

WILL NEW DATA RAISE
THIS SUPPLEMENT TO
AN ERGOGENIC LEVEL?

By James Krieger

RIBOSE REVISITED

BACK IN THE September 2001 issue of *Pure Power* I gave you the rundown on ribose, a supplement that's supposed to improve your recovery time between training sessions and improve your gym performance. At the time, the news didn't look so hot for ribose; there wasn't any good evidence that it would do the things that it was supposed to do, and the rationale behind using it was shaky at best. However, the world of science is ever-changing... what we know today may change tomorrow as new studies come out that increase our knowledge. In fact, a new study on ribose and performance was just recently published. Will these results change our view of ribose?

RIBOSE REVIEW

Briefly, ribose is a sugar that's the backbone for adenosine triphosphate (ATP), the primary fuel for all of your muscle cells. During periods of hard training, resting ATP stores in your muscle can decrease by up to 20%.^{4,7} Ribose proponents believe that if you supplement with ribose during these times, you can accelerate the creation of new ATP in your muscles and thus improve your recovery between training sessions.

While there were some studies that, at first glance, seemed to indicate that ribose might improve performance, a closer inspection revealed that there wasn't much to hang a hat on.^{1,2,5} Also, the small changes in resting ATP that occur with training don't affect muscle performance.^{3,4} Thus, even if ribose supplementation could enhance ATP levels in muscle, it shouldn't have any effect on your strength, speed, or power. Of course, that was then, and this is now. Where does this new study fit in?

THE TRIAL

In a collaborative effort, researchers from the Katholieke Universiteit Leuven in Belgium and from Maastricht University in the Netherlands examined the effects of oral ribose supplementation on leg extension performance.⁶ Ten subjects were given four 4-gram doses of ribose a day, while nine subjects were given a placebo. The study was double-blind so neither the researchers nor the subjects knew who was getting what. All of the subjects participated in a six-day training program that involved two exercise sessions a day. The exercise sessions involved 15 sets of 12 reps of one-leg leg extensions on an isokinetic dynamometer (which keeps the speed of movement constant). The sets were separated by 15 seconds of rest. Before and after the training period, the subjects were tested for average muscle

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INTENSITY CHECK

TRACK YOUR INTENSITY
CLOSELY FOR
MAXIMIZED GAINS

By Dan Wagman, PhD, CSCS

FOR MOST OF YOU, WHEN YOU HEAD TO the gym, training hard is the mantra of the moment. Training hard for gains is likely *the* most intuitively appealing concept in sport. But if you've paid even a modicum of attention to sport research, you've learned that training hard all the time is counterproductive. In fact, taking your sets to failure has been shown to be less effective than stopping your sets a

few reps shy of failure. Still, without a doubt and with plenty of research support, the intensity of your training in the weight room, not the overall volume of work, is your key to success. But how intensely should you train? Does your training intensity need to change depending on how long you've been training? Moreover, how can you best keep track of your intensity?



INTENSITY IN TIME

The bottom line is that if you want to develop max strength, you'll need to move increasingly heavier and heavier weights. Forget about reps above five and countless sets until you can't move the body part you just trained. It's about the weight on the bar—that's it! And when you talk about the weight on the bar, you need to be basing it on your 1-rep max (1-RM), the greatest amount of weight you can lift once.

Most of you are aware that cycling your training is the most effective way to achieve strength gains. That means you'll observe periods of high-intensity training followed by periods of low-intensity training. You've probably also heard that you should spend most of your training time around

the 80% 1-rep max mark; research established this level more than 15 years ago.² However, this rough number doesn't take the time you've spent in a training belt into consideration. In other words, does this 80% mark hold true for the beginner, intermediate, and advanced trainee?

Recently, Jeremy Pick from the University of Oregon and Daniel Becque from Southern Illinois University looked at how much training experience may impact muscle activation.⁵ They selected subjects based on training experience: one group had no weight training experience and the other two years or more of training experience. The researchers determined the 1-rep max for each subject and had them go to failure in the back squat with 85% of their 1-rep max while measuring



VICKY HEMBREE
EN ROUTE TO
REWRITING THE
RECORD BOOK AT
THE IPF WORLDS.

the electrical activity in two of the leg muscles, the vastus lateralis (located toward the outside of the thigh) and vastus medialis (located toward the inside of the thigh, above the knee). The results revealed that the experienced group showed significantly greater muscle activation during max attempts, that in the set to failure the trained group had higher electrical values toward the end of the set, and that the trained group could perform more reps relative to their max than the untrained group.

THE POINT?

