



STADION[®]news

Training Info for Serious Athletes

<http://www.stadion.com>

Volume 12, Number 2, Spring 2005

\$3.00

Periodization and Adaptation

The previous issue of this newsletter was dedicated to outlining the concept of periodization. The issue of tapering training before contests and easing it up at other times during the macrocycle was mentioned but not really explained for the lack of space. Here is an explanation for the need to ease up on training from time to time that goes a little beyond the obvious.

There are several reasons for periodic lowering of the training loads within mesocycles and macrocycles. The obvious reasons are providing the time to restore energy, to rest the mind, and to rebuild and heal tissues that were damaged by hard training. The less obvious reason is that periods of reduced training, such as a taper before competition and detraining after, renew athletes' ability to adapt to training (adaptability) and so permit further improvement of their form.

Observations of thousands of high-level athletes, over decades, have revealed that after about a year of training, their progress stops and training harder does not help. It is as if athletes' adaptability or responsiveness to training is exhausted. To restore it,

athletes need to reduce training or detrain themselves over a few weeks at the end of each macrocycle, and for much shorter periods during some mesocycles.

It is not known yet what causes this temporary loss of adaptability. There are several hypotheses for this loss (Viru 2001):

- Fatigue in the cellular genetic apparatus
- A regulatory mechanism that lowers protein synthesis after prolonged stimulation by exercise
- Exhaustion of some elements of the nervous system
- Alteration in endocrine function

Whatever its cause or causes, the loss of adaptability can be detected without sophisticated laboratory techniques. Everyday observations, measurements, and tests of athletes' physical and mental states, like those described in *Science of Sports Training*, will do. The loss of adaptability shows itself in a lack of improvement of athletes' form in spite of an increasing training load and in early signs of overtraining.

References

Viru, A, and M. Viru. 2001. *Biochemical Monitoring of Sport Training*. Champaign, IL: Human Kinetics.

Highlights

- *Periodization and Adaptation*

page 1

- *More on Precompetition Taper*

page 1

- *Tests and Training Plans*

page 2

- *I Told You So... Sunshine is Good for You*

page 3

- *When in Doubt, Wear Red*

page 3

- *Q&A on Training*

page 4

STADION NEWS is published by Stadion Publishing Co., Inc., P.O. Box 447, Island Pond, VT 05846, U.S.A.

Contents copyright © 2005 by Stadion Publishing Co., Inc. All rights reserved. Nothing can be reprinted in whole or in part without written permission from the publisher.

Printed in U.S.A.

More on Precompetition Taper by Thomas Kurz

In the previous issue of Stadion News I mentioned tapering. Now I expound on this topic using information from an article by George Wells (see references).

Optimal tapering results in performance improvements of up to 4% in quantitatively (distance, time, weight) measured sports. In other sports, such as individual contact sports and games, effects of a taper may be harder to measure in seconds, meters, or kilograms but are decisive nevertheless. Good mood, high confidence, and

quick reflexes resulting from a good taper can add up to peak performance in the ring or on the court.

The goal of tapering is to eliminate fatigue, a necessary and unavoidable effect of training, while preserving fitness, which results from that training. With well-trained athletes it is possible to temporarily reduce training loads so their fatigue decreases faster than their fitness, and the whole art of precompetition tapering is in knowing when and how to reduce the training just right.

Effects of tapering can be divided into physiological and psychological, but both kinds are tightly connected. For example, lowered stress results in higher anabolic-to-catabolic hormone ratio; higher aerobic capacity and increased tolerance for anaerobic efforts mean lower levels of lactate and so a better mood; and better sleep means better mood and mental function as well as better physical recovery.

Following are the main effects of tapering (Wells 2004):

(continued on page two)

Tests and Training Plans

by Thomas Kurz

Recently I had an e-mail exchange with a wrestling coach on planning training. Here are his questions (in italics) and my answers:

What is the best way to start the planning of a year-long training program for a new athlete?

Test and observe the athlete. I do not believe in relying on numbers alone, as a coach's personal observation of an athlete gives valuable info beyond the numbers.

What type of test would you conduct, and what types of things are you looking for during these tests?

