LUNGE PROGRESSIONS

By James Burk, CSCS

USE VARIETY IN YOUR LUNGING TO BUILD YOUR STRENGTH

If you're looking for an exercise that provides great training benefits and variety to keep your training interesting, look no further than the lunge. In this exercise, you take a large step forward, bend your lead leg's knee until the trailing leg's knee almost hits the ground, and then you step back up, bringing the trailing leg next to the lead leg before you repeat. The lunge has probably what amounts to 32 variations, which address the need for variety as well as the ability to progress to more difficult variations of the exercise.

PLATE LUNGE WITH TWIST

One reason the lunge is so beneficial is its dynamic nature, as opposed to a stationary exercise like the squat. Also, since the main action involves one leg at a time while the other trails, you're also working on balance, body control, and total body awareness. Some movements in athletics that resemble a lunge are those of a pitcher in baseball and a volleyball player when digging a ball. Athletes who need to jump or push off a single leg include shot putters, basketball players, and high jumpers. So you can see where the training benefits match the demands of the sport. But unlike most exercises in the weight room, where your only degree of manipulation is in the sets and reps you perform, with the lunge you can increase the difficulty also by executing variations on the main lunge. And that's where the added training benefits can translate into greater sports performance.

TRAINING CONSIDERATIONS

Program design considerations are critical for all exercises that you do in the weight room. In order to obtain maximal adaptations in your training, you'll have to consider what's termed progressive overload and variation. Progressive overload means that your training approach doesn't stay the same. By progressively overloading your body, you're maximizing the training effect. There are seven main ways in which you can achieve this:

1. Increase the amount of weight you train with
2. Increase the number of repetitions you do in a set
3. Change the type of exercises you do in a progressively more difficult fashion
4. Increase your total volume (total volume is sets times reps in a training session)

BODY WEIGHT LUNGE

OVERHEAD BARBELL LUNGE

5. Shorten your rest periods
6. Increase your repetition speed with sub-maximal loads
7. Any combination of the above

In this article, the focus will be on points 1 to 3 above.

The second consideration refers to variation. This is actually a sub-point under progressive overload (see point 3 above), but warrants special mention because it's a major benefit of the lunge. Because the lunge is performed while you're moving and while you're focusing on one leg at a time, you can make various modifications to this exercise. With each change that you implement, you can increase the difficulty of the exercise, thereby increasing even more the training benefit.

LUNGE TOWARD EXCELLENCE

When addressing the variety and progressive overload of this exercise, consider the following:

- Go easy to hard
- Use body weight before progressing to the barbell and dumbbell
- Move the weights from close to your body to farther away
- Go from stationary to walking
- Go from walking to using an unstable surface

As you look at the lunge, you can almost visualize the different ways in which you can perform this exercise. Here's a progression by the type of lunge:

1. Body weight lunge
2. Barbell lunge
3. Dumbbell lunge
4. Plate lunge with a twist
5. Plate lunge to press
6. Overhead plate lunge
7. Overhead barbell lunge
8. Overhead dumbbell lunge

For each one of these exercises, you can also go from performing them stationary to performing them while walking. And for the advanced athlete who wants to take advantage of an added balance component, you could consider doing a stationary lunge on balance beams, dyna-discs, etc.

Here's a closer look at the progressions with important training tips.

Progression #1

Perform exercises 1 to 8 stationary; once this cycle is completed, go through it again but this time while walking.

Progression #2

Perform each exercise for three weeks but change the number of reps you perform each week.

Example:

Week 1: barbell lunge, 3 sets of 12 reps
Week 2: barbell lunge, 3 sets of 10 reps
Week 3: barbell lunge, 3 sets of 8 reps
Week 4: dumbbell lunge, 3 sets of 12 reps
Week 5: dumbbell lunge, 3 sets of 10 reps

Progression #3

In this progression, you alternate stationary with walking using the same exercises. But you reduce the reps for walking from 10 to 8 due to the higher degree of difficulty of the walking lunge.

Here's an example:

Week 1: stationary barbell lunge, 3 sets of 10 reps
Week 2: walking barbell lunge, 3 sets of 8 reps
Week 3: stationary dumbbell lunge, 3 sets of 10 reps
Week 4: walking dumbbell lunge, 3 sets of 8 reps

NEW APPROACH

With this new approach to performing the lunge, you're satisfying a major training consideration—progression. You're increasing the demands of the exercise not only by manipulating sets and reps but also by changing how you execute the exercise. What this means is that you can anticipate greater training gains that will almost certainly translate into better sport-specific performance.

