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Mental Toughness and Training Too Hard

Working out too hard may lead to anxiety, loss of desire to train, and loss of interest in your sport. The anxiety may be associated with just one type of workout—the one with excessive loads—or it may spread to all intensive workouts. Athletes may try to deal with the anxiety by training harder, which is counterproductive—it makes them more anxiety-prone, and likely to overtrain. The most effective way of dealing with performance anxiety is described in the Spring 2004 issue of *Stadion News.*

How do you tell if the training load in a workout is too great ? Pay attention to the following signs.

During-workout signs of exercising too hard: worsening coordination, dizziness or vertigo, dark spots in vision, paleness, and irregular heartbeat

After-workout signs of exercising too hard or of being overstressed: difficulty falling asleep, waking up in the middle of the night, irritability, and reluctance to work out

An athlete who experiences any of these signs should take a break from working out for a few days or reduce the amount and intensity of exercises for 2–3 weeks, or both. The athlete who disregards those signs and does not reduce training will enter deeper into the forms of overtraining described in *Science of Sports Training* (see pp. 321–327), which may end any dreams of sports success. The after-workout signs may be caused by stress outside of training, but still you may have to reduce training the better to cope with the other stressors. By the way, poor sleep alone can make you both mentally and physically unwell. It makes one anxiety-prone and it interferes with post-workout recovery.

There are many more signs of overtraining, and the ways of dealing with overtraining at its three stages are given in *Science of Sports Training*.

Another good source for the signs of overtraining and of mental stress is *The ABCs of Hormonal Stress* by Dr. Philip Maffetone (available at www.mafbionutritionals.com). The connection of overly intense training with depression, anxiety, and phobias is explained in Dr. Maffetone's book *In Fitness and In Health.*

Highlights

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Sports Injury Treatment and Rehabilitation by Thomas Kurz

It is bad for an athlete to be injured. It can be made even worse by being treated by people who do not know the athlete's sport.

Advice from a doctor who does not intimately know what the athlete does, and what stresses his or her body is subjected to, can make a minor injury or a chronic disorder become a major injury. Usually you trust your physician. If the physician says to do or not to do something, an athlete is likely to believe it. A doctor not knowing the sport will be making assumptions and more or less educated guesses, and if wrong, could obliviously lead a trusting athlete into trouble—either make the injury worse or unnecessarily delay return to normal training. A physician who does know the injured athlete's sport, on the other hand, knows what the athlete can do at any given stage of treatment and recovery. Such a physician knows enough to advise how to readapt the body to sports techniques or how to change the techniques to suit the impaired ability of the rehabilitated muscles or joints. To give such advice one has to really know the sport and not just have read about it or otherwise wing it.

In the 90s the French national judo team, in addition to having a team doctor who knew judo, had a trainer whose duty was to supervise and even practice with athletes as they returned to the mat after an injury. He would serve as a practice partner for the rehabilitating judoka to better dose their effort. He would adjust his own activity level and moves to match the athlete's current ability. If he felt the athlete spared the rehabilitated limb or otherwise compensated and changed the correct form of movement, he would intervene. This is the proper approach to sports injury rehabilitation.

Research That Could Be Done Better

by Thomas Kurz

An Army study, presented at the Combined Sections Meeting of the American Physical Therapy Association in February 2004, showed that a dynamic warm-up routine with no stretches had a better effect on power and agility than a static warm-up that included stretches (Bieze 2004a). So far, nothing unexpected and it looks reasonable, but it stops looking good when one sees what sets of exercises were compared.

The dynamic protocol involved 10 types of calisthenics and five movement drills.

The static protocol involved a one-minute run in place and nine 20- to 30-second stretches of the major muscle groups.

This looks a lot like destroying a straw man or at least kicking down an open door. What educated instructor—never mind that, what sane person?—would consider one minute of running in place followed by about 5-10 minutes of static stretches to be a good warm-up? To investigate which type of stretching (or no stretching) is most effective as preparation for a workout or performance, one should set up a reasonable warm-up scenario. That means doing things as they are done in well-run workouts—first easy activity to raise alertness and body temperature, then exercises of increased intensity to make athletes sweat and get limber, and then stretches *if needed.*

Now, if one wants to research the effectiveness of a given type of stretching, say, dynamic versus static or either type of stretching versus no stretching, then one should have the subjects do these stretching variables *within otherwise rational warm-ups*, at the appropriate times within these warm-ups. Otherwise one is comparing a rational way of warming-up with artificial insanity.