What test I would use depends on the age and skill level of the athlete. I would not do sport-specific tests for wrestling with someone who has not mastered techniques that are required in the test.

For beginners, one can use batteries of tests such as the AAHPERD Youth Fitness Test, of the President's Challenge, or the English test from Leeds Education Authority. National wrestling organizations should offer tests with norms for every stage of a wrestler's development, and even if they do not, a thinking coach can mix and match a battery of general fitness tests for beginners. Knowing that for wrestling agility is the leading feature, and strength, endurance, and speed are the essential features, with flexibility being an assisting feature, just drop tests of lesser informative value such as the 50-yard sprint (it tests running speed, but for wrestlers number of burpees per 20 seconds is more relevant). But if there are no time and space constraints, then short sprints can be included—after all, these are complex tests of speed and strength.

As an example of general fitness tests, here are such tests, with norms, for sambo wrestlers (Gulevich and Zvyagintsev 1968):

- Sprint 30 m from a standstill—4.6 sec
- Run 1,500 m over broken terrain—5 min 20 sec
- Ski cross-country 10 km—58 min
- Long jump, no pre-run—2.45 m
- Chin-ups—20 reps (for heavyweights, 13 reps)
- Squats with a weight (barbell or partner) equal to one's own body weight—30 reps
- Lean forward (like a good morning lift)

with weight (barbell or partner) equal to one's own body weight—25 reps

—Press a barbell of a weight equal to one's own body weight (for heavyweights, 15% less)—1 rep

Here are samples of sport-specific tests for wrestlers described by Platonov (1997):

—Wrestlers' sport-specific test of anaerobic-alactacid fitness consists of doing a souplless (backward-bending throw) of a wrestling dummy at the maximal pace for 30 seconds. Time of the first three throws is compared with the time of the last three throws.

—Wrestlers' sport-specific test of anaerobic-lactacid fitness consists of throwing (souplless) a wrestling dummy at a pace of 15 throws per minute. Duration of work at this pace is measured.

—Wrestlers' sport-specific test of aerobic fitness consists of throwing (souplless) a wrestling dummy at a pace of 7.5 throws per minute. Duration of work at this pace is measured.

In all these tests, the dummy's weight depends on the weight category of the wrestler. In Platonov's examples, for wrestlers of lightweight categories the dummy weighs 45 lb., for middleweight categories 56 lb., and for heavier 68 lb. (These are weights of dummies used in Russia. In other countries the wrestling dummies may be made in slightly different weights, for example 50–55 lb., 60–65 lb., and 80–85 lb. The exact weights of the dummies do not matter as long as they are used consistently in these tests.)

What to test, at different times of yearly training, I explain in *Science of Sports Training*. For example—do not test sport-specific anaerobic endurance at the time when the main goal is building aerobic endurance. Another example: If tests of aerobic endurance show that it needs more work, then doing tests of anaerobic endurance at the same time would be of no use.

References

Gulevich, D. I., and G. N. Zvyagintsev. 1968. *Borba Sambo*. Moscow: Voennoe Izdatelstvo Ministerstva Oborony SSSR.

Platonov, V. N. 1997. *Obshchaya teoriya podgotovki sportsmenov v olimpiyskom sportie*. Kiev: Olimpiyskaya Literatura.

Precompetition Taper

(continued from page 1)

- Increased aerobic capacity thanks to improved oxygen transport by the blood
- Increased tolerance for anaerobic efforts thanks to improved buffering capacity of the blood
- Improved immunity thanks to an increase of white blood cells, specifically of eosinophils and lymphocytes
- Increased ratio of anabolic to catabolic hormones
- Increased size, strength, and velocity of contraction of fast-twitch muscle fibers
- Improved sleep quality and duration, which increases the release of growth hormone
- Improved mood, as measured by the Profile of Mood States (lowered mental tension, depression, anger, and fatigue but increased motivation, arousal, and mental relaxation)

Following are the training load changes during a taper (Wells 2004):

- Number of workouts per week is reduced (recommended by no more than 20%), but not as much as to let athletes "get out of the groove" skill-wise
- Duration of the taper is from 4 to 21 days, with athletes of speed-strength sports generally tapering longer than athletes of endurance sports
- Intensity of sport-specific exercises remains high
- Volume of total training reduced by 50–70% for endurance athletes and even by 85% for speed-strength athletes

More specifics of lowering training during a taper are in the article "Scientific Bases for Precompetition Tapering Strategies" in *Medicine and Science in Sports and Exercise*, written by I. Mujika and S. Padilla.