RESOURCES

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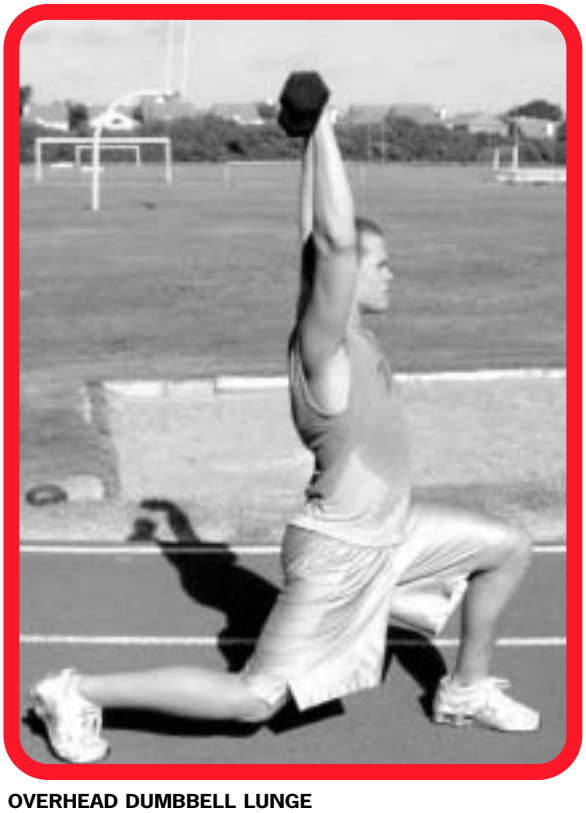


OVERHEAD DUMBBELL LUNGE

OVERHEAD PLATE LUNGE

EXERCISE AFTER TOTAL HIP REPLACEMENT

By Dan Wathen, ATC, CSCS*D, NSCA-CPT*D and Jeff Falkel, PSCS*D

NEW HIP DOESN'T MEAN NO TRAINING

What do weightlifters Tommy Kono, Ken Patera, Bill Starr, powerlifter Laura Dodd, pro wrestlers Rowdy Roddy Piper, pro-wrestling superstar Billy Graham, and pro football/baseball's Bo Jackson have in common with Dan Wathen, the lead author of this article? They've all had total hip replacements (THR). And second author Jeff Falkel has had bilateral knee replacements. Joints generally require replacement due to pain from severe osteoarthritis, which is generally caused by overuse, overtraining, improper training, accidental injury, early and/or long-term use of corticosteroid medication, or joint defects.[1-4] According to a recent newsletter by the Association of Knee and Hip Surgeons, more than 800,000 knee and hip replacements were done in 2003. These procedures have been done for nearly a half-century. This means that millions of men and women are walking around on prosthetic knees and hips. After this kind of surgery, what kind of exercise can you do safely to maintain independence and quality of life?

LEAD AUTHOR DAN WATHEN'S TOTAL HIP REPLACEMENT. THE SMALL HALF-CIRCLE SHAPE ON THE RIGHT SIDE IN THE PELVIS IS THE SOCKET, AND A LONG METAL COMPONENT IS SEEN IN THE THIGH.

REPLACEMENT BASICS

The surgical procedure for total hip replacement involves cutting through the muscles on either the outside of the thigh or through the buttocks to expose the thighbone and acetabulum (hip socket). The degenerated thigh and acetabulum are removed and replaced with a variety of metal, ceramic, or plastic components. Until recently, the procedure was rarely done on individuals under age 65. Because the lifespan of the prosthesis was typically 10 to 20 years, if you were under 65 you'd likely have to have the procedure done more than once in your lifetime. Now, however, technology has allowed for better materials and procedures. Today's new metal, plastic, and ceramic components are expected to last for more than 20 years and allow patients to return to their daily activities, so younger patients (many in their twenties) are now more common. These younger patients want to

maintain an active lifestyle despite their THR.

After the replacement parts are inserted, they may or may not be cemented in place. With a younger and more active person the non-cemented option is preferred because the replacement hip will be part of that person's life for many decades and a non-cemented version allows for new bone growth. Since older people tend to be less active, cementing the new hip in place is preferred.

Finally, the muscle, tendon, and ligament structures that were displaced to gain access to the hip joint are replaced and repaired. Because of the surgical procedures performed on these soft tissues, the person with a THR must follow several precautions with regard to hip movement and activities in order to prevent dislocation of the new THR. For at least eight weeks, patients must not flex the involved hip beyond 90 degrees or cross the leg over the midline of the body (adduction).[3] For example, patients should sleep with a wedged pillow between their legs for several months and use an elevated toilet seat or commode to prevent flexing the hip past 90 degrees.

COMEBACK

After THR, the exercise focus is on getting the patient walking. Partial weight bearing (using a walker, crutches, a cane) is done for up to eight weeks.[4] Patients can progressively increase the duration of walking up to 30 minutes per session and can gradually increase their speed in one or two long walks per day. During the first eight weeks, the patient performs straight leg lifts in flexion, extension, and abduction (out to the side), along with knee extension/flexion and calf raise exercises. These exercises, generally done in sitting or lying positions, are performed for 1 to 3 sets of 10 to 20 reps. Patients can also exercise the non-operated leg by doing resisted knee extension and flexion and even leg presses, as long as they can safely get into the machine. Exercising the non-operated leg causes a crossover effect that assists in strengthening the operated leg. However, these exercises may be modified depending on the surgical approach.[3] Non-weight-bearing upper-body

EIGHT TO 12 WEEKS AFTER THR, YOU CAN ADD RANGE-LIMITED SQUATS, LEG PRESSES, AND DEADLIFTS, DOING 1 TO 3 SETS OF 10 TO 20 REPS.

exercises, using machines or dumbbells, are usually well tolerated during this period as long as the patient can safely get onto the seat or bench without moving the hip past 90 degrees of flexion or adducting the hip across the midline. The patient must be careful doing the bench press after THR, particularly in regard to foot placement, because that position can stress the hip too much.