Well, here's where science gets really cool, at least to me, and it certainly should to you if you want to peak your performance. First you need to understand that when a muscle undergoes training, many important adaptations occur that in the end mean better performance. I'm talking about things like the nervous system firing more effectively and at a higher rate,¹ synchronization of the motor unit discharges (a motor unit is a nerve

and the muscle fibers it innervates),⁴ and an increase in intermuscular coordination.⁶ So what this all adds up to is that a more highly trained muscle will work *less* than a less well-trained muscle at the same intensity.

Let me spell it out for you. One gal has been training for 20 years and her 1-rep max in a given lift is X. You've been training for 5 years and your 1-rep max in the same lift is Y. Now we'll load two bars, one for you and one for her, with 80% of the respective 1-rep max, and you guys go at it. What'll likely happen is that your muscles will work harder to move the 80% than hers will, that early on in the set she'll need fewer motor units than you, toward the end of the set your nervous system will be working harder than hers, and toward the end she'll have greater motor unit reserves to tap into to actually do more reps, all because she has more training time under her belt than you. Now, I do need to point out that muscle size also contributes to this equation, so don't think it's only about the nervous system.³ So after 20 years of training she probably also has a greater degree of muscularity that can contribute to moving that weight than you.

OK, now we're really getting to the heart of the matter. You see, since the person with more training time and with more seasoned muscles can basically do more work *and* since it's easier for her to do a given level of work, training at the same level of intensity for the same period of time will likely *not* elicit the same sort of gains in the seasoned trainee as in the novice. So, if you've been training for years, what are you to do? Does this mean you *do* need to train to failure? Does it mean you need to take less down time than when you were training for less time? How do you make sense of this and turn it into continued gains?

FOREVER GAINING

The first thing that I need to point out to you is that we don't have any science to provide you with steadfast recommendations. I also need to tell you that we don't actually know exactly at

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WRIST SMARTS

KNOWING HOW TO
TREAT AN INJURED
WRIST IS KEY
BUSINESS

By Dan Wathen, LATC, CSCS*D, NSCA-CPT*D

AT THE ROOT

Wrist injuries can happen for any number of reasons. Here's a brief list:

- Falling on an outstretched, extended arm and wrist
- In contact sports such as boxing and football, punching/blocking with an extended wrist, which can create both acute and chronic injury
- In weightlifting, racking or cleaning the bar when the weight rests on the extended wrist without sufficient support of the shoulder or clavicle
- Using a very wide or narrow grip in pressing movements
- Performing any repetitive movement that requires wrist flexion and/or extension, which can cause an overuse injury

Signs and symptoms of wrist injury include edema (swelling), initial numbness followed by pain at a touch, limited ability to flex and extend the wrist, decreased grip strength, and, in severe cases, deformity.

THE CURE

Initially you want to treat a wrist injury like any other joint injury with RICE—rest, ice, compression, and elevation. If the symptoms don't subside in a few days or become worse, a visit to a

sports medicine specialist for X-rays is necessary to rule out a fracture. But you should know that many fractures are missed on regular X-rays and are only found weeks later when the symptoms persist. So you might need to consider an MRI or bone scan to be certain.

Once the pain has subsided, the rehabilitation process begins. First, you need to work on regaining normal range of

SOME YEARS AGO I HEARD USA Weightlifting coach Jim Schmitz say that the worst injury a lifter could have was one to the wrist—and he's right. From a biomechanical standpoint, the wrist is to the upper body what the ankle is to the lower body. All forces that go to the foot from either the ground up or the body down must pass through the ankle. All forces that go to or from the hand must pass through the wrist. Critical forces pass through the wrist in many activities, such as weightlifting, football, basketball, wrestling, boxing, pole vaulting, gymnastics, golf, volleyball, and racket and throwing sports. No wonder that a wrist injury can dead-stop your training. But if you know how to address a wrist injury, you'll minimize the time you're benched.



motion. This is done by gently stretching the wrist to the point of mild discomfort in flexion and extension several times daily. This process may be aided by applying topical ice or heat (packs, whirlpool or paraffin baths) before or during stretching.

TRAINING

As your wrist health and range of motion continue to improve, you need to include grip exercises in your rehab program. Start off with squeezing a ball or towel and wadding newspaper. As you gain in strength, you can start pinch gripping lightweight plates and graduate up to pinching two 10s or 25s together. You can also get yourself some really light grippers and work your way up to heavier ones as your strength improves.

The next step concerns bending your wrist. Once you obtain normal range of motion in extension and flexion and supination and pronation (turning your palm up and down), you can add dumbbell exercises. Exercises that focus on what's called radial and ulnar deviation can also be initiated. What you do is hold a short bar at one end by your side and then lift the thumb side of the bar up and down for radial deviation and the little finger side of the bar up and down for ulnar deviation. Try to do 3 sets of 10 to 20 reps per exercise, adding weight when you can easily perform 20 reps.



