



Copyright © February 1st, 2009 by Alan Aragon  
Home: [www.alanaragon.com/researchreview](http://www.alanaragon.com/researchreview)  
Correspondence: [aarrsupport@gmail.com](mailto:aarrsupport@gmail.com)

## Contents FEBRUARY 2009

### EDITOR'S CUT

**2 Orthorexia nervosa: the perfect eating disorder for health nuts?**

By Alan Aragon

### THE WISDOM OF...

**4 Interview with Dr. Larry Plotkin, Team Chiropractor for the University of Maryland, College Park.**

By Alan Aragon

### NUTRITION & EXERCISE

**6 Effects of Caloric Restriction and Overnight Fasting on Cycling Endurance Performance.**

Fergusson LM, et al. J Int Soc Sports Nutr. J Strength Cond Res. 2009 Feb 4. [Epub ahead of print] [[Medline](#)]

**7 Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates.**

Sacks FM, et al. N Engl J Med. 2009 Feb 26;360(9): 859-73. [[NEJM](#)]

### SUPPLEMENTATION

**8 The effects of creatine ethyl ester supplementation combined with heavy resistance training on body composition, muscle performance, and serum and muscle creatine levels.**

Spillane M, et al. J Int Soc Sports Nutr. 2009 Feb 19;6(1):6. [Epub ahead of print] [[Medline](#)]

**9 Green tea catechin plus caffeine supplementation to a high-protein diet has no additional effect on body weight maintenance after weight loss.**

Hursel R, et al., et al. Am J Clin Nutr. 2009 Mar;89(3):822-30. [[Medline](#)]

### LESS RECENT GEM

**10 Protein feeding pattern does not affect protein retention in young women.**

Arnal MA, et al. J Nutr. 2000 Jul;130(7):1700-4. [[Medline](#)]

### IN THE LAY PRESS

**12 The art of war: a guide to online debating.**

By Alan Aragon

### ERRATUM

**13 Correction in August 2008.**

**Orthorexia nervosa: the perfect eating disorder for health nuts?**

By Alan Aragon

*Introduction*

This article is inspired by the peculiarly obsessive and perfectionistic view that many fitness enthusiasts have of food. I first heard the term “orthorexia” mentioned many years ago, but it wasn’t until I became involved with the online fitness communities that I realized how prevalent it really was. Let’s dig into the concepts and controversies behind this intriguing condition, which some would argue doesn’t actually exist.

*Defining orthorexia nervosa*

The term “orthorexia” is rooted in the Greek word *orthos* (straight, proper, correct) and *orexia* (appetite). Orthorexia has been described as a pathological obsession with food free of pesticides, herbicides, preservatives, and artificial ingredients. There’s an intense fear of eating what’s perceived as “unclean” or unhealthy food. Unlike anorexics, orthorexics don’t necessarily have the specific intent to lose weight. Militant adherence to such a dietary habits can have adverse social consequences. Nutritional deficiencies can develop, which can lead to other health problems. In support of this concept, Catalina Zamora et al presented a case study of a 28 year-old female who was hospitalized for severe malnutrition.<sup>1</sup> At a height of 1.59 m (~5’3”), she weighed 27 kg (~60 lbs). To quote the case study:

The patient had intense acne at 14 years of age that did not improve with conventional treatments. She went to a naturist who recommended that she eliminate all fats from the diet. At 16 years of age, she restricted different foods until becoming a lacto-ovo vegetarian at 18 years of age. At 24 years of age, she eliminated eggs and milk products from her diet. Her weight was around 43 kg (BMI 17). She has never been overweight.

The subject in the above case study went on to limit her food intake to a raw vegan regime. Her menstrual cycle eventually stopped, and her condition progressively worsened until she finally was hospitalized. This case study represents a “perfect storm” leading to a downward spiral. However, less severe, yet no less concerning cases abound. General physician Steven Bratman may have been the first to coin the term orthorexia in 1997, and tack on to it the suffix *nervosa*. Bratman eloquently defines orthorexia nervosa (ON) as a “fixation on righteous eating”<sup>2</sup> To quote him on the nature of orthorexics:

Such people are sometimes affectionately called "healthfood junkies." However, in some cases, orthorexia goes beyond a mere lifestyle choice. Obsession with healthy food can progress to the point where it crowds out other activities and interests, impairs relationships, and even becomes physically dangerous. When this happens, orthorexia takes on the dimensions of a true eating disorder, like anorexia nervosa or bulimia.

That quote reminds me of a large segment of the online fitness community. I would venture to say that Bratman’s description represents the vast majority of those who compete in bodybuilding and figure competitions. I know that I’m not too far off the mark, since I work with this population on a daily basis. Questions remain about the proper place of ON within the realm of formal clinical diagnosis, which we’ll discuss next.

*Is ON a ‘legitimate’ condition?*

ON is still a relatively new concept that doesn’t yet have a universally accepted definition or standardized set of diagnostic criteria. As of this writing, ON is not a condition listed in the American Psychiatric Association’s Diagnostic and statistical manual of mental disorders (DSM). However, emerging research is hinting towards progress in that direction.

Based on a more simple questionnaire by Bratman (Bratman’s orthorexia test – BOT), Donini et al developed an orthorexia diagnostic tool called ORTHO-15, which they found to have good predictability, and was validated against a control sample.<sup>3</sup> Recently, Arusuglo et al translated ORTHO-15 into Turkish and tested it on a sample consisting of 994 subjects aged 19-66 years.<sup>4</sup> They concluded that their adaptation of ORTHO-15 (which they called ORTHO-11) had “statistically satisfactory properties”, and that orthorexia was related to pathological eating attitudes and obsessive-compulsive symptoms.