My views on stretching as a part of a workout are these:

No static stretches before a workout that does not require static flexibility. In other words, no splits before kicking. This is backed up by plenty of old and new research quoted in *Stretching Scientifically*, and by common sense.

If a workout or performance calls for displays of static flexibility, then static stretches should be done in a warm-up, after dynamic stretches (if dynamic flexibility is needed), and prior to rehearsal of sport-specific skills that require static flexibility. So, for example, gymnasts would do both dynamic and static stretches at the appropriate times within their warm-up.

If the workout or performance does not call for one's maximal range of motion dynamic or static, then no stretches are needed in a warm-up. Example: a warm-up for running or for lifting weights.

A practical example of warming up that includes stretches: A warm-up for a judoka who wants to practice a very low Tai-otoshi (legs in this throw may go into a position similar to an extremely low front lunge or even a wide straddle stance or a combination of these two). First do a general warm-up, which may include some calisthenics but no static or ballistic stretches; then do task-specific drills that mimic elements of the throw; eventually shadow fit-ins of the whole throw done increasingly faster and lower (at an increasing range of motion), then drills with partner and the rest of the workout follow.

Were there any stretches in this warm-up? Yes, there were. These were the shadow fit-ins of the whole throw done increasingly faster and lower. For all practical purposes these were dynamic stretches without being named so.

The same Army researchers plan to compare effects of dynamic warm-up and static warm-up on injury rates (Bieze 2004b). If in this planned study the warm-up protocols will be set up in as biased a manner as in the one just past, then what is the point of the study? The results will be no surprise because basic knowledge of physiology is enough to understand that static stretching prior to dynamic actions is risky at worst and a waste of time at best. When comparing two exercise protocols with or without static stretches, one should not set up one protocol in a preposterous manner. A possible argument that such is the way ignorant people work out is irrelevant—they do not read research anyway so proving them wrong is a waste of time. And what about the likely injured subjects?

Another study (Bandy et al 1998) misnames static active stretches (raise-and-hold stretches) as "dynamic range of motion exercises." Here is how these researchers describe their "dynamic range of motion exercises":

"[Subject was] lying supine with the hip held in 90 degrees of flexion. The subject then actively moved the leg into knee extension (5 seconds), *held the leg in end range knee extension for 5 seconds* [italics mine—TK], and then slowly lowered the leg to the initial position (5 seconds). These movements were performed six times per session (30 seconds of total actual stretching time)."

Dynamic stretches do not involve stopping and holding the stretched position. Such holding is the identifying feature of static active stretches, not of dynamic stretches. See the definitions in *Stretching Scientifically*, pages 14–15.

Then the study compares the effectiveness of those static active stretches against static passive stretches—but how? By measuring the static passive range of motion (ROM) of the hamstrings. Duh! The static passive stretches improved static passive ROM more than the static active stretches did. The authors conclude: "Given the fact that a 30-second static stretch increased ROM more than two times that of DROM [Dynamic Range Of Motion—as they called the raise-and-hold stretches], the use of DROM to increase flexibility of muscle must be questioned."

Sure, trying to increase passive static flexibility with static active stretching is not very effective. *Static active stretches* are best for increasing *static active flexibility*. Further, misnaming static active stretches as "dynamic range of motion exercises" might lead readers to wrongly conclude that dynamic stretching doesn't measure up to what it is supposed to do—namely to increase dynamic flexibility and not static flexibility.

This research could have been done a lot better.

References

Bandy, W. D., J. M. Irion, and M. Briggler. 1998. The effect of static stretch and dynamic range of motion training on the flexibility of the hamstring muscles. *Journal of Orthopaedic and Sports Physical Therapy* vol. 27, no. 4, pp. 295-300.

Bieze, J, 2004a. In Stride With Sports Medicine: Army protocol favors dynamic warm-up, no static stretching. *BioMechanics* March 2004 (www.biomech.com).

Bieze, J, 2004b. Editor's Memo Ayear later, they soldier on. *BioMechanics* March 2004 (www.biomech.com).