COMEBACK TRAIL

As you get back into your training, you'll need to refrain from any exercise that causes pain. These are generally exercises in which your wrist is loaded in extension, such as pressing, racking, or curling movements. Pulling movements when the weight isn't racked or caught overhead aren't usually affected. If the squat hurts you, move your grip width in or out or position the bar in a different location on your back. If that doesn't decrease wrist pain, consider a safety squat bar if your gym has one. Front squats can be problematic because your wrist is bent back quite a bit. Try doing them with your arms crossed over the bar. Since many machines don't require you to hold a bar, you should consider using them until you're completely healed. And if you injured only one wrist, be sure to train the other arm because that will actually allow your injured side to maintain some of its strength.

Once you're completely healed, you should consider continuing with the rehab exercises as a normal part of your training. In terms of frequency, load, and volume of training, treat these exercises the same way you would any other exercise. Don't overlook the fact that for many athletes and trainees a lack of focus on hand and wrist strength can be risky business.

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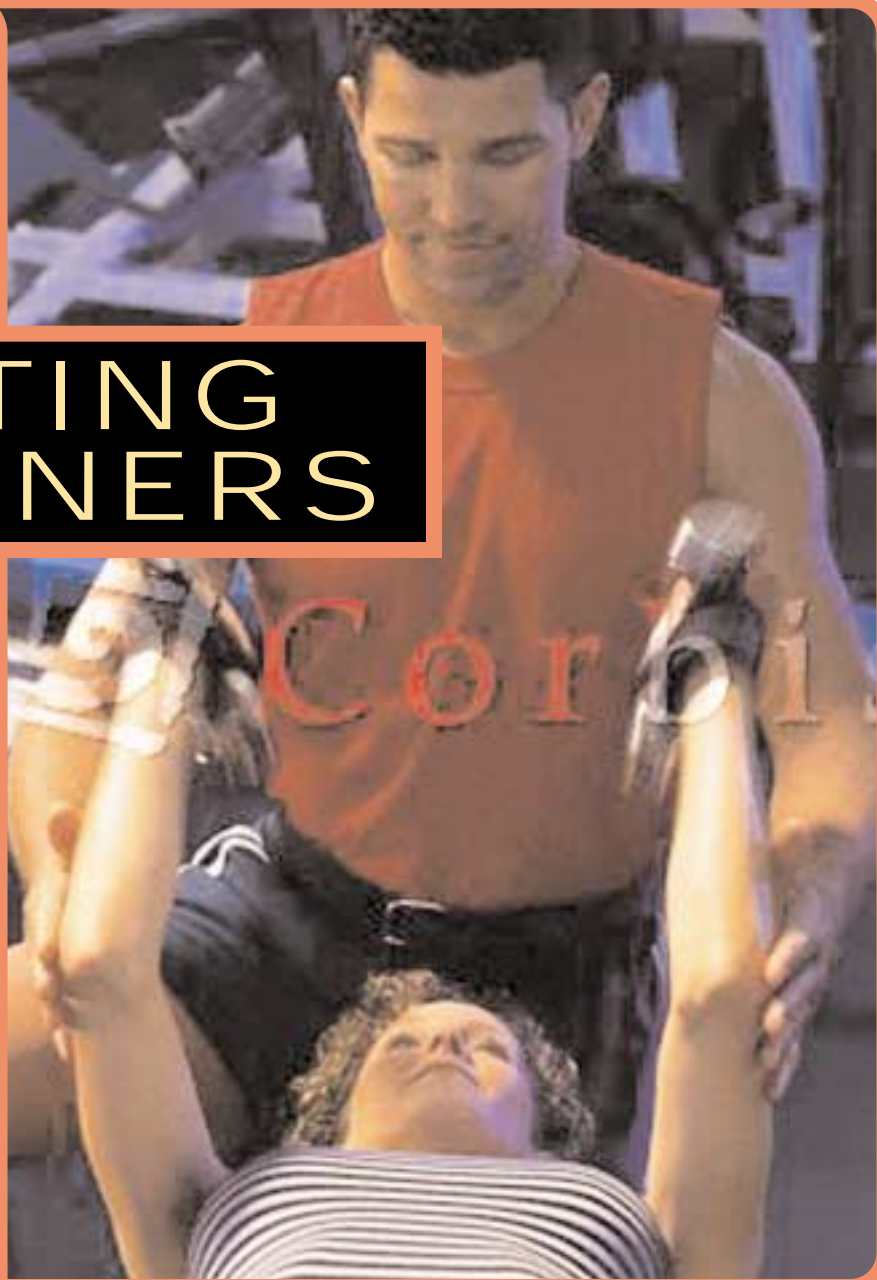


WHAT'S MORE
IMPORTANT,
EDUCATION OR
EXPERIENCE?