There are many ways of arranging microcycles (weekly training cycles) during the mesocycle (monthly cycle of workout) that precedes competition. They may be arranged according to the pendulum principle, where microcycles with high content of sport-specific exercises are alternated with microcycles with low sport-specific content, or in some other ways. More information on structuring training prior to and during a competition period is found in *Science of Sports Training*, in the chapter "Cycles in Sports Training."

References

Wells, G. 2004. Tapering: The Critical Interaction of the Art and Science of Coaching. *Coaches Report* vol. 11, no. 1, pp. 27–29.

I Told You So . . . Sunshine is Good for You

by Thomas Kurz

In *Science of Sports Training* and in *Stadion News* (Spring 2001,) I wrote about the benefits of exposing one's body to sunshine (no sunscreen!).

I wrote what I was taught as a student of physical education—that suntanning without a sunscreen is good for you as long as you do not get a sunburn. Now the Western medical science is catching up and discovering the obvious:

- Sunscreen is bad because it interferes with formation of vitamin D in the skin.
- Interfering with formation of vitamin D in the skin exposed to sunshine causes health problems, including cancer.
- One's common sense and skin pigment (except for albinos) are the best protection against repeated sunburn, which may lead to melanoma.

Sunscreen and Cancer

In addition to being necessary for healthy bones, vitamin D helps prevent some cancers such as lymphoma and cancer of the colon, prostate, lung, and even skin.

The best way to get vitamin D is to produce it in skin exposed to sunshine. It is

hard to obtain enough vitamin D from foods (even those vitamin D fortified), and supplements and multivitamins usually contain the less effective form of this vitamin. To make things worse, taking it in supplements may cause overdosing because vitamin D is not readily eliminated from the body. Effects of overdosing on vitamin D from dietary sources include anorexia, mental retardation, calcium deposits in blood vessels, and irreversible kidney damage. But it is practically impossible to overdose on vitamin D produced by sunshine in one's skin.

Research of Dr. Edward Giovannucci, professor of medicine and nutrition at the Harvard University, suggests that vitamin D might help prevent 30 deaths for each one caused by skin cancer. And to get the deadly form of skin cancer—melanoma—one has to sunburn repeatedly. There is no evidence that moderate exposure, without sunburns, causes melanoma.

Why I Never Use Sunscreen

Here are three reasons for not using a sunscreen:

- Sunscreen blocks production of vitamin D.
- Most sunscreens contain mineral oil, which decreases absorption of vitamin D and E.
- Even those that do not contain mineral oil still have ingredients that warrant warnings about skin irritation and rash, and in a case of ingestion, advise to contact the Poison Center immediately.

If I have to spend a lot of time working out in strong sun, I put olive oil on my skin—just like ancient Greeks did—because it does not kill vitamin D, and it contains vitamin E, which has anti-inflammatory and antioxidant properties. With olive oil, unlike with sunscreen, there is no danger of skin irritation and no need to rush to the Poison Center in case of accidental ingestion. And if I stay in the sun long enough to feel that I might get sunburn, I put on a shirt.

When in Doubt, Wear Red

Competitors wearing red are more likely to win than those not wearing red.

At the 2004 Olympic Games, British anthropologists Russell Hill and Robert Barton of the University of Durham studied outcomes of such one-on-one sports as boxing, taekwondo, Greco-Roman wrestling, and freestyle wrestling (Hill and Barton 2005).

Competitors (all male) in those sports were randomly assigned red or blue clothing or body protection. In the studied sports, competitors in red won more often—54.9% of all matches.

In matches where the point difference was small—most likely because the competitors had similar skills and fitness—the percentage of red wins was even higher—more than 60%.

Where the point difference was large, which would indicate that one competitor was clearly superior in skills and fitness to the other, wearing red had no effect on the outcome.