Generally, after 8 to 12 weeks, full weight bearing and walking can commence. Patients can also add stationary cycling, aquatic resisted walking exercises, and swimming for aerobic training and overall fitness. You can also add closed chain movements such as range-limited squats, leg presses, and deadlifts at this time, keeping the motion at 30 to 60 degrees of hip flexion to avoid possible dislocation.[3] Again, 1 to 3 sets of 10 to 20 reps are advised. You can add resistance when 20 reps can be easily achieved. For example, the lead author began deadlifts with 115 pounds for 20 reps at about eight months post-op and now does 300 pounds for 20 reps five years later. He could lift more but doesn't want to overstress the implant/bone interface.

LIMITED COMEBACK

Activities that require much running, jumping, or extremes of joint motion are generally to be avoided due to high wear or failure rate of the prosthesis or bone/prosthesis interface.[1-4] Bo Jackson learned this the hard way due to coming back to baseball too soon after THR, then needing a second and now third replacement hip. Walking, hiking, swimming, cycling, rowing, golf,

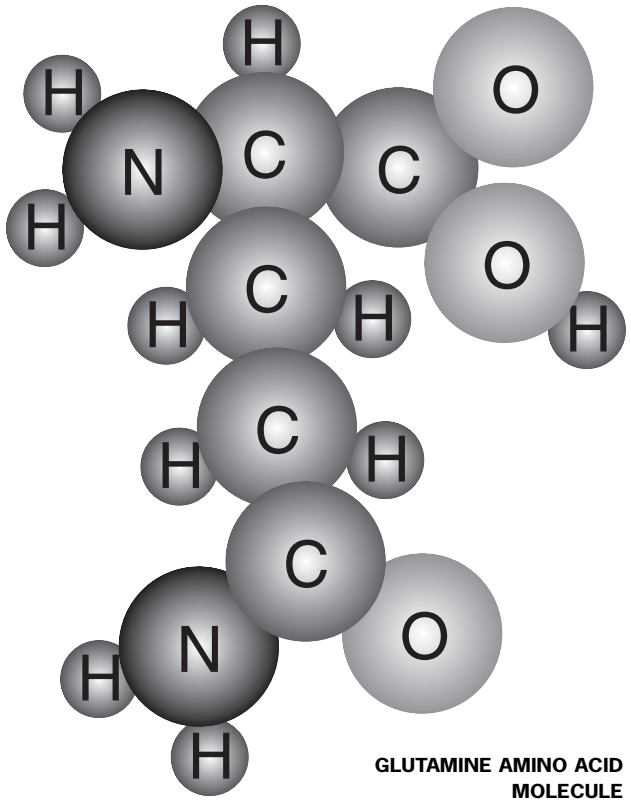
CONTINUED ON PAGE 48

AMINO ACID SUPPLEMENTATION

By Nick Ratamess, PhD, CSCS

WHAT CAN IT REALLY DO FOR YOU?

With the promise of bigger and stronger muscles, amino acid supplements are very popular among athletes. But before you buy into the hype, you need to answer a couple of important questions: what's the function of amino acids and does increasing your intake of them make you bigger, stronger, more powerful? Armed with this knowledge, which is based on science without the usual hype, you'll be able to make better purchasing and training decisions.



GLUTAMINE AMINO ACID MOLECULE

THE BASICS

Amino acids are the building blocks of proteins. This means that protein consists of a specifically sequenced chain of amino acids linked together. Twenty amino acids have been identified, with nine considered essential and 11 nonessential. The difference is that essential amino acids can be obtained only from the foods you eat, whereas the nonessential group can be produced by your body.

The next consideration is that the structure of protein dictates its function and is dependent upon the biochemical interaction of amino acids within the chain. What you need to realize is that proteins and amino acids serve many important functions in the human body. Of course to you, the athlete, one of the primary considerations is the role of amino acids in increasing muscle size, strength, power, endurance, and recovery between workouts.

PROTEIN FOR GROWTH

Muscle growth and recovery require that the amount of protein synthesized must be greater than the amount broken down. What that means is that as you train, you're breaking down protein. For you to grow, you have to make sure that your body either breaks down less protein or is able to resynthesize more protein than was broken down in your training. If you can achieve that, you're in a positive net protein balance and your growth is guaranteed.

What research in this area has found is that protein synthesis is elevated from three to 48 hours following training.[3, 4, 13] But what's interesting is that the rates of synthesis are far greater than breakdown within 48 hours following exercise, leaving you generally in positive protein balance. The prolonged periods of positive protein balance lead to muscle

growth and recovery and to potential increases in strength and power. But other factors beyond protein contribute to the degree of growth you experience—factors such as the mechanical stress on your muscles from lifting weights and the program used, the muscles' hydration status, and the acute anabolic hormonal response (e.g., testosterone, growth hormone, insulin-like growth factor-1).

