center line, whether you face each other or you are behind. If you stand in the line of the attack, even if you block it, your counterattack will be that much more difficult. Keep a minimum distance of one leg length (the attacker's leg length) between you so it is hard to surprise you.

To learn more techniques, order *Basic Instincts of Self-Defense*. Call 800-873-7117 or send us your check or money order (see the order form on page four).



Q&A on STRETCHING (continued from previous issues)

Study carefully these typical questions on stretching. Among them may be just the one that you wanted to ask.

■ **Question:** *Most of the stretches you show are practiced daily at my martial arts school. In fact most of them were taught to us in high school. Also, isometrics or dynamic tension is nothing new to this country. So why should your results be better?*

Answer: It is not exercises alone that make the method effective. It is also the way of arranging them in proper sequence during a workout, during a day, and during a weekly cycle of workouts. Doing the same exercises in the wrong order reduces their effectiveness. I explain how various coordination, speed, strength, endurance, and flexibility exercises influence each other. Some exercises should follow each other and some should not.

■ **Question:** *These stretches are the same we do at karate class five times a week, so why can't I do what you can?*

Answer: It is not only what exercises you do but also how, when, how much, and in what order. If you do isometric stretches five times a week, then it is no wonder that you have difficulties with your flexibility, especially if you have to call on it without a warm-up.

■ **Question:** *What is the difference between your book and your video on stretching? Do I need the video?*

Answer: The book shows stretches for the whole body. It only mentions but does not show exercises other than stretches that develop strength and endurance while promoting flexibility. The book tells you all that you must know about flexibility, but you have to devise your own exercise program on the basis of the provided (and abundant) information.

The video shows stretches as well as recommended endurance and strength exercises for your legs and trunk. The video is of the "do-along" type. If you do not know much about strength training, if your flexibility suffers because of lack of strength, if doing stretches makes your

back tired, if you are often sore after a workout—then the video may help you.

■ **Question:** *I have no access to an exercise machine to do adductor pull-downs (an adductor exercise shown in the video Tom Kurz's Secrets of Stretching). What can be done instead of this exercise?*

Answer: You do not need an expensive exercise machine to do adductor pull-downs. You can attach a pulley to a beam or a tree and hang any type of weights at one end and make a loop for your foot at the other end. If that is impossible, you can do adductor flies with loads permitting about 10 repetitions.

■ **Question:** *I practice karate and my teacher can lift a leg and hold it steady above his shoulder. Will your static active flexibility exercises let me achieve this type of strength so I can kick higher and with more power?*

Answer: Yes and no. Static active flexibility exercises will help to develop your ability to lift and hold the leg but not to make your kicks more powerful. Specific strength for a kicker is the strength that lets one pack a wallop in a kick, not to hold a leg up! Specific strength for kicking is developed by kicking a heavy bag, kicking into layers of sponge, kicking with bungee cords attached to legs, and other dynamic exercises similar to kicking. Strength, just like flexibility, is specific to the speed of movement, its angle, and range of motion (McArdle, Katch and Katch 1991).

■ **Question:** *When do I do dynamic stretches, when strength exercises, and when isometric stretches?*

Answer: The answer to your question about dynamic stretches is on pages 30-31, 41-42; about strength workout and isometric stretches is on page 64.

But just in case you find the book difficult to follow, I will repeat it here. Do dynamic stretches at least twice per day, once in the morning and once during a warm-up for your workout.

Do strength training 2-3 times per week, ending with isometric stretches.

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