Red uniforms help in team sports too. Hill and Barton found that red uniforms

made a difference at a soccer tournament. Five teams at the Euro 2004 soccer tournament wore two uniforms. One uniform was red, and the other one was of some other color. Each team scored more goals when wearing red.

There are several likely explanations why wearing red provides an advantage in sports contests. Red is the color that signals male dominance and high testosterone levels in many animal species, including primates. Because of that it may cause a testosterone surge in the competitor wearing red, it may suppress testosterone release in the opponent, and it may do both. It may also influence judges and referees in sports where subjective perceptions influence scoring so they see the competitor in red as the dominant one. It may affect a score in, say, a boxing match, where each judge may score punches differently and have a different impression of each boxer's activity, and where a referee may perceive the red-clad boxer to be in better shape or fighting more fair.

Another possible explanation has to do with how the human eye perceives red. Because the color red focuses slightly in front of the retina, red objects appear to be moving forward. This may throw off distance perception of an athlete whose opponent wears red. Red is also an attention getter, so the red clothing may divert the opponent's attention from body clues that precipitate actions (Morton 2005).

When all else is equal, better wear red.

References

Hill, R. A., and R. A. Barton. 2005. Red enhances human performance in contests. *Nature* vol. 435, no. 293 (19 May 2005). <http://www.nature.com/nature/journal/v435/n7040/abs/435293a.html>.

Morton, J. L. 2005. http://www.colormatters.com/news_may05/focus2.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 our address: Stadion Publishing Company, Inc., P.O. Box 447-N, Island Pond, VT 05846, U.S.A. e-mail: news@stadion.com

Q and A on TRAINING

Study these typical questions on stretching and training carefully. You may find information that relates to questions of yours. Questions are in *italic boldface*.

■ *I am a 44-year-old man, train in tae kwon do (12 years), and have been actively athletic my entire life. About 6 years ago I tore my left pec (chest) in a freak incident where I turned suddenly and reached out to stop something from falling. It was not heavy, but the speed and movement immediately ripped much of the point of insertion of the muscle around my left arm. Ever since then, my left chest has been disfigured (it is obvious that much of the muscle is not attached where intended when the muscle contracts), and I have much less strength there than I did before. While this does not affect my everyday life, or even my tae kwon do training, I am not able to work my chest as hard as before when I lift weights, and my chest is not symmetrical. My physician is not concerned about it because he says I don't really need it to be at full strength. That may be true, but it still bothers me in that it is a limitation when it comes to my weight training. Is there anything that can be done for a torn pec, or is it a permanent condition that I need to just accept and live with?*

Surgeons prefer to repair a completely torn muscle within 2 weeks of the tear. Later the muscle atrophies and shortens so much that reattaching it may be impossible. You ripped a part of your pec (I assume it was the pectoralis major) 6 years ago (where was your doctor then?), but if the whole muscle was not torn off, maybe there is a chance of fixing it—only a good surgeon will know that after a thorough examination.

Now, a story: I know a strong man who at about 150 lb. bench pressed about 300 lb. for several reps. One day he was sparring and reached out and back to put a headlock on his sparring partner. As soon as he had the partial hold, his pec (pectoralis major) snapped off. After he healed he continued to do his bench presses, and a year later his other pec snapped off. Now he has a symmetrical chest. End of story.

My comments: I do not see any sense

for a fighter to bench press that much. Heavy bench presses are for powerlifters or bodybuilders. I hardly do any bench presses and if so, then mostly one-handed. The maximum I did was 5–6 reps with 90 lb. in one hand, and I stopped because it was not related to either sparring or grappling. I never had a situation in a ground-work where pressing more would help—no matter how heavy the opponent. If I am so squashed as not to be able to brace my arms against the opponent's body, then having strength to press even twice my body weight will not help, but if I can brace them, then I usually have options other than dumb lifting. The strength to do a few chin-ups and thirty push-ups suffices.

Dry facts: Lifting heavy may cause a disproportion between structural strength of tendon and muscle and the contractile strength of muscle (determined largely by one's nervous system ability to mobilize more motor units). Tendons are strengthened in the long term by doing sets of many repetitions with light to moderate resistance.