By James Krieger

TESTING TRAINERS

HEALTH CLUBS ARE big business in America. Memberships increased to about 10 million by the end of the last century.¹ Along with that boom you've undoubtedly noticed a huge increase in the number of personal trainers, to the tune of over 62,000 in the United States. But since they aren't required by law to have a license or certification, it's obvious that their education and experience vary widely. So if you're in the market for some expert help in your training, what should you look for?



DECISIONS, DECISIONS

Certification is one important quality to look for in a personal trainer. However, there are dozens of certifications available from all sorts of organizations, including the American Council on Exercise (ACE), the American College of Sports Medicine (ACSM), the National Strength and Conditioning Association (NSCA), the International Sports Sciences Association (ISSA), and many, many others. Some health clubs even offer their own certifications for their trainers. Different certifications require different levels of knowledge; some certifications are easier to get than others.

Another important variable to consider is the experience of the trainer. However, experience does not always guarantee knowledge and an educated background. For example, in one survey of 110 health clubs in Massachusetts, it was found that only 34% of the clubs had staff that have bachelor's degrees.² The ACSM recommends a doctor's consent before beginning an exercise program for men over 40 and women over 50, but 74% of the clubs in this study didn't require this. In another survey, only 3% of personal trainers followed ACSM guidelines for prescribing aerobic exercise.³

Clearly, not all trainers are created equal. With the broad range of certifications, experience, and education, how can you assess the chances that a trainer is skilled and knowledgeable enough to take you to new heights of sport performance?

HARD DATA

Moh Malek, a student research assistant at the University of California, Los Angeles, and colleagues decided to do a study to answer this question.¹ In order to assess the knowledge of personal trainers, they designed an eight-page questionnaire called the Fitness Instructors Knowledge Assessment (FIKA). The FIKA included questions about nutrition, health screening, exercise testing, exercise prescription, and training special populations such as diabetics. The questionnaire was administered to 115 health and fitness professionals in southern California, either directly by the researchers or by the managers of the health clubs where the professionals worked. The majority of the professionals were fitness instructors who worked in independently owned or corporate-owned health clubs. Sixty-eight of them didn't have a college degree, 12 had an associates, while 34 had a bachelor's degree or better. The researchers statistically analyzed the FIKA scores to find out what factors best predicted the overall knowledge of the personal trainers.

First, the researchers found that years of experience (which ranged from 0.2 years to 18 years) weren't associated with performance. Trainers

who had five or more years of experience didn't demonstrate more knowledge than trainers who had less experience. Second, trainers who had at least a bachelor's degree in exercise science scored 31% higher on the FIKA than trainers who didn't have a degree. Third, trainers who had four or more core college courses in exercise science, such as nutrition, biomechanics, exercise physiology, anatomy, etc., scored 25% higher on the FIKA than trainers who had three courses or less. Finally, trainers who had certifications from the ACSM or NSCA scored 45% higher than trainers who had certifications from other organizations and trainers who held no certification. So here's the bottom line. A personal trainer's knowledge is most highly related to:

- Having a bachelor's degree in exercise science
- Having taken four or more core courses in the field
- Having ACSM or NSCA certification

Out of these three, the first and third were found to have the strongest relationships to a trainer's knowledge.

EDUCATION RULES

So, based on this study, experience didn't matter, and formal education turned out to be the most important predictor of a trainer's knowledge. So you should look for a trainer with an ACSM or NSCA certification and at least a bachelor's degree in exercise science or a related field. In this study, trainers who had both of these certifications scored an average of 85% on the FIKA questionnaire. Trainers who had neither scored only 36% on the test, and trainers who had one but not the other scored 55%. While a certification and degree won't guarantee that a trainer has the knowledge and capability to design appropriate, safe, and effective training protocols, they'll definitely improve your chances.

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A CRITICAL COMPONENT TO ANY ATHLETE'S SUCCESS IS THE COMPOSITION of his or her training regimen. One of the major factors to consider is how often to train. You need to train frequently enough to optimize your training gains but not so much that you end up in a state of overtraining in which your performance will eventually decrease. In strength training for children, many of the same issues arise as for adults, though often for different reasons, such as safety. Yet for children, too, one of the main issues is: how often to train during a week?

ONE OR TWO?