THE AMINO CONNECTION

And here's the main question: how does amino acid supplementation affect net protein balance after training? The key elements for the answer are:

1. the dose of amino acids consumed
2. the composition of the supplement (ratio of essential to nonessential amino acids)
3. the timing of the supplement

Your supplement dose and composition are important for increasing the availability of amino acids. It's generally thought that consuming an amino acid supplement after training aids the recovery process. Interestingly, both low and high doses of essential and mixed amino acids (6g and 30-40g, respectively) can increase protein synthesis substantially.[6, 12, 16, 17]

This brings us to the next key element, the composition of the supplement. Essential amino acids (especially branched-chain amino acids, or BCAAs) appear to be most critical, since small doses lead to large elevations in protein synthesis.[16] Branched-chain amino acids (leucine) directly enhance protein synthesis[1], and protein synthesis is greatly stimulated by the anabolic hormone insulin, which increases proportionally to blood elevations in glucose and amino acids.[5]

Lastly, the timing of the supplement is important. Amino acid uptake into muscle is greatest when blood flow increases. That is, taking a supplement in close proximity to your training is very important to maximize amino acid uptake. In fact, supplementing before training (thereby maximizing flow during the training) increases amino acid delivery to a greater extent than following training.[17] Thus, amino acid supplementation enhances protein synthesis following weight training, and this elevation persists long into your recovery period.[18]

THE AMINO SPORT PERFORMANCE CONNECTION

OK, so from a biochemical perspective, amino acid supplementation will enhance protein synthesis in the short term. But does that mean you'll actually make better gains, be bigger, stronger, faster, more powerful, if you supplement with aminos for the long term? Most amino acid studies have looked at performance during endurance exercise and have shown limited effects. Although blood BCAA concentrations are higher and protein degradation is lower with BCAA supplementation, it had very limited effects on endurance performance.[19]

IN THE SHORT TERM, AMINO ACID SUPPLEMENTATION PROVIDES SOME BENEFITS, BUT NOT IN THE LONG TERM.

Studies that looked at amino acid supplementation in weight training have generally not found any performance-enhancing benefits. Here's a quick review:

- Williams and colleagues found that glucose/amino acid supplementation (0.2 g/kg body mass per day) didn't significantly enhance muscle strength after 10 weeks of training.[20]
- Antonio and colleagues found no additional improvements in strength after amino acid supplementation and training for six weeks in previously untrained women.[2]

ESSENTIAL AND NONESSENTIAL AMINO ACIDS

Essential	Nonessential
isoleucine*	alanine
leucine*	arginine
valine*	asparagine
histidine	aspartic acid
methionine	cysteine
phenylalanine	glutamic acid
threonine	glutamine
tryptophan	glycine
lysine	proline
	serine
	tyrosine

*Branched-chain amino acids

• Research that my colleagues and I conducted found no further enhancement of strength or power with amino acid supplementation following six weeks of training (4 weeks of overreaching and a taper phase).[14]

You can see from these performance studies that observing something from a biochemical perspective and then leaping to performance-enhancing conclusions can be quite a leap. A major consideration, however, is that these results may be typical for well-fed athletes who receive sufficient protein in their diet. If you're deficient in protein, maybe because you're dieting to make a weight class, you may benefit from supplementation.

So if the amount of protein you get from your diet is key, how much is enough? Studies have shown that strength athletes should consume about 1.7 to 2.2 g/kg of body mass of protein per day.[10, 11, 15] This is roughly double the general recommended daily allowance. *But*—intake will depend upon other factors, such as the intensity, volume, and frequency of your training. So don't just think "I gotta eat more protein—period." Be smart and consider all the variables.

THE AMINO RECOVERY CONNECTION

I'm sure you've heard this amino acid manufacturer's claim: supplement with our amino acids and you'll recover quicker and therefore be able to train harder more frequently and therefore make more gains. Sounds good, but can amino acids really deliver on that promise? The only way to find out is to conduct a scientific study that tightly controls all extraneous variables.

Because amino acids increase net protein balance, it has been suggested that supplementation could improve recovery by reducing protein breakdown and potential muscle damage. Studies have shown that BCAAs reduce protein breakdown.[7, 8] In addition, muscle damage is a normal response to unaccustomed training. One marker commonly used to indirectly measure muscle damage is blood concentrations of creatine kinase (CK). Creatine kinase is an enzyme located within skeletal muscle that is released into circulation when the muscle membrane is damaged. Thus, higher concentrations of CK indicate greater muscle damage. One study actually found lower concentrations of CK during aerobic exercise with BCAA supplementation (12 g per day) vs. a placebo,[9] but does this result apply to weight training?

There were no studies that looked specifically at the recovery aspect of amino acid supplementation, so my colleagues and I set out to investigate.[14] Specifically, we wanted to find out how amino acid supplementation might mediate muscle damage, but beyond that, we also wanted to find out if there were any performance-enhancing effects from amino acid supplementation. We wanted to make sure that our subjects trained hard and would actually incur more than usual muscle damage. So we set out to elicit overreaching by training all major muscle groups on consecutive days to also minimize recovery between training sessions. Overreaching is the scientific term for a short-term training phase where you increase your training volume and/or intensity far above normal. The rationale is to overwork (to suppress performance and build up tolerance) and then taper to rebound in performance.