In another recent trial, Eriksson et al examined how scores on the Social Physique Anxiety Scale (SPAS) and the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) relate to BOT scores with regard to age, sex, and self-reported exercise frequency and duration.<sup>5</sup> They found that men and women seem to differ with regard to which variables were related to the BOT results, and no clear-cut conclusions could be drawn. Nevertheless, they acknowledged the importance of raising awareness that some widespread fitness ideals are neither healthy nor realistic, and that ongoing efforts are necessary to improve the participants’ self-image and prevent eating disorders, which are common among the exercising population.

In light of these explorations toward the formalization of diagnostic criteria for ON, controversy exists regarding the legitimacy of the condition. For example, Kummer et al have a very skeptical view of ON.<sup>6</sup> Here’s a summary of their points of contention in a recent commentary:

- The emergence of ON as a new eating disorder has been emphasized by some scientific articles, but is mainly a questionable figment of the mass-media.
- ON might merely be a precursor to known eating disorders such as anorexia and bulimia, which also involve strong concerns with food quality.
- There are many studies which reported increased risk of developing known eating disorders in both dieters and vegetarians.
- Some dieters may not overtly express their intention of weight loss, while their habits are conducive to it, for example, the avoidance of calorie-dense foods and viewing them as “unhealthy”.

- ON is nothing but a psychopathological characteristic. It can be considered a set of symptoms that may or may not lead to a real eating disorder.

### *No immunity for health professionals*

Kummer's scathing dismissal of ON can sound pretty convincing, but being well-entrenched in the fitness community, I can attest to the utility of developing a diagnostic tool for ON. It seems to have its own characteristics distinct from anorexia, bulimia, and OCD. Those who think differently have not spent a whole lot of time around bodybuilders and hardcore fitness fanatics. Furthermore, it's possible that many people in the health and fitness-related fields chose their profession because of a somewhat pathological interest in the fine details of how food affects the body. Interesting research by Kinzl et al examined the prevalence of ON and its related psychological factors in female dietitians.<sup>7</sup> Their conclusion may or may not surprise you:

This study, within the limitations of its methods, partly confirms the assumption that orthorexia nervosa seems to be a frequent eating disorder in dietitians, and that some women take up dietetics because of an existing eating disorder and their hope of coping with it. At the same time, for other women, the daily confrontation with nutrition and healthy food may heighten their tendency to an eating disorder in general.

To my knowledge, no such study as the above has been conducted on personal trainers. However, I would expect to see similar outcomes, if not more severe. The above findings have not been limited to our dietitian friends. Bagci Bosi et al recently examined the prevalence of ON in resident medical doctors.<sup>8</sup> As indicated by ORTHO-15, a positive correlation was found between markers of ON and those who were trying to control their bodyweight. The authors concluded that despite the study's limitations, it rightfully draws attention to ON and implicates the benefit of conducting further research to develop valid, reliable diagnostic tools for detecting the presence of ON.

### *Bigorexia: the perfect adjunctive dysfunction*

The former slang term "bigorexia" has been published and used interchangeably with muscle dysmorphia in the scientific literature.<sup>1,9,10</sup> This condition is common among bodybuilders, and is characterized by a fear of being inadequately muscular. Even the thought of appearing "normal" can be terrifying. Compulsions include spending hours in the gym, squandering excessive amounts of money on useless supplements, bizarre eating patterns (eating by the clock instead of by hunger, carrying home-prepared food wherever you go in order to avoid food that hasn't been meticulously weighed and prepared to your desired standards), and drug abuse.

In my observations, bigorexics are particularly susceptible to orthorexia. In fact, at the higher levels of competitive physique development, there seems to be a synergy between the two conditions. Ironically, many of those with this combination of dysfunction love to read, but they tend to gravitate towards unrealistic claims. My theory is that at a subconscious level

there's some sort of hope for the magic bullet or special way of eating that might bring the physique closer to aesthetic perfection. In the process of obsessively seeking out the "perfect" foods, food timing, food combinations (and separations), and food avoidance, the big picture gets buried in the meaningless details.

Most ortho-bigorexics are completely unaware of the irony in their habits. For example, they'll declare that fruit is "unclean" due to the sugar content, and then turn right around and consume a large dose of empty-calorie carbohydrate (like dextrose or waxy maize starch) postworkout. They'll passionately preach the fat-promoting danger of mixing carbs and fats, and at the same time they'll eat every 2.5 hrs, which ensures absorptive overlap of the macronutrients. Bodybuilders will tell you that humans weren't meant to consume dairy foods, then they'll turn around and buy a tub of whey isolate or hydrolysate, which are some of the most technologically altered dairy foods available.

### *In conclusion*

The mass media can't help but use the time-honored formula of beautiful people to sell products. But as long as companies reinforce the genetically exceptional (and/or drug-enhanced) as models of "beauty" in their marketing campaigns, the public, hungry for happiness and self-acceptance, will always be prone to destructive behavior driven by unrealistic goals. The only solution I can see is education – *scientific* education.

### REFERENCES

1. Catalina Zamora ML, et al. Orthorexia nervosa. A new eating behavior disorder? *Actas Esp Psiquiatr.* 2005 Jan-Feb;33(1):66-8. [[Medline](#)]
2. Bratman S. What is orthorexia? Accessed Feb 2009. [[Orthorexia Home Page](#)]
3. Donili LM, et al. Orthorexia nervosa: validation of a diagnosis questionnaire. *Eat Weight Disord.* 2005 Jun;10(2):e28-32. [[Medline](#)]
4. Arusuglo G, et al. Orthorexia nervosa and adaptation of ORTO-11 into Turkish. *Turk Psikiyatri Derg.* 2008 Fall;19(3):283-91. [[Medline](#)]
5. Eriksson L, et al. Social physique anxiety and sociocultural attitudes toward appearance impact on orthorexia test in fitness participants. *Scand J Med Sci Sports.* 2008 Jun;18(3):389-94. [[Medline](#)]
6. Kummer A, et al. On the concept of orthorexia nervosa. *Scand J Med Sci Sports.* 2008 Jun;18(3):395-6; author reply 397. [[Medline](#)]
7. Kinzl JF, et al. Orthorexia in dietitians. *Psychother Psychosom.* 2006;75(6):395-6. [[Medline](#)]
8. Bagci Bosi, et al. Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine (Ankara, Turkey). *Appetite.* 2007 Nov;49(3):661-6. Epub 2007 May 13. [[Medline](#)]
9. Leone JE, et al. J Athl Train. Recognition and treatment of muscle dysmorphia and related body image disorders. 2005 Oct-Dec;40(4):352-9. [[Medline](#)]
10. Mosley PE. Bigorexia: bodybuilding and muscle dysmorphia. *Eur Eat Disord Rev.* 2008 Sep 1. [Epub ahead of print] [[Medline](#)]