FOR KIDS, TOO, HOW OFTEN YOU TRAIN CAN AFFECT

By Dan Wagman, PhD, CSCS

SUCCESS



BACK EXTENSION

BACKGROUND CHECK: KIDS 'N' WEIGHTS

Yes, we're living in the twenty-first century, but most parents and coaches that deal with children still voice grave concerns about the safety of weight training for kids. This despite a compelling body of evidence from such reputable organizations as the American Academy of Pediatrics, the American College of Sports Medicine, and the American Orthopaedic Society of Sports Medicine supporting weight training for children—as long as the established training guidelines are followed.¹⁻³ Besides the obvious strength gains, gains in muscular endurance, coordination, and bone mineral density are all welcomed adaptations resulting from a sensible strength training program for children. But just as for adults, how to specifically approach training is fraught with misconceptions, conjecture, and myth.

In an effort to provide clarity to the issue of strength training in children, several studies have looked at training frequency.^{6, 7, 10-12} These studies have found that lifting weights two to three times a week can be beneficial for children. But these studies have not determined how once-a-week training might affect progress. Just as in adults, finding the optimal training frequency is critical.

The reasons for this are multifactorial, but don't only center around training gains per se in children. Probably the biggest reason why children drop out of sport is that they simply aren't having any fun, an issue well documented in the sport psychology literature. If we're looking to weight train our children, then we should do it in a fashion that not only produces physical results but also allows the kids to enjoy themselves. And if they can have fun and make the same progress in one training session a week, why do more?

THE SETUP

A group of six researchers led by Avery Faigenbaum, EdD, CSCS, from the department of exercise science and physical education at the University of Massachusetts, Boston, recently completed a study looking at the differences between children training once or twice a week.⁵ The scientists found 21 girls and 35 boys ranging in age between 7.1 and 12.3 years with no prior weight training experience to volunteer for the study. Since preadolescent girls and boys show similar rates of strength gain,⁴ they were randomly assigned to either a one-day-per-week or two-days-per-week weight training sessions. Another 5 girls and 8 boys were enlisted to serve as controls and



CHEST PRESS

LEG EXTENSION

LAT PULLDOWN

LEG PRESS

didn't participate in any strength training.

After an introductory training session to learn proper technique, the test subjects were tested for max strength in a seated chest press machine, in the leg press, and for grip strength using a Takei handgrip dynamometer. The subjects were also tested on lower back and hamstring flexibility along with vertical and standing long jump ability.

The actual training occurred once a week or twice a week for a period of eight weeks (on a Tuesday or Thursday, or Tuesday and Thursday). On each training day, the children observed a warm-up session of low- to moderate-intensity aerobic work and stretching before engaging in the actual weight training, which lasted between 30 and 40 minutes. Each training day was ended with 10 minutes of games, stretches, and cooldown activities. The weight training program had the subjects use child-size equipment to perform one set of 10 to 15 repetitions of 12 different exercises (abdominal curl, lower back extension, leg press, leg extension, leg curl, seated chest press, pec dec, lat pull-down, seated row, shoulder press, biceps curl, triceps extension) where the last rep of each exercise was at muscular failure. On most exercises, the children would train with a weight that allowed them to reach failure between 10 and 15 reps.

Once they could perform 15 reps, the weight was increased by 5 to 10%. The rep ranges were based on previous work by Faigenbaum that demonstrated that children respond better to moderate loads at higher reps than heavier weights with low reps.⁶ In order to increase enjoyment of the activity, the children were allowed to change the exercise order in successive sessions, and if a particular child's technique deteriorated, training intensity was decreased.

MORE = BETTER

The statistical analysis of the data indicated that the subjects training twice a week ended up with better gains than those training once a week. The two-day group increased their chest

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ANALYSIS OF 1-REP MAX CHEST PRESS AND LEG PRESS TESTS

EXERCISE	GROUP	BASELINE (KG)	POST TRAINING (KG)
Chest press	Control	18.2 ± 4.0	19.0 ± 3.8
	1 Day Group	22.3 ± 5.9	24.3 ± 6.4
	2 Day Group	21.7 ± 7.0	24.2 ± 7.7*
Leg press	Control	62.2 ± 13.6	63.7 ± 12.6
	1 Day Group	60.6 ± 17.9	69.2 ± 17.9*
	2 Day Group	56.9 ± 24.0	71.1 ± 27.5*

*Change in strength from baseline to post-test significantly (P<0.05) different from control group. Data are presented as the mean ± SD.

OFF BALANCE

OVERLOOKING BALANCED DEVELOPMENT
COULD BE YOUR BIGGEST MISTAKE

By Fred Roll, CSCS

THIS ARTICLE WON'T BE LISTING A LOT OF references. I know—it's not the *Pure Power* way. But you know what? This article doesn't need any references because it's about common sense. And I know what you're thinking: if it's about common sense, why are you writing an article in the first place? Well, that's the easy part. You see, I want to remind you that in your strength training you need to consider the issue of balance, or the lack thereof. I've been a strength and conditioning coach for over 30 years, coaching both child athletes and the pros, and nobody remembers balance. So I will remind you about its importance now.