Fast-twitch muscle fibers—which are recruited when one generates great muscle tension—grow quickly in response to heavy lifting and are structurally weaker than the slow-twitch fibers. The bigger the muscle fibers, the weaker their structure.

Slow-twitch fibers are the main stabilizers of joints and are developed best by many repetitions with light to moderate resistance—just like what's good for tendons. Slow-twitch fibers do not contribute as much to muscle growth as the fast-twitch fibers.

This, in brief, is the rationale for the strength training program outlined in *Science of Sports Training*.

Summary: Pec tears happen to people who do heavy bench presses. Their muscles become stiff and can be inflamed. When structural strength of muscles or tendons falls behind contractile strength of these muscles, either the muscles or their tendons rip.

Stiffness of muscles, caused by wrong training (too heavy, too often, lacking balance between strength and endurance work), may be remedied by sports massage. See the article in *Stadion News*, Summer 2003.

ORDER FORM



Stadion Publishing Co., Inc.
P.O. Box 447-N
Island Pond, VT 05846
(800) 873-7117, (802) 723-6175
<http://www.stadion.com>

- ___ *Basic Instincts of Self-Defense*
(video 104 min.) @ \$39.95
 - ___ *Children and Sports Training*
(softcover 250 pages) @ \$29.95
 - ___ *Explosive Power and Jumping Ability for All Sports*
(softcover 144 pages) @ \$23.95
 - ___ *Gold Medal Mental Workout for Combat Sports*
(book, 6 audio cassettes) @ \$59.95
 - ___ *Power High Kicks with No Warm-Up!*
(DVD or VHS, 80 minutes) @ \$49.95
 - ___ *Science of Sports Training*
(softcover 424 pages) @ \$39.95
 - ___ *Stretching Scientifically*
(softcover 214 pages) @ \$25.99
 - ___ *Tom Kurz's Secrets of Stretching*
(DVD or VHS, 98 min.) @ \$49.95
- Please circle the video system: NTSC (North and Central America) or PAL (Europe, Asia, Australia).
SHIPPING: Air Mail for U.S.A. \$4.00 per book or video.
Foreign orders: \$8.00 per book or video. Foreign orders, please pay by International Money Order in U.S. dollars only. **You may return the videos or books with original invoice and in good condition at any time for a refund of the price of merchandise (less shipping and handling).**
- The following *Special Reports* are available in electronic form only (as PDF files) and will be e-mailed to your e-mail address.
- ___ #1 *How You Can Use Anatomical Tricks to Increase Stretches (15 p.)* @ \$10.95
 - ___ #2 *How Your Age Affects Your Stretching (8 p.)* @ \$5.95
 - ___ #3 *How You Can Stretch Fast for High Kicks with No Warm-Up (13 p.)* @ \$7.95
 - ___ #4 *How You Can Stretch Fast for Splits with No Warm-Up (11 p.)* @ \$7.95
 - ___ #5 *How and When You Can Do Stretches for Best Results (15 p.)* @ \$10.95
 - ___ #6 *How You Can Do Splits on Chairs (5 p.)* @ \$5.95
 - ___ #7 *How You Can Solve Typical Martial Arts Flexibility Problems (14 p.)* @ \$10.95
 - ___ #8 *How You Can Combine Stretching with Sports, Martial Arts, or Other Activities for Best Results (12 p.)* @ \$7.95
 - ___ #9 *How to Improve Your Flexibility and Prevent Injuries with Strength Training (22 p.)* @ \$12.95
 - ___ #10 *How You Can Speedup Recovery after You Were Injured (14 p.)* @ \$9.95

Name _____
Address _____
City _____
State/Zip _____
Phone _____
AmEx/Master/Visa _____
Expiration date _____
Signature _____

Checks held 14 days for clearing. No C.O.D. orders.
Make checks or money orders payable to **Stadion** and mail with this order form to **Stadion Publishing, P.O. Box 447-N, Island Pond, VT 05846, U.S.A.** or call toll free: **800-873-7117**, 24 hours, 7 days a week. Fax orders: **802-723-6171**, 24 hours, 7 days a week.