### Interview with Dr. Larry Plotkin, Team Chiropractor for the University of Maryland, College Park.

By Alan Aragon

---

*Editor's note: Larry is a very down-to-earth guy who is also a recent subscriber to AARR. Since I know very little about chiropractic, I thought it would be interesting to get the perspective of someone who has attained a rare position in this field. Enjoy the interview.*

#### **What are your proudest career accomplishments?**

My proudest career accomplishments are being able to provide quality care to a vast number of patients over my 15 year career, and now working with the University of Maryland. Developing a strong integrated working relationship with the Athletic Trainers, Physical Therapists, Primary Care Physicians, and Orthopedic Surgeons, both at Maryland and in my local area.

#### **What are the biggest career regrets you're willing to admit to?**

I can't say that I have any career regrets I can think of. I have travelled a path that I had always hoped to. I remember when I started practicing in 1993, I said in 10-15 years I wanted to practice 3 days a week and teach 3 days a week. 15 years later I am doing just that. I have recently moved into a work partnership which has worked out better than I could have hoped for.

#### **What turn of events and specific efforts landed you the spot of official chiropractor of the University of Maryland Terrapins? Was working with athletes a conscious decision from the start?**

I was fortunate to be working with a colleague who was affiliated with the Baltimore Ravens, and had many contacts. When the new Assistant Athletic Director from UMD came on staff, he was looking to expand the Sports Medicine department, to bring it up to pace with other professional programs. He contacted us, and due to my location, I was the one who took the lead at Maryland. The relationship has grown over the last 3 years, and continues to be a great work environment. I have always been into exercise and nutrition, and always wanted to work with athletes. I started out working with local high schools, and even professional wrestlers that used to travel to the area.

#### **What do you consider unique about your philosophy of patient care compared to your peers?**

I don't know if I would consider this unique to only my care, but I incorporate Chiropractic, Exercise and Nutrition into my practice daily. Nutrition has become a love of mine, as this is one of the areas most people, as you know, fall way short of. I also believe in working with as many other health professionals as possible, as the most important aspect of care is what is best for patients.

#### **What do you enjoy most about your day-to-day work? What do you enjoy least?**

In my day to day work, I love working with people. I enjoy being around people, interacting, and knowing each and everyday I go into the office, I do not feel like I am going to work. The only aspect of my job that is not pleasant is dealing day in and day out with insurance companies, who attempt to dictate what kind of care and how much care a patient may need. The paperwork associated with this is only getting worse.

#### **What is your biggest criticism or rant about the industry you're in?**

I think the biggest criticism is just like many other professions, there are people that practice the way you feel it should be done, and others that try to "work" the system. This makes it very difficult for the docs out there doing things the way that I feel is correct. Unfortunately in this profession, people tend to relate one bad experience with a chiropractor, to all chiropractors being bad.

#### **What are the most common injuries you treat, and what are their most common causes?**

The most common injuries I treat in the office are lower back and neck issues. Most are caused by poor biomechanics, and people who are not taking care of themselves on a daily basis. Working at University of Maryland, we work with many lower back, neck and shoulder issues. Restoring proper joint function to the area, whether it be spine related or extremity related, is vital to returning the athlete to optimal levels. Most are overuse injuries, or traumatic from the sport.

#### **What are some preventive measures that athletes can take to avoid these injuries?**

I think athletes need to learn to take care of themselves better in general. They need to learn how important diet can be in influencing optimal performance, recovery, inflammation, and injury prevention. They need to also learn the benefits of core stability, and how balance in both strength, and flexibility, along with life in general can be. And in my mind, one of the most important preventative measures anyone can take is learn the powerful benefits of ice.

#### **The chiropractic profession has had its share of conflict with the medical mainstream. Do you think the field is heading in a direction that's more compatible with its traditional detractors (physical therapists, MDs, etc)?**

There is no question we are making more strides into "mainstream" medicine. I think the more that D.C.'s continue to develop positive relationships with other health professionals the better. I just finished teaching a class for the University of Maryland Medical School for 4<sup>th</sup> year students on Chiropractic. This is an elective course that many are choosing to take. It was a great opportunity to talk about how Chiropractic and Medicine can work hand in hand, and how to find a good D.C. to work with.

**What would be your response to anyone who says that chiropractic medicine is not scientifically sound?**

I would tell them to do some research, especially for lower back and neck pain. There are many good studies out there to read about. That being said, more scientific based research needs to be done as well. I also think people don't realize as chiropractors, at least in the state of Maryland, we are also licensed to be able to provide PT and Rehab. There are many great adjunct techniques to what we do that can really help patients to get better (ART, SASTM, GRASTON, etc.)

**Just how divided are the professionals in the chiropractic field? I ask because my earlier readings mentioned "straight" chiros, and "mixers" who dabbled a host of 'alternative' therapies from herbs to magnets. Where along this continuum do you fall?**

I think there is still a divide in the chiropractic profession in general. I am seeing more and more D.C.'s working with other medical professionals, which I believe is vital for the future, especially with the uncertainty of Health Care. In contrast, there are still others in the profession who still believe chiropractic can cure everything, and are not open to working with others.