BALANCED BASICS

Most athletes view strength training as an exciting proposition that'll provide them with the strength they need to reign supreme on the field, on the court, or wherever they perform. So they jump right into their program and pump away till they're ready to explode. At issue is that everybody assumes that their structures are balanced, that their left side is equal to the right, and vice versa. Obviously

you know about the dominant side of your body, but this likely won't enter your mind when it comes to training. That could be a mistake, because muscular imbalance could diminish your gains and, at worst, predispose you to injury.

If you're right handed, you probably know that your right hand is stronger than your left. But this sort of imbalance extends to your thighs and legs as well. For many of you, one leg is slightly longer than the other, muscular origins and insertions aren't 100 percent equal, and strength ratios can differ, such as between the quad and hamstring on one thigh versus the other thigh. Sport scientists

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TIC-TOC

MEDICINE BALL EXERCISES

TIC-TOC

Start with a medicine ball or plate overhead, arms extended. Keeping arms and upper body tight, move side to side.

45 DEGREE

While seated, lean your torso back at approximately 45 degrees, with thighs at 90 degrees, knees bent at 90 degrees, and feet on the floor. Hold a medicine ball or plate out front and from the hips rotate side to side, touching the floor on either side.



45 DEGREE





WOOD CHOP

WOOD CHOP

With your feet shoulder-width apart, begin with a medicine ball or plate overhead. Keep your torso, back, and arms in the same plane. Bend at the waist, using a chopping motion, and take the medicine ball or plate between the legs, keeping the knees just slightly bent. Return overhead, reaching as high as possible, and repeat.



HAMMER THROW

SUITCASE CRUNCH

Lie on the floor with a medicine ball or plate overhead and your body outstretched. Keeping the arms straight, reach upward by sitting up to touch both feet while balancing on buttocks.



DIAGONALS

HAMMER THROW

Begin in squat position, feet flat, with a medicine ball or plate hanging between the legs. Keeping the back as flat as possible, extend from the squat position and mimic throwing the medicine ball or plate over the right shoulder, extending as high as possible. Return to start and repeat over left shoulder.



DIAGONALS

Lying on the right side with a medicine ball or plate overhead, initiate the sit-up off the right hip and sit up to touch toes. Lower yourself to left side and repeat.

RUSSIAN TWIST

Stand erect with feet shoulder-width apart and a medicine ball or plate at arm's length in front of your body. Rotate right and left, attempting to increase the range of motion with each swing.



RUSSIAN TWIST

ROCKY SOLO

Sit on the floor with an erect torso and legs and arms outstretched, holding a medicine ball. Reach to the right as far as possible and place the ball on the floor behind you. Reach around in the opposite direction and pick it up. Repeat.



SUITCASE CRUNCH



ROCKY SOLO

RIBOSE REVISITED CONTINUED FROM PAGE 1

power and maximal isometric force output, a fancy way of saying “how strong are you?”

After a six-week “wash-out” period to clear the supplement from the subjects’ systems, 16 of the subjects were again assigned to either a ribose group or a placebo group. This time, the subjects only did the exercise protocol on a single day, and they consumed the four doses of ribose or placebo on the day of exercise. The researchers took muscle biopsies to look at muscle ATP levels.

THE VERDICT

The researchers’ analysis of their results showed no differences between the ribose and placebo groups in average power output or maximal isometric strength. In addition, there were no differences in muscle ATP levels between the groups. Now, the supplementation period during the second part of the study was only one day, so

it’s possible that this wasn’t long enough for ribose supplementation to affect muscle ATP. However, even if it did, it obviously had no effect on performance, particularly judging by the results of the first part of the study.

Thus, this study adds to the growing body of evidence that ribose is probably not effective for improving your recovery between training sessions or boosting your performance in the gym. If you want a sugar that will do that, try a baked potato.

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PERFORMANCE TIPS

INTENSITY CHECK CONTINUED FROM PAGE xx

what time—8 years, 10 years, 15 years—you need to start thinking about changes in your training intensity. All we do know is that there’s a difference between an untrained and a highly trained muscle. And we also know that at some point your training gains will level off. But there must be an answer and I’m going to go out on a limb and tell you what I think.