We randomly assigned 17 resistance-trained men to either an amino acid or placebo-supplemented group. The amino acid supplement consisted of a mix of essential amino acids (mostly BCAAs), and the subjects consumed 0.4 g/kg of body mass per day. Each subject underwent four weeks of weight

training consisting of two 2-week phases that were much higher in training volume and frequency than their regular program. Phase 1 consisted of 3 sets of 8- to 12-rep max per exercise for eight total-body exercises. Phase 2 consisted of 5 sets of 3- to 5-rep max for five total-body exercises. [Editor's Note: A 3- to 5-rep max means that a maximum amount of weight was selected that allowed the subjects to perform no more than 3 to 5 reps.] The subjects' muscle strength and power were measured before and at the end of each training week and blood samples were taken to evaluate muscle damage.

During the initial phase of the study, the placebo group experienced definite performance reductions while the experimental group stayed the same. The blood samples indicated that the placebo group had a large increase in CK, meaning that a high level of muscle damage occurred. But the amino acid group experienced much lower levels of CK. We also found that the level of CK in the blood was related to the strength loss, meaning muscle damage may have played a role in the strength loss. However, these initial differences in muscle damage almost disappeared by the conclusion of the study; specifically, in both groups CK values returned to baseline levels. This means that the body adapts to tougher training quickly and that in the end, amino acid supplementation shows little benefit.

The next critical issue we considered was how these biochemical markers may be related to actual performance. In the placebo group, max squat and bench press strength decreased after the first week by 11.5 and 37.5 pounds, respectively. Similar results occurred for upper-body power (measured using the ballistic bench press) through the first two weeks of Phase 1. However, subjects in the amino acid group maintained max strength and power despite increased physiological stress due to the large increases in training volume and frequency. However—and this is critical—beyond Phase 1, max squat, bench press, and power increased similarly in both groups. We also included a subsequent two-week taper phase, which resulted in further strength gains in both groups. This means that the amino acid supplementation didn't provide any further enhancements in strength and power.

What this study taught us is that amino acid supplementation does indeed provide certain positive biochemical changes and performance-

BASIC FUNCTIONS OF PROTEINS AND AMINO ACIDS

1. **Enzymes** Proteins act as enzymes, which catalyze nearly all reactions in the human body.

2. **Transport and Storage** Proteins are involved in transporting molecules (e.g., hormones, oxygen) in the blood and storing them within the cells. In addition, proteins located within the cell membrane regulate what (and how much) goes in and out of the cell.

3. **Hormones and Receptors** Proteins act as hormones in the body. Some important protein hormones involved in increasing muscle size and strength are insulin, insulin-like growth factor 1, and human growth hormone. Proteins act as receptors, which are necessary to mediate the hormonal response. In addition, some amino acids are thought to stimulate a hormonal response.

4. **Immune System** Many immune cells, which help the body fight disease and improve recovery ability, are proteins.

5. **Nerve Transmission** Some amino acids form neurotransmitters necessary for proper nerve function.

6. **Mechanical Support** Certain proteins (e.g., collagen) are essential for maintaining strength of tendons, ligaments, bones, skin, organs, etc.

7. **Muscle Function** Proteins form the contractile unit, which enables muscles to contract and produce force. In addition, structural proteins are necessary to stabilize these proteins as well as the muscle itself.

8. **Energy** Certain amino acids (e.g., alanine, leucine) may be used for energy during times of starvation or strenuous endurance exercise.

9. **Acid-Base Balance** Proteins can buffer acids to preserve blood and muscle pH.

enhancing properties—in the short term. In the long term, however, amino acid supplementation provided no additional benefits.

AMINO CONCLUSION

Here are the main bullets to sum up why you really don't need to supplement your diet with amino acids, particularly if you eat well:

- Effects on muscle damage and recovery apply only to short-term situations
- Effects on performance measures apply only to the short term

Considering that your training efforts are ongoing, for months and years on end, and that as an athlete you eat a well-balanced diet high in protein (you better!), there is little if any research support to indicate that you would perform better while supplementing with amino acids.

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FIRST POWER: NUTRITION FOR ATHLETES
CONTINUED FROM PAGE 3

to come up with and agree upon specific recommendations for each of the 10 sections. It is this process that yielded the current publication titled *Nutrition for Athletes.*

REVIEW

As mentioned, I was very excited to review this brochure. I was impressed by its scientific approach in dealing with an issue as complex as sports nutrition, and since I have collaborated with one of the principal authors of this brochure on a different project, I was sure that this publication would hold up to scientific and public scrutiny. Given my high expectations, I was mightily disappointed when the first thing I read in the brochure was a statement by Sandy Allan, the CEO of the Europe, Eurasia, and Middle East branches of the Coca-Cola company, extolling the benefits of its sports drink, Powerade. Allan explains that it was his company's partnership with the IOC that allowed for the creation of this brochure. He then fairly obviously pitches the Coca-Cola company's Powerade brand as a product "developed to help athletes perform at their best for longer, thanks to its formulation, which can help delay the onset of fatigue during exercise and prevent dehydration."