**You're also a CSCS. How much of the sports conditioning aspect is incorporated into your work as a chiropractor?**

As a C.S.C.S., I incorporate a significant amount of exercise and conditioning into my practice and life. Patients need to learn about how important it is to actively participate in their own care. I am also a strong believer in practice what you preach. That is how I live my life as well.

**What pieces of literature - sports-related or other - have been most helpful to you on either a technical or emotional level?**

Good Calories, Bad Calories ... Your research site .... Younger Next Year .....T-Nation ..... 150 Best Foods.....The PaleoDiet ....I can go on and on ....

**Looking ahead 5-10 years, how do you see your practice changing or evolving?**

I see my practice continuing to maintain over the next 5-10 years. I would also like to pursue more teaching to help educate more people, and hopefully produce better P.T.'s, D.C.'s, and others in the health profession. I am also looking to pursue the nutritional end of things. In dealing with local athletes, it amazes me how good they can perform while eating awful. I hope to be able to educate and change some of this, and see the results.

---

*Dr. Larry Plotkin has been a practicing chiropractor since 1994. He graduated from the National College of Chiropractic in 1993, Summa Cum Laude, second in his class. He did his undergraduate training at Towson University, where he graduated in 1990, Magna Cum Laude. He was Certified as a Strength and Conditioning Specialist in 1996 (CSCS) by the*

*NSCA. He was also certified as a Nutrition Consultant (CNC) in 2002, and a Sports Nutrition Consultant (CSNC) in 2004 by the AFPA. He currently teaches continuing education for the Steiner Education Groups (Baltimore and Virginia Schools of Massage), the American Massage Therapy Association (AMTA) (Maryland Chapter) the Maryland Chiropractic Association, as well as Anabolic Laboratories. He is certified as an instructor for the National Certification Board for Therapeutic Massage and Bodywork (NCBTMB). In 2005, he starting working as the Team Chiropractor for the University of Maryland, College Park, where he works with all the sports teams, as well as traveling with the football team. He is also on the teaching faculty at the University of Maryland College Park in the Kinesiology Department. More information on Dr. Plotkin can be found at [www.drlarryplotkin.com](http://www.drlarryplotkin.com)*

## Effects of Caloric Restriction and Overnight Fasting on Cycling Endurance Performance.

Fergusson LM, et al. J Int Soc Sports Nutr. J Strength Cond Res. 2009 Feb 4. [Epub ahead of print] [[Medline](#)]

**PURPOSE:** In addition to aerobic endurance and anaerobic capacity, high power-to-weight ratio (PWR) is important for cycling performance. Cyclists often try to lose weight before race season to improve body composition and optimize PWR. Research has demonstrated body fat-reducing benefits of exercise after fasting overnight. We hypothesized that fasted-state exercise in calorie-restricted trained cyclists would not result in performance decrements and that their PWR would improve significantly. We also hypothesized that substrate use during fasted-state submaximal endurance cycling would shift to greater reliance on fat. **METHODS:** Ten trained, competitive cyclists completed a protocol consisting of baseline testing, 3 weeks of caloric restriction (CR), and post-CR testing. The testing sessions measured pre- and post-CR values for resting metabolic rate (RMR), body composition,  $VO_2$ max, PWR and power-to-lean weight ratio (PLWR), and power output, as well as 2-hour submaximal cycling performance, rating of perceived exertion (RPE), and respiratory exchange ratio (RER). **RESULTS:** There were no significant differences between baseline and post-CR for submaximal trial RER, power output,  $VO_2$ , RMR,  $VO_2$ max, or workload at  $VO_2$ max. However, RPE was significantly lower, and PWR was significantly higher post-CR, whereas RER did not change. The cyclists' PWR and body composition improved significantly, and their overall weight, fat weight, and body fat percentage decreased. Lean mass was maintained. The cyclists' RPE decreased significantly during 2 hours of submaximal cycling post-CR, and there was no decrement in submaximal or maximal cycling performance after 3 weeks of CR combined with overnight fasting. without compromising endurance cycling performance. **CONCLUSION:** Caloric restriction (up to 40% for 3 weeks) and exercising after fasting overnight can improve a cyclist's PWR without compromising endurance cycling performance. **SPONSORSHIP:** George Washington University Department of Exercise Science, Washington, DC.

### Study strengths

This is the first study to ever examine both caloric restriction (CR) and fasting on various measures of endurance performance. Previous research has merely looked at these conditions in isolation – not combined. A relatively broad array of parameters were tested, including power output, oxygen consumption,  $VO_2$ max, resting metabolic rate (RMR), rating of perceived exertion (RPE), power-to-weight ratio (PWR), substrate use during training, and body composition. Subjects were trained, competitive cyclists, which eliminated the newbie effect (a broader range of protocols produce similar results in novices). Additionally, subjects had very similar fitness levels. All had raced at least at the Category 3 level (men) or the Category 4 level (women) for the last 3 consecutive years or more. This project's ambitiousness also yielded some potential problems, which I'll discuss next.

### Study limitations

Although a registered dietitian instructed the subjects on the proper techniques of accurate record keeping, dietary control in a self-selected/self-reported is limited. This is only remedied by the lab providing the food and beverages, but beyond acute/short-term trials, this is a costly control measure that unfortunately is rarely taken.