Mental Toughness a Matter of Practice

by Thomas Kurz

Mental Practice

Mental toughness—control of emotions and behavior, quality of concentration, and endurance to stress—is not inborn but trainable. It takes a willingness to prepare systematically, with both physical and mental exercises. It also takes the discipline to methodically go through the steps of mobilization and concentration prior to each start, attempt or encounter.

Peak performance requires a certain state of mind (and body). Athletes who are consistent peak performers know how to control their minds and so their bodies, too. A large part of this control is their prestart ritual. This is a set of behaviors that gives athletes a sense of being in control so they feel just right—mobilized but not too anxious, calm but not too passive. At the end of the ritual, there is what Dariusz Nowicki, author of *Gold Medal Mental Workout,* calls a "trigger" for peak performance.

Recall Yelena Isinbayeva pole vaulting at the Olympic Games in Athens. Before each vault she went through the same ritual—the same posture, the same time with eyes closed, the same lip movements, the same look up right before the run-up. Watching her magic, I could not help but think, "That's Medea herself."

Isinbayeva was engaging a mobilization ritual, a concentration technique, shutting off all distractions of the Olympic stadium, and then mentally rehearsing her run-up and vault. Her rehearsal lasted virtually the same time every time. (Readers of *Science of Sports Training* know the relation between the duration of mental rehearsal and the athlete's class.) That her ritual was always the same before each attempt is a testimony to the systematic nature of her mental training—how firmly instilled are her habits of mental preparation.

Mental Toughness and Motivation

Isinbayeva vaults for the joy of it, just like other great pole vaulters. She doesn't pay attention to how her rivals do."If you start looking at them and thinking who can jump what, it is over" (Feyn, I. 2004. Smekh i slezy na vysote. *Fizkultura i Sport* 5/2004, pp. 2–3). In Athens, between vaults she covered her face with a towel when her rivals were taking their turns.

That she went for the world record after winning the Olympic contest had to do with the joy of jumping (even though setting the bar at just one centimeter over the world record has a commercial reason).

It Ain't Over Till It Is Over

When Isinbayeva cleared 4.85 meters, which her rival Svetlana Feofanova failed after failing at 4.80, it was obvious that Isinbayeva won but she did not celebrate yet. Her rival had one more attempt, at 4.90 but it was not likely that Feofanova would clear it. Feofanova's best result was 4.88 made seven weeks earlier on July 4, 2004, and she had not shown that level of performance since then.

Instead of waiting for the victory to drop in her lap Isinbayeva prepared for the next attempt, and after that for the world record at 4.91 meters. This not taking victory for granted is the warrior attitude, as was Svetlana Feofanova's not giving up and striving for gold until the end.

Contrast that with the attitude of Polish boxer Andrzej Rzany. He lost his fight for a medal because, in the last round, he believed he was ahead on points so he avoided fighting and played for time. He lost by one point. The mentally tough always have someone or something to best, even if that someone is only themselves.

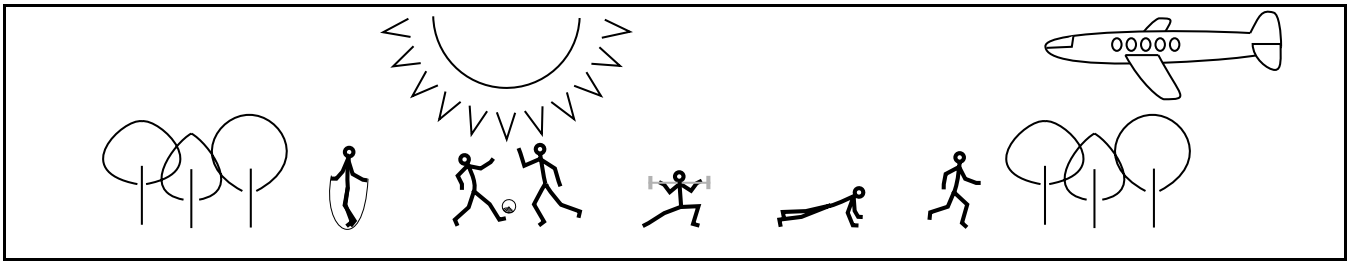
Jet Lag

by Thomas Kurz

When I flew from Montreal to Warsaw in August and then, four weeks later, returned to Montreal, I did not experience any jet lag. After both flights the next day after landing my schedule was as if I never traveled through six time zones. I was up at my usual early hour and in the evening I fell asleep at my usual hour. How did I do it? I kept my own advice on minimizing jet lag, as explained at length in *Science of Sports Training.*