The first thing you need to do is track your intensity over time and make sure that you train precisely at the correct intensity. Why do I say this? Because I keep track of my intensity religiously, and after doing the math for a period of five years I learned that I spent 3% of the time training at 50% 1-RM, 8% at 55% 1-RM, 4.3% at 60% 1-RM, 24% at 65% 1-RM, 9% at 70% 1-RM, 16% at 75% 1-RM, 13.5% at 80% 1-RM, 11% at 85% 1-RM, 7.5% at 90% 1-RM, and 4.5% at 95% 1-RM and maxing out. Clearly, spending a

fourth of the last 5 years training at 65% is pretty pathetic, not to mention ineffective. Yes, I’ve gotten stronger and my physical development hasn’t declined either. But clearly, based on the science we discussed above, an athlete with 20 years of training under his belt ought to probably spend a quarter of the time training at 80% instead, probably more. In fact, I trained 64% of the time at 79% 1-rep max and below, and only 36% of the time at 80% or more of 1-rep max.

So here’s what you do:

Go to www.purepowermag.com/upload/weightcalculator.txt. This chart will allow you to record every exercise that you do for a given body part along with your max for that exercise. As you type in the max weight that you can do, the chart will automatically compute the various training percentages for you.

Develop your own system of recording the intensity at which you train for each microcycle. A microcycle is the scientific term for a short period

of training; to me it's the period I need to train all of my muscles once, typically an 8- to 9-day period. To make it easy, you ought to keep *all* of your training at the same intensity. In other words, if this microcycle calls for training at 85% 1-rep max, then everything you do in the gym will be at that intensity. Of course, if you decide to vary the intensity of major work and minor work (such as pulls vs. calves, abs, and arms), you ought to keep track of each muscle group's intensity separately. Now, you might consider recording 10 microcycles, at which point you determine what the average intensity was at which you trained. If your average intensity is 80 to 85%, you're right on. If it's below, you need to start cranking it out more.

The final recommendation is that you should *not* throw the concept of periodization into the wind and start pushing it hard all of the time. You still need to cycle your training and vary your intensity and sets and reps, not to mention taking time off and incorporating unload microcycles that'll allow for rest and optimal growth and adaptation. But keep track of the average intensity that you put out and adjust accordingly.

IT'S ABOUT GAINS

The bottom line is that your training is supposed to provide you with gains. Period! But considering the science about muscular adaptations, if you've been training for a decade or more, it's likely that you won't make continued gains if you approach training in the same old way. As a mature athlete you need to train at a different level. Use these recommendations to provide you with added fuel to bump up your performance to new heights.

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ONE OR TWO?

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press strength by 11.5% versus 9% for the one-day group, and in the leg press the two-day group increased their strength by 24.9% versus 14.2% for the one-day group. In grip strength, flexibility, vertical jump, and long jump, there were no significant differences between the groups.

One of the considerations as to why the two-day-per-week group increased their strength more than the one-day-per-week group relates to the overall training volume. Basically, the one-day group did half as much as the two-day group, and some studies in adults suggest that the frequency and volume of total work is key.^{8,9} A final consideration is that although the two-day-per-week group increased their strength more than the one-day-per-week group, one-day training still resulted in greater gains than what was seen in the control group. So if a training commitment of two days per week is not possible, or the child is not having as much fun as he or she should be having, weight training once per week can still provide gains above and beyond no training. The bottom line is that kids can lift weights safely, if the adult supervision is of sufficient knowledge and experience, and that training even as little as once a week can provide gains, though not as significant as twice-a-week training.

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OFF BALANCE CONTINUED FROM PAGE xx

know that these ratios differ between limbs, though the reasons thereof are not well understood and what the ratio should be isn't clearly defined. But what the scientists do seem to agree upon is that these ratios ought to be as equal as possible between the limbs. Typically, these differences are miniscule. However, as you gain in strength in certain areas and not others, these differences can become more pronounced. That's when you can run into problems. With a rational and measured approach to your training, however, you can keep this imbalance in check. The key is to learn proper technique and to advance with a solid base.

BALANCED BEGINNINGS

The approach to balance out your body revolves around one fundamental issue: creating a solid base. As you approach your lifting, be aware that imbalances exist in your body. So don't attempt to lift max weights until you've mastered the technique, because invariably your dominant side will want to take over. That can lead to poor technique, with imbalance in the execution of the lift, a decrease in balance, and a greater potential for injury. So do only what you can with good technique and slowly build up from there. Most certainly, there will be a time when you have to push your training to the max and lay it on the line and find out what your true fiber is. But this shouldn't be done in the beginning.