### Comment/application

Air displacement plethysmography (ADP, trade name BODPOD) was used to determine body composition. Although this method has shown some promise for a range of young and old populations,<sup>1-4</sup> a more concerted dig through the literature raises doubts about its validity compared to the better established reference standards (dual X-ray absorptiometry – DEXA, & hydrostatic weighing – HW). For example, Fields et al found that ADP underpredicted body fat as compared with the 4-compartment model (fat mass, total body water, bone mineral mass, residual mass).<sup>5</sup> Similarly, Collins et al, found that ADP underestimated percent bodyfat compared to HW, DEXA, and the 3-compartment model (fat mass, total body water, and fat-free dry mass).<sup>6</sup> In contrast, Wagner et al found that ADP significantly underestimated body density in black subjects, resulting in an overestimation of bodyfat.<sup>7</sup> Ball et al recently compared ADP with DEXA and found that their measurements differed significantly, and this difference increased along with an increase in bodyfat.<sup>8</sup> Finally, as I've mentioned in a previous issue, ADP may be prone to overestimating the bodyfat of obese individuals in tight clothing.<sup>9</sup>

Regardless of the mixed potential of ADP, this trial yielded some interesting results. The main finding was the lack of decrease in submaximal endurance performance in the overnight-fasted conditions after 3 weeks of 40% caloric restriction (CR) below maintenance needs. Additionally, no significant differences were seen in  $VO_2$ max, workload at  $VO_2$ max, or RMR. The non-effect on RMR was reflected in a lack of significant LBM loss. One finding that surprised the authors was the RPE decrease in the post-CR submaximal cycling test. But, they also acknowledge that the RPE is a subjective measure, despite its high reproducibility.

Previous research has seen adverse effects on endurance performance and RPE as a result of fasting anywhere from 21 hours to 3.5 days. The present trial's pre-test fasting period was significantly shorter (11 hours). Ironically, in other trials there has been a lack of decrement in endurance capacity despite fasts as long as those that did show adverse effects.<sup>10,11</sup> Another interesting finding was the lack of a statistically significant decrease in respiratory exchange ratio (RER), which would have indicated a greater shift towards fat oxidation in the fasted CR group. The lack of this occurrence was attributed to the subjects' high level of endurance conditioning, which may have provided a tendency towards increased fat metabolism during training that offered less room for further fat oxidation. In sum, the present trial demonstrated that in trained subjects, a short (3-week) period of moderately severe CR is not detrimental to the conditioning process, nor did an 11-hr fast adversely affect endurance capacity.

## Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates.

Sacks FM, et al. N Engl J Med. 2009 Feb 26;360(9): 859-73. [\[NEJM\]](#)

**PURPOSE:** The possible advantage for weight loss of a diet that emphasizes protein, fat, or carbohydrates has not been established, and there are few studies that extend beyond 1 year.

**METHODS:** We randomly assigned 811 overweight adults to one of four diets; the targeted percentages of energy derived from fat, protein, and carbohydrates in the four diets were 20, 15, and 65%; 20, 25, and 55%; 40, 15, and 45%; and 40, 25, and 35%. The diets consisted of similar foods and met guidelines for cardiovascular health. The participants were offered group and individual instructional sessions for 2 years. The primary outcome was the change in body weight after 2 years in two-by-two factorial comparisons of low fat versus high fat and average protein versus high protein and in the comparison of highest and lowest carbohydrate content. **RESULTS:** At 6 months, participants assigned to each diet had lost an average of 6 kg, which represented 7% of their initial weight; they began to regain weight after 12 months. By 2 years, weight loss remained similar in those who were assigned to a diet with 15% protein and those assigned to a diet with 25% protein (3.0 and 3.6 kg, respectively); in those assigned to a diet with 20% fat and those assigned to a diet with 40% fat (3.3 kg for both groups); and in those assigned to a diet with 65% carbohydrates and those assigned to a diet with 35% carbohydrates (2.9 and 3.4 kg, respectively) ( $P>0.20$  for all comparisons). Among the 80% of participants who completed the trial, the average weight loss was 4 kg; 14 to 15% of the participants had a reduction of at least 10% of their initial body weight. Satiety, hunger, satisfaction with the diet, and attendance at group sessions were similar for all diets; attendance was strongly associated with weight loss (0.2 kg per session attended). The diets improved lipid-related risk factors and fasting insulin levels. **CONCLUSION:** Reduced-calorie diets result in clinically meaningful weight loss regardless of which macronutrients they emphasize. **SPONSORSHIP:** National Heart, Lung, and Blood Institute and the General Clinical Research Center, National Institutes of Health.

### *Study strengths*

Compared to most dietary interventions, this one had a large randomized sample; 811 subjects were recruited, 645 (80%) completed the study. It was also exceptionally long, spanning over 2 years (October 2004 through December 2007). Blinding was facilitated in part by the use of similar foods for each diet. Although the diets were not provided by the lab, group sessions were held once a week, 3 of every 4 weeks during the first 6 months and 2 of every 4 weeks from 6 months to 2 years. Individual sessions were held every 8 weeks for the entire 2 years. Daily meal plans in 2-week blocks were provided. Subjects recorded their intake in a daily food diary as well as a web-based self-monitoring tool that calculated how closely their daily food intake met the goals for macronutrients and energy. Behavioral counseling was integrated into the group and individual sessions to promote adherence to the assigned diets.

### *Study limitations*

Although the 4 diets allowed for a dose-response test of carbohydrate intake ranging from 35-65% of total kcals, most low-carb dieters wouldn't consider 35% accurately representative of the low end, which commonly falls in the neighborhood of 15-20%. As well, protein hovered within a curiously low range of 15-25%. The targeted caloric deficit was 750 kcal less than baseline intake. Since baseline intake averaged 1966 kcal, a 750 kcal reduction equals 1216 kcal. A protein intake range of 15-25% of this figure ends up being a paltry 45.6-76 g. Targets aside, the actual caloric intake range at the 2-year point was 1413-1560 kcal, and protein intake ranged from 19.6-35.1% (73-126g). This ended up being a little more sensible, particularly from the standpoint of preserving lean mass under hypocaloric conditions. This brings up the next limitation, which was a lack of measurement of body composition. However, this shortcoming was partially alleviated by measuring waist circumference. Exercise was tracked by a self-monitoring program online, but the target of 90 minutes of moderate physical activity per week clearly is not applicable to athletic populations.