Clearly, I thought, this brochure constitutes nothing more than a marketing ploy to get you to buy Powerade. And on the facing page, the medical director of the IOC, Dr. Patrick Schamasch, emphasizes that Powerade is the IOC's partner in spreading the information contained within the brochure. My first reaction was shame on the IOC and shame on the scientists who sold out to corporate interests. This brochure, irrespective of its intent, seemed tainted right from the start. Could this first impression be reversed?

UNDER THE MICROSCOPE

Despite my initial disappointment, I decided it was important to review this brochure in its entirety. The Key Messages set the stage for what is to follow by accurately pointing out the importance of proper diet in maintaining an athlete's health and performance. Then, key bullets highlight the benefits of a well-chosen diet, including why athletes can fall short of reaching their nutrition goals.

Energy Needs and Weight Control This section briefly and accurately addresses an athlete's caloric requirements and how they can be manipulated to obtain specific goals. It also addresses the dangers of restricting caloric intake too much and provides a very insightful table about how to determine low energy availability due to caloric restriction.

Fuel Needs for Training and Recovery Recently, carbohydrates have attained nearly satanic status, at least in the United States. Of course, this amounts to marketing hype and complete nonsense, and this section of the brochure does a terrific job of pointing out how critical carbohydrates are to peak performance. But beyond that, the brochure offers specific guidelines for carbohydrate intake depending on type of training and timing. In addition, you'll learn about the best sources for carbohydrates.

Protein Needs for Training and Bulking Up This section is crucial, particularly for the readers of *Pure Power.* Much has been written about protein needs for athletes, especially strength and power athletes. The common marketing pitch is that more is better. However, this section summarizes the research very well by outlining how much protein you really need. In addition, I am impressed with the accuracy with which this section addresses how and why more *isn't* better. This is a must-read section for any strength and power athlete. The sidebar on protein-rich foods is especially valuable.

Vitamins, Minerals and Antioxidants for Training and Staying Well The importance of vitamins, etc., is clear. But rather than buying into the usual hype about these compounds, this section provides reasons why you might need to supplement to meet your athletic needs and how to avoid the need for supplementation altogether. As it pertains to antioxidants, I was happy to see current research on the topic summed up most accurately with the following: "It is not known whether hard training increases the need for dietary antioxidants, as the body naturally develops an

effective defense with a balanced diet. Supplementation with antioxidants cannot be recommended."

Preparation for Competition The pre-meet meal has achieved the most mythical standing of all meals. The two key components of this meal are carbohydrates and fluids. This section does a fantastic job of summarizing how to load on carbohydrates, when to eat them (about six hours before competition), and what types of fluids to consume. Helpful sidebars make the math easy to follow and implement.

Fluid, Carbohydrate, and Salt Needs During and After Exercise Beyond the obvious impact on sports performance, these issues can be the difference between life and death, particularly if you have to train and compete in extremely hot, humid conditions. This section provides instructions for fluid replacement that are extremely easy to follow and implement: 1) how much, 2) what type of foods, drinks, products, 3) when during exercise, and 4) what modifications should be made in hot or cold environments. The sidebar on how to estimate sweat rate has tremendous practical utility.

Supplements and Sport Foods Considering all the marketing information and all the promises that athletes and coaches are inundated with, this is an extremely important section for all athletes and coaches to read. Of critical importance is the simple fact that "few of these products are supported by a sound research base and some may even be harmful to the athlete." The subsections, which provide sound, evidence-based information, include Protein Powders and Supplements, Fat Reduction and Muscle Building, Increasing Energy Supply, Nutrition and the Immune System, Supplements and Bone Health, and Supplements That Might Work. I realize that you can't wait to hear which supplements are worth investing in, so here's the short list: creatine, caffeine, and bicarbonate. Actually, I'm surprised that caffeine is listed because although it does have performance-boosting effects, in larger quantities it can cause a positive in doping control. I'm equally surprised that the brochure doesn't highlight this potentially dangerous side effect.

Supplements and Doping Issues This is another absolutely critical topic for all athletes and coaches. Not too long ago, the IOC laboratory in Cologne, Germany, found that many supplements are tainted with banned compounds (see *Supplement Doping II* in the July 2002 issue of *Pure Power*). And if a supplement causes a positive in doping control, you don't have much recourse because "athletes must be aware of the strict liability principle that makes *them* responsible for everything *they* eat and drink" (emphasis added). But beyond the obvious

doping control issues, this section accurately declares that the labels of many supplements don't mention everything that's in the bottle—and that the bottle may not contain everything that's on the label. In short, "there can be no guarantee of the purity of any commercial supplement. The only way to be sure is to avoid supplements altogether."

Special Needs for Endurance Sports and **Special Needs for Team Sports** Since these two sections are probably not of major interest to *Pure Power* readers, it should suffice to say that the advice provided is as scientifically sound, concise, and easy to implement as that of the other sections.

Special Needs for Power and Sprint Sports Somewhat of a recap of information contained in other sections, this section notes key elements to consider in training, such as how to put on mass, how to hydrate, and which supplements to consider and which to avoid. Competition issues are addressed as well, and the subsection on Eating Strategies for Power and Strength Athletes recommends that you consult a qualified sports nutritionist to fine-tune your specific diet. Since several studies have extolled the benefits of eating a protein and carbohydrate snack before and after training, a brief sidebar lists the top foods that best meet these demands.