Many of you might approach cardiovascular (CV) fitness as a mere by-product of lifting. But the better your CV fitness, the better your recovery from training, and an improved CV system is a welcome by-product of establishing a balanced base. One exercise is followed quickly by another exercise until the whole body has been worked, usually starting with larger muscle groups and progressing to smaller groups. Because CV conditioning may be a limiting factor in how much you can do early on in your training, keep weights light. This way you're lifting and learning technique while developing CV capacity.

CENTRAL BALANCE

The strength training profession is increasingly conscious of the importance of developing core body strength. The "core" is just a new term that refers to your midsection, to your abs and back. At issue is how your core basically connects your upper body with the lower body and, given sufficient strength, provides great stability and balance. Nearly everyone is aware of abdominal strength and the role it plays in lower back care and protection. Expand that thought to include the encompassing and powerful muscles on all sides of your torso.

An added benefit of developing these muscle groups is that they are designed to work with a postural function, supporting the spine. The role they play becomes obvious when your core is in an isometric/static contraction, as when keeping your upper body erect while performing a heavy squat or power clean. Enhancing the strength of these muscle groups allows greater isometric/static contractions, thus greater support, stability, and balance. What you're doing is creating a base from which to develop balanced body parts, a base from which to transmit leg and hip strength to the bar, bat, and ball.

GET BALANCED!

The main point is to stay away from the "Let's see what I can do!" mentality. This is a building phase; it's about developing a balanced body and proper technique. In the strength and conditioning program I ran, we took young, untrained football players and started them squatting with 4.4-pound medicine balls and slowly progressed them to squats of 500 pounds and more. Be smart! Start slow and keep on progressing. That's your training secret.

First, derive a sense of where you're at. Begin by testing your leg strength and how your legs compare. Perform a walking lunge with no weight. In order to detect problems, your reps must be done perfectly. Proper technique includes keeping your torso erect (no folding over), keeping your

knees in line with the hip, putting weight on the heel of the foot of the lead leg, keeping the knee of the lead leg over the ankle, keeping the trail leg in line with no twisting of the hips, keeping the trail leg knee on the floor (show the best hip flexion you can in the trail leg), and keeping your hands off your knees so you don't help yourself. Try about 10 reps on each leg and you'll probably notice a difference in strength, flexibility, balance, and alignment. If you experience pressure on the ball of the lead foot, if your knees collapse inward, or if you fold at the waist instead of staying erect, these indicate weak hips. You may have problems with getting the back knee down (lack of flexibility in the hip flexor) and/or lack of strength in the hamstrings. You may see other flaws besides these. Bottom line: if you can't do this exercise perfectly, you shouldn't be doing heavy back squats until you can perfect this simple tasks.

To correct these mistakes, look at a total of 200 to 400 repetitions with a medicine ball ranging in weight from 2.2 pounds to 25 pounds, but don't sacrifice technique for the sake of using more weight. You'll do half abs and half torso/leg work and 20 reps in each exercise. If you're a beginner, you should be able to do 400 to 600 reps before you advance to body weight circuits. Once you have gotten to body weight circuits, you'll keep your reps on the first part of the workout at 200 to 400 reps before continuing on to the next stage of the workout. If you're an experienced athlete, incorporate some type of warm-up that includes these types of movements that pertain to the movements of your day's training. A typical pre-workout or workout should have a minimum of 10 movements, 20 reps each, for a total of 200 reps. Here's an example of medicine ball work:

STANDING	REPS	SEATED AB WORK	REPS
Giant Circle	20	Sit-up	20
Tic-Toc	20	45-degree twist	20
Wood Chop	20	Suitcase crunch	20
Hammer Throw	20	Diagonals	20
Russian Twist	20	Rocky solo	20

MORE BALANCE

The next level of development will take place in circuits. The time frame for moving to this phase is two to four weeks or longer. Every body weight circuit should be done only after the medicine ball workout. The med ball workout may now serve as a component of your fitness base and as a warm-up. An example of a body weight circuit looks like this:

EXERCISE	REPS
Squat (body weight)	20
Pull-up	3
Side to side (rotations)	20
Squat jump (as high as possible)	20
Push-up	10
Sit-up	20
Walking lunge	20
Pull-up	3
Dip	6
Split jump	20
Lower back bridge	90 seconds

All stations should be set up beforehand. This allows you to work nonstop. Pay close attention to form in the exercises and go as far as you can toward completing three circuits. Allow yourself 2 to 3 minutes between completed sets. Cooling down with a good stretch makes for a very good workout.

CLOSING WITH BALANCE

Of course you can add your own variations to the program. You may substitute exercises and degree of difficulty. You may begin to introduce weights to the exercises and slowly work up to traditional interval work. Always try to increase your workload and strength levels. Having done this base of work to get to the traditional lifts and maintaining this base will insure that you have the necessary functional strength to perform all lifts with confidence.

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