Here are the points I followed:

1. Upon boarding the plane, I reset my watch and changed my sleep and meal times to match the time at my destination.
2. I did not nap after arrival.
3. I exercised after arrival—outdoors, in the sun. I exercised at a light to medium intensity. (Exercising too strenuously or late in the evening may disrupt sleep.)
4. Upon arrival I adjusted my activity and rest times to local time. Since it was daylight in Warsaw, I went outside rather than staying indoors.
5. I exposed myself to sunlight in the afternoon or evening when traveling westward, and in the morning when traveling eastward.
6. I influenced the sleep-and-wake cycle with food. In the morning, to increase alertness, I ate high protein and low carbohydrate foods. In the evening, I ate a high carbohydrate and low protein meal to become drowsy. I drank tea in the morning to speed up adaptation to local time. Coffee works too.



Q and A on STRETCHING and TRAINING
(continued from previous issue)

Instead of "Questions and Answers on Stretching and Training," in this issue I answer a question on research.

—Thomas Kurz

■ ***I am in my second year of physical therapy school at a university. Three of my classmates and I are doing research on dynamic stretching. Our hypothesis is that dynamic stretching combined with warm-up improves performance of the 40-yard dash and vertical leap compared to static stretching and warm-up or warm-up alone.***

We have found very little research that examines the impact of dynamic versus static stretching on muscle power. I am wondering if you have any literature to support our hypothesis. Thank you for any assistance you can provide.

Research papers relevant to the impact of static stretching on muscle power are quoted in *Stretching Scientifically* and in *Science of Sports Training* (in chapter 11, "Flexibility").

The other research you are looking for, on the impact of dynamic stretching on muscle power, is hard to find. The concept of dynamic stretching seems to be foreign to most Western researchers. They know the definition of dynamic flexibility but do not know dynamic stretching—only ballistic stretching, not the same thing! Some researchers—for example, Lucas and Koslow (1984)—use the name *dynamic stretching* to denote bouncing ballistic stretching techniques!

The research that comes nearest to your interest was done by U.S. Army researchers Captain Danny McMillian, and Lieutenant Colonel Josef H. Moore. See the article on page 2 of this newsletter. You can find out more about it at www.biomech.com/db_area/archives/2004/0403.sports1.bio.shtml. You just have to realize that dynamic stretches are not only those moves I show in *Stretching Scientifically* but any that fit the definition of dynamic stretching given in that book, such as the examples given on page 122.

Here are other articles that may be worth reading:

- Spring, H., W. Schneider, and T. Tritschler. 1997. Stretching [article in German]. *Der Orthopäde* vol. 26, no. 11 (November), pp. 981-6.
- Thacker, S. B., J. Gilchrist, D. F. Stroup, and C. D. Kimsey, Jr. 2004. The impact of stretching on sports injury risk: a systematic review of the literature. *Medicine and Science in Sports and Exercise* vol. 36, no. 3 (March), pp. 371-8.

By the way, a recent article on static stretching and peak torque is in the *Journal of Strength and Conditioning Research* vol. 18, no. 2.

Now, some questions of mine:

What will happen if any of your subjects get hurt doing a 40-yard dash after static stretching? There are articles published on static stretching and injury risk. (Dr. Ian Shrier, past president of the Canadian Academy of Sports Medicine, wrote a few articles giving a good rationale for not stretching statically before dynamic activities.)

Even if your subjects sign a release, should they be injured, an average lawyer will dispose of this release in a hurry.

Why do you think dynamic stretching might improve vertical leap? Vertical leap does not require a large ROM. I can conceive why static stretching might worsen the vertical leap, but unless your dynamic stretching will consist of a few squats or half squats then I'd expect it to either have no significant effect or even a detrimental effect.

Nevertheless, experiments have a way of doing away with expectations, so I look forward to the conclusions of your research.

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?
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