Special Needs for Winter Sports Again, this section is probably not of primary concern to the readers of this magazine. However, subtopics contain to-the-point and scientifically sound advice on Training and Competition Issues, Special Issues for Exercise in Cold Climates, Special Issues for Exercise at Moderate Altitudes, and sidebars on pre-event meals and iron-rich eating.

Special Needs for Weight Conscious Sports Many of *Pure Power's* readers will find this section valuable since many of you compete in sports that have weight classes (weightlifting, powerlifting, wrestling, etc.). The main message is that restricting your diet too much can lead to dehydration and lack of valuable energy needed for training and competition. Unfortunately, the advice provided is cursory and lacks the detail that other sections do. The main advice is to seek out a qualified dietitian, but the section doesn't specify how to determine what qualifies a particular dietitian to dispense sports nutrition advice. Since this isn't the first mention of the need to consult a sports nutritionist, the brochure should add a section that tells the reader how to determine the qualifications of a nutritionist or dietitian and how to seek one out.

Special Needs for the Traveling Athlete At first glance, you might think this section applies to travel to another country. However, this section also addresses shorter journeys to training sites or to local competitions. The advice provided is logical and valuable since it addresses common issues that seem so obvious that they can be overlooked (such as absence of familiar foods). The keys to eating well while traveling include Planning Ahead, Eat and Drink Well While on the Move, Be Wary of Food and Water Hygiene, Choose Well from Local Cuisine, and Use Clever Tactics in Restaurants.

POSTSCRIPT

The IOC brochure concludes by listing incomplete references and a summary. In my opinion, the IOC would've done the athletic community a greater service by providing the summary up front instead of a cheap sales pitch for Powerade. In addition, the references should be complete and comprehensive as they apply to each section. Finally, the brochure should list the names of the reviewers, along with their university affiliations and credentials, in order to enhance the level of credibility and integrity it provides.

The proverbial bottom line is that the IOC has succeeded in publishing a wonderfully accurate, science-based, practical, and easy-to-read brochure that should be considered the bible of sports nutrition. I hope a second edition will do a better job in setting this information apart from common false claims by nutrition companies and highlighting the high degree of credibility it enjoys. For your own review, please visit *Pure Power* at www.purepowermag.com/upload/nutrition_for_athletes.pdf.

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LISTEN TO YOURSELF!

Dan Wagman, PhD, CSCS

MAKE THAT LITTLE VOICE YOUR GREATEST ALLY

It really doesn't matter what your sport is: it could even be testing day in the weight room. One thing's for sure, that little voice inside your head is going to be telling you all sorts of stuff. Usually, that little voice is either positive or negative. If it's positive, it can increase your self-confidence, self-esteem, motivation, concentration, and performance. If it's negative, it'll likely be demeaning, critical, and help you fail.[3] But there's an in-between: the voice could be neutral, giving you task-specific instructions.[2] The questions is, what's best for sport?

DISCOVERING YOUR VOICE

What's so cool about research is that every study builds upon information derived from previous studies. Research, in effect, is an attempt to build a brick house; each piece of research is a brick upon which another brick will be laid. It's a step-by-step process; just like you don't build the roof first, early studies don't provide all the answers. So when it comes to researching the impact that self-talk can have on performance, bricks are still being laid.

The early studies on self-talk were conducted in the lab and were basically designed to find out how a certain type of self-talk can influence the subjects' ability to perform a certain task and how different types of self-talk made them feel. Then sport psychologists wanted to know if the findings could be reproduced in a sport setting. Then sport psychologists wanted to know how self-talk might affect athletes in different sports. From all this research, it's clear that what you say to yourself can impact your sport performance. Now the question is, can you effectively change your self-talk to purposely enhance your sports performance?

NEW BRICK

Researchers from the department of Physical Education and Recreation Studies at the University of Manitoba, Winnipeg, Canada, set out to test a self-talk intervention strategy for the low drive in soccer.[1] The low drive is a scoring technique that directs the ball to the lower corners of the goal. It's an important scoring skill that requires concentration, and since self-talk

can enhance concentration, this is the perfect sport skill to test.

The researchers recruited four girls from an elite, under-fourteen regional soccer club. The girls had six years of soccer-playing experience. For inclusion in the study, the players had to meet these criteria:

a. they played a position that requires a lot of goal shooting
b. they knew how to execute a low-drive shot, but were not terribly proficient at it
c. they had a high likelihood of making the team for a game

The next step was to obtain baseline data on the low drive. The two main aspects that the researchers looked at were the technique used and where the ball went. Next, each subject was individually introduced to the concept of self-talk. The self-talk approach to this particular sport skill was determined to be most effective if it included two cue words that would focus the player's mind on proper execution of the low drive. The two cue words were "down" and "lock." They were selected because in order for a soccer player to effectively execute a low drive, the foot needs to point down and the ankle needs to be locked. Given this degree of technique-oriented specificity, this type of self-talk is considered task-specific. Next, each subject was told to use these cue words silently as "downlock" in her self-talk right before executing the move. Three of the subjects participated in the actual experiment and one subject didn't in order to provide comparisons between low drives performed with and without the self-talk intervention.