### *Comment/application*

The main finding is that the diets were equally successful in promoting clinically meaningful weight loss and weight loss maintenance over the 2-year trial duration. Satiety, hunger, and satisfaction with the diet were similar for all diets. This isn't too surprising given the non-extreme hypocaloric intake coupled with the (relative) lack of disparity in the lowest and highest intakes of carbohydrate and protein. As expected, all participants had difficulty achieving the goals for macronutrient intake of their assigned group despite the intensive behavioral counseling.

The importance of in-person/group dietary counseling was highlighted in this trial. Interestingly, the importance varied across groups. Subjects assigned to the lower-protein or higher-fat diet did not have to drastically change their customary level of dietary protein and fat. Therefore, they had to focus primarily on reducing overall intake. In contrast, the participants in the higher-protein or lower-fat groups had the dual challenge of changing their habitual diet composition in addition to reducing intake. The investigators were not surprised that attendance at group counseling sessions was strongly related to adherence to high-protein or low-fat goals, but not strongly related to the goals in the average-protein or high-fat groups.

I recently pop-quizzed a group of students and asked them what's the best diet (I gave them a few choices that covered the range of pyramid-type to Atkins-type diets), and had then discuss things amongst themselves. None of them got it. The answer to the trick question was: the best diet is the one you can adhere to. In agreement with this philosophy, the authors of the present trial conclude that calorie reduction – however it's best achieved by the individual – is more important for long-term weight loss than specific proportions of the macronutrients. Bear in mind that this is particularly true with non-athletic populations with more general weight loss goals. Sports with varying energy demands will undoubtedly vary in respective nutritional support.

## The effects of creatine ethyl ester supplementation combined with heavy resistance training on body composition, muscle performance, and serum and muscle creatine levels.

Spillane M, et al. J Int Soc Sports Nutr. 2009 Feb 19;6(1):6. [Epub ahead of print] [[Medline](#)]

**PURPOSE:** Numerous creatine formulations have been developed primarily to maximize creatine absorption. Creatine ethyl ester is alleged to increase creatine bio-availability. **METHODS:** This study examined how a seven-week supplementation regimen combined with resistance training affected body composition, muscle mass, muscle strength and power, serum and muscle creatine levels, and serum creatinine levels in 30 non-resistance-trained males. In a double-blind manner, participants were randomly assigned to a maltodextrose placebo (PLA), creatine monohydrate (CM), or creatine ethyl ester (CEE) group. The supplements were orally ingested at a dose of 0.30 g/kg fat-free body mass (approximately 20 g/day) for five days followed by ingestion at 0.075 g/kg fat free mass (approximately 5 g/day) for 42 days. **RESULTS:** Results showed significantly higher serum creatine concentrations in PLA ( $p = 0.007$ ) and CM ( $p = 0.005$ ) compared to CEE. Serum creatinine was greater in CEE compared to the PLA ( $p = 0.001$ ) and CRT ( $p = 0.001$ ) and increased at days 6, 27, and 48. Total muscle creatine content was significantly higher in CM ( $p = 0.026$ ) and CEE ( $p = 0.041$ ) compared to PLA, with no differences between CM and CEE. Significant changes over time were observed for body composition, body water, muscle strength and power variables, but no significant differences were observed between groups. **CONCLUSION:** When compared to creatine monohydrate, creatine ethyl ester was not as effective at increasing serum and muscle creatine levels or in improving body composition, muscle mass, strength, and power. Therefore, the improvements in these variables can most likely be attributed to the training protocol itself, rather than the supplementation regimen. **SPONSORSHIP:** Labrada Nutritionals (Houston, TX) and AST Sport Science (Colorado Springs, CO).

### Study strengths

I've been waiting for this trial. It's the first non-acute study comparing the effects of creatine monohydrate (CM) with the much-hyped creatine ethyl ester (CEE). Body composition was assessed with dual X-ray absorptiometry (DEXA). Instead of administering a flat dose, subjects received a dose that was proportional to fat-free mass (FFM): 0.30g/kg FFM for a 5-day loading phase followed by a 0.075g/kg FFM maintenance dose. Dosing times per day were standardized. Compliance was reinforced by supplement logs and verbal confirmation. The resistance training protocol was theoretically sound, and reasonably representative of the 'middle ground' of volume and frequency that creatine-targeted athletic populations might undergo. Diet records were required 4 days prior to each testing period, and were analyzed with software. No significant differences in dietary intake were detected among the 4 testing sessions.

### Study limitations

In a perfect world, diet would be provided by the lab, but unfortunately this is often a cost-prohibitive measure. A few more weeks added on to this 7-week trial would have been nice. Obviously, the longer the better, but this still gives us useful data for those who plan on taking creatine in more focused phases. This might be a slight nit-pick, but I was hoping to see a 3-5 RM test instead of a 1 RM. The latter parameter has limited utility outside of powerlifting. Certainly, it wasn't congruent with the training protocol, which was more glycolytic/hypertrophy-oriented (3 sets of 8-10 repetitions with 70-80% 1-RM). Although training was documented in logs by the participants, it was not supervised. The fact that the subjects were not resistance-trained compounds this design flaw.

### Comment/application

To give some background on the rationale behind CEE, creatine is a polar molecule, and thus hydrophilic. Esterification (a common process used in pharmaceuticals) is thought to increase the bioavailability of creatine by making it less hydrophilic. According to the manufacturers of CEE, the esterification enables creatine to bypass the creatine transporter due to increased permeability of the sarcolemma (the membrane of the muscle cell). This claim has not been demonstrated, but it has thus far been the marketing crux. Common claims are that much less CEE needs to be taken due to its superior bioavailability, which has the added benefit of less bloat, etc.

As early as 1922, esterification of creatine was shown to reduce its stability in acidic conditions, making it more susceptible to degradation.<sup>12</sup> However, the first real nail in the coffin for the CEE claims emerged from a study by Child and Tallon, which showed that CEE rapidly degraded into creatinine (the inert breakdown product of creatine) while standard creatine monohydrate (CM) stayed almost completely undegraded for 2 hours in simulated stomach acidity.<sup>13</sup>

The present study all but crushes things for the purveyors of CEE, since it compared its effects with CM over a chronic period, demonstrating the superiority of CM on a number of fronts. Notably, serum creatinine increased 3-fold after the loading phase, and continued to elevate above normal levels throughout the length of the trial. On the other hand creatinine levels in the CM treatment stayed within the normal range. No significant differences were seen in total body mass increase, but the CM group showed the largest increase in thigh mass. Interestingly, the CM and placebo groups decreased fat mass, while the CEE group showed a slight increase. My feeling is that this was due to the lack of tight dietary control, and not due to any special lipogenic effect of CEE. Still, it rubs a little more salt in the wounds of the CEE campaign. There were no significant differences in strength increase among the groups (including the placebo control). This was attributed to the newbie gains from training that could have masked the benefit of either treatment. To conclude, I'll quote the authors:

*"...our results seem to indicate that creatine esterification does not provide a superior alternative to creatine monohydrate for muscle creatine uptake."*



## Green tea catechin plus caffeine supplementation to a high-protein diet has no additional effect on body weight maintenance after weight loss.

Hursel R, et al., et al. Am J Clin Nutr. 2009 Mar;89(3):822-30. [\[Medline\]](#)

**PURPOSE:** Green tea (epigallocatechin gallate + caffeine) and protein each were shown to improve body weight maintenance after weight loss. **OBJECTIVE:** We investigated the effect of a green tea-caffeine mixture added to a high-protein (HP) diet on weight maintenance (WM) after body weight loss in moderately obese subjects. **METHODS:** randomized, placebo-controlled, double-blind parallel trial was conducted in 80 overweight and moderately obese subjects [age (mean +/- SD): 44 +/- 2 y; body mass index (BMI; in kg/m<sup>2</sup>): 29.6 +/- 2.0] matched for sex, age, BMI, height, body mass, and with a habitually low caffeine intake. A very-low-energy diet intervention during 4 wk was followed by 3 mo of WM; during the WM period, the subjects received a green tea-caffeine mixture (270 mg epigallocatechin gallate + 150 mg caffeine/d) or placebo, both in addition to an adequate protein (AP) diet (50-60 g protein/d) or an HP diet (100-120 g protein/d). **RESULTS:** Subjects lost 7.0 +/- 1.6 kg, or 8.2 +/- 2.0%, body weight ( $P < 0.001$ ). During the WM phase, WM, resting energy expenditure, and fat-free mass (FFM) increased relatively in both the HP groups and in the AP + green tea-caffeine mixture group ( $P < 0.05$ ), whereas respiratory quotient and body fat mass decreased, all compared with the AP + placebo group. Satiety increased only in both HP groups ( $P < 0.05$ ). The green tea-caffeine mixture was only effective with the AP diet. **CONCLUSION:** The green tea-caffeine mixture, as well as the HP diet, improved WM independently through thermogenesis, fat oxidation, sparing FFM, and, for the HP diet, satiety; a possible synergistic effect failed to appear. **SPONSORSHIP:** NUTRIM, Maastricht University, Maastricht, Netherlands.

### Study strengths

At 80 subjects, this was a fairly large sample size, considering the norm of less than half of this for dietary supplement interventions. As a rare example in supplementation research of being statistically responsible, the authors of this trial calculated the necessary minimum number of subjects according to the differences observed in fat mass (FM) in a previous study. With a difference of 2.2 kg and a standard deviation of 4.5 kg, it was calculated that after factoring in a 10% dropout, at least 80 subjects were needed to achieve sufficient statistical power (90%) to observe significant ( $P < 0.05$ ) changes in body composition and body weight. Investigators rarely go out of their way and draw attention to their calculation of sample size, so this was a welcome tidbit of reporting in an area of research notorious for small samples. Body composition was assessed through an uncommon method called hydrometry, also called deuterium oxide dilution. Hydrometry doesn't have a boatload of literature behind it, but in the little that it does, it has shown less bias than DEXA and strong validity against the 3-compartment model.<sup>14,15</sup> Physical activity was tracked by accelerometers. The lab provided the food during the initial 4-week 500 kcal very-low-energy diet (VLED) phase. During the weight maintenance phase, consumption of the additional protein in the

higher-protein group was checked by taking 24-hour urine samples and analyzing their nitrogen content.

### Study limitations

This study was meticulously designed and executed. It's tough to find glaring fault with it, since it measured what it set out to measure while minimizing the potential confounders. One possible flaw (which really turned out not to be) was the choice to assign 50-60g (roughly 10% of total kcal) protein in the so-called "adequate protein" group (AP) I consume close to that amount of protein *per meal*. The designated "high-protein" group (HP) was allotted 100-110 g per day (roughly 20%). These amounts would likely be insufficient to prevent lean body mass loss under athletic regimes, or regimes involving progressive/rigorous exercise. In this particular study, however, that wasn't an issue.

### Comment/application

Despite my minor beef with the potential lack of protein, none of the groups lost a significant amount of fat-free mass (FFM) by the end of the trial; fat free mass remained steady and similar across all of the groups. Nevertheless, there were subtle but expected differences. During the weight-maintenance period, significant body weight regain appeared in the AP + placebo group, but not in the HP + placebo group, the green tea/caffeine + AP group, or the HP + green tea/caffeine group. This was also the case with BMI and waist circumference. FFM increased in all groups with a comparable magnitude. Fat mass (FM) increased only in the AP + placebo group. An increase in FFM and slight decrease in FM indicated a FFM-sparing effect during the weight maintenance in the HP groups and in the green tea-caffeine mixture + AP group.