This study continued for a period of three months and all low-drive shots were recorded. For purposes of data analysis, the effect of the self-talk intervention was assessed based on two criteria: scientific and practical. The scientific criterion was used to see if self-talk had a strong effect on low-drive performance. The practical aspect was to determine whether the girls who used the intervention and the coaches felt that it was of value. And just in case you're wondering, the way this study was designed and the type of controls that were implemented do allow for strong conclusions to be drawn, despite the fact that only four subjects were used.

DO TALK TO ME

The baseline data for all subjects showed a trend toward poor performance. However, once the self-talk cue words were implemented, there was a gradual and marked increase in scoring ability by all of the subjects by the end of the study. As hypothesized, the fourth subject, who didn't utilize self-talk, remained at baseline levels. In a competitive setting, which was also assessed, the three subjects who used self-talk outperformed the subject who didn't by between 9% and 20%. These are the hard numbers for the scientific criteria.

In practical terms, all of the subjects and the coaches agreed that improving low-drive shooting would be very important. Upon completion of the study, the subjects felt that the task-oriented self-talk not only had a positive psychological effect on them, but also improved their low-drive shooting ability. Moreover, their confidence and perceptions about their scoring ability also increased.

What this study shows is that self-talk can indeed improve confidence and performance. Moreover, the self-talk for a sport setting should be task-specific. This means that simply saying to yourself "I can do it" is less effective than saying something as specific as "down" and "lock" in order to reinforce specific technique strategies. So whatever sport you participate in and even if it's max-out day in the gym, talk to yourself in *specific* and *technique-oriented* terms. The added concentration and confidence will soon turn you into a top performer.

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POWER MED
EXERCISE AFTER TOTAL HIP REPLACEMENT
CONTINUED FROM PAGE 37

bowling, doubles tennis, and low-impact dancing are generally well tolerated. As far as lifting weights goes, if the movement involves the hip, you want to ensure that you don't overload the joint.[2-4] Unfortunately, the amount of weight that can be lifted without causing premature failure is unknown at this time. The lead author regularly lifts 500 pounds in the standing calf raise, over 450 pounds for shrugs, and 330 pounds in the single leg press, all for reps of 20 or more five years after THR surgery. As more active people require THR surgery, we will learn more about the effects of lifting weights on the longevity of the THR. However, until we have more data, our recommendation is lifting lighter weights for more repetitions (15 to 20) in a limited range of motion to avoid overstressing the implant and soft tissues that prevent dislocation.

SUCCESS!

Joint replacement, followed by a slightly modified exercise program, has allowed millions of "hippies" (people with THR) to return to pain-free, independent, active lives. Since having his hip replaced, the lead author can walk without limping and sleep through the night. He has hiked in numerous national parks. He pumps iron three days a week (full body) and cycles and/or rows three days a week. There's plenty of active life after a THR.

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FAKE HIP TRAINING

Total hip replacement has not kept powerlifter and lead author of this article, Dan Wathen, out of the weight room. Old habits die hard and in this case continue, though with certain changes. Below is Wathen's current training regimen.

Day 1
Upper-body exercises: wide-grip bench press, seated row, lateral raise, abdominal curl. The bench press is done in four-week cycles, doing 10-rep max in the first week, 5-rep max in the second week, 3-rep max in the third, and 1-rep max in the fourth. Other upper-body exercises are done in 1 to 3 sets of 20 or more reps.
Lower-body exercises: deadlift, leg press (single leg), leg extension, standing leg curl, seated calf raise. The deadlift is done from one inch below the knee 1x20; the leg extension (single leg), leg press (single leg), standing leg curl, and seated calf raise are all done for 1 to 3 sets of 20 or more reps. Wathen adds weight when 20 reps are easy.

Day 2
Stationary cycle or rowing for 20 to 30 minutes. Then hammer curl and straight-arm pulldown for 1 set of 20-rep max.

Day 3
Upper-body exercises: incline press, front raise, lat pulldown, pullover, leg raise, shrug. The incline press is performed in the same manner as the bench press. The front raise, lat pulldown, pullover, leg raise, and shrug are all done for 1 to 3 sets of 20 or more reps.
Lower-body exercises: leg press, hip flexion, hip adduction, hip abduction, glute-ham raise, standing calf raise. The leg press is performed with one leg at a time. The hip flexion, hip adduction, hip abduction, glut-ham raise, and standing calf raise are all done for 1 to 3 sets of 20 or more reps. Weight is added when 20 reps are easy.

Day 4
The training of Day 2 is repeated.

Day 5
Upper-body exercises: bench press, seated row, and lateral raise. The bench press is now performed with a shoulder-width grip while the same volume and load approach as on Day 1 are repeated. The seated row and lateral raise are done for 1 to 3 sets of 20 or more reps.
Lower-body exercises: deadlift, single leg press, single leg extension, reverse hyperextension, seated calf raise, and abdominal curl. All of these exercises are done for 1 to 3 sets of 20 or more reps; the weight is increased once 20 reps are easy.

Day 6
The training of Day 2 is repeated.