Previous research has shown a caffeine/green tea combination's short-term ability to hike up thermogenesis and fat oxidation.<sup>16,17</sup> Thus, the authors of the present trial were lead to hypothesize that this combination might act synergistically with a high-protein diet to enhance weight loss and weight maintenance. However, no synergistic effect of green tea + caffeine supplementation was seen on a higher-protein diet on body weight maintenance after weight loss. Weight maintenance after the HP + green tea/caffeine was comparable with the results of the HP + placebo and the AP + green tea/caffeine treatment.

The absence of synergy between effects of a green tea/caffeine mixture and the HP diet could be due to a number of mechanisms. The one that seems plausible to the investigators is that proteins (especially caseins present in milk) formed complexes with the polyphenols in tea. There are 3 different caseins; of these, b-casein has a tendency to bind to different polyphenols because it is the casein richest in proline. The EGCG in green tea has a tendency to bind to proline-rich protein. The protein envelops the catechins in a process called noncovalent cross-linking, which is suspected to reduce the bioavailability of the polyphenols. This brings us right back to the old reliable basics of getting adequate protein for satiety and LBM support (and a dash of extra thermogenesis) under hypocaloric conditions for successful weight loss and weight loss maintenance. Is that too simple to sell?

### Protein feeding pattern does not affect protein retention in young women.

Arnal MA, et al. J Nutr. 2000 Jul;130(7):1700-4. [[Medline](#)]

**PURPOSE:** This study was undertaken to determine whether a pulse protein feeding pattern was more efficient than a spread pattern to improve protein anabolism in young women as was already shown in elderly women. **METHODS:** After a 15-d adaptive period [1.2 g protein/(kg fat-free mass. d)], 16 young women (age 26 +/- 1 y) were given a 14-d diet providing 1.7 g protein/(kg fat-free mass. d), using either a pulse pattern (protein consumed mainly in one meal, n = 8), or a spread pattern (spreading daily protein intake over four meals, n = 8). Nitrogen balance was determined at the end of both the 15-d adaptive and the 14-d experimental periods. Whole-body protein turnover was determined at the end of the 14-d experimental period using [(15)N]glycine as an oral tracer. **RESULTS:** Nitrogen balance was 17 +/- 5 mg N/(kg fat-free mass. d) during the adaptive period. It was higher during the experimental period, but not significantly different in the women fed the spread or the pulse patterns [59 +/- 12 and 36 +/- 8 mg N/(kg fat-free mass. d) respectively]. No significant effects of the protein feeding pattern were detected on either whole-body protein turnover [5.5 +/- 0.2 vs. 6.1 +/- 0.3 g protein/(kg fat-free mass. d) for spread and pulse pattern, respectively] or whole-body protein synthesis and protein breakdown. **CONCLUSION:** Thus, in young women, these protein feeding patterns did not have significantly different effects on protein retention. **SPONSORSHIP:** Supported by a Ph.D. studentship to M.A.A. and grants from the Société Danone, Le Plessis-Robinson, France.

#### *Study strengths*

Food was provided by the lab through the length of the trial. This eliminated the major confounding variable of self-reporting error. There was no difference in the protein sources between the diets (70% animal, 30% vegetable). Protein intake was adequate throughout, and even rode the high end (1.67g/kg) for the experimental period. The purpose of this was to enable an increase in protein retention. This was compensated for by a decrease in carbohydrates in order to keep the adaptive and experimental periods isoenergetic (the diets averaged slightly under 2000 kcals). Proportion of fat was 35.5% and did not differ between the two periods.

#### *Study limitations*

Sample size was small (8 subjects per treatment arm), and the experimental duration was short (2 weeks). Nitrogen balance was used to assess bodily protein turnover. There are certain limitations of this method of assessment. One of the overlooked aspects is that for each individual, a true zero-balance state must be determined before positive or negative states can be estimated. The zero-balance point can only be found by assessing nitrogen status at several levels of protein intake in small enough increments. Secondly, the actual procedure of measuring excreted nitrogen is inherently difficult. The most common procedural error is overestimating intake and underestimating excretion. Finally, microbial nitrogen

consumption within the body often contributes to false positive conclusions. Nitrogen losses through skin, respiration, and other miscellaneous means (aside from measurement in urine and feces) are extremely difficult to measure, leading to large variations in study results. Finally, menstrual cycle was not normalized or accounted for.

#### *Comment/application*

The authors of the present trial acknowledge that overestimation is a common problem of nitrogen balance measurements. However, they note that it would have been minimized because great care was taken to avoid it – all meals were prepared by the cooking staff, leftovers were collected, nitrogen contents were measured, fecal nitrogen excretion was measured, and urinary creatinine excretion was used as an index of urinary recovery. Perhaps the strongest supporting point is that all measurements were made under the same conditions, which should render valid comparisons of the effects of protein the feeding patterns.

The main finding of this study was that in young women, there was no difference in protein retention between a “pulse” protein feeding (79% of the daily total in one mid-day meal) and a “spread” pattern (even distribution across 4 meals spaced throughout the day). However, whole-body protein breakdown was slightly higher in the pulse feeding, but not to a statistically significant degree. In spite of that slight difference, Body composition was not altered differently by either pattern. No variation in fat-free mass was detected between the adaptive and experimental periods with either the spread pattern pulse pattern.

These study calls into question the common protein dosage cut-offs perpetuated within fitness communities. The typically referenced range is 20-40 grams, where anything beyond that will go to waste if consumed in a single sitting. My guess is that this came from the false idea that eating 6 times a day is optimal (for stoking the metabolism or other such nonsense). From this standpoint, it makes sense that folks should be consuming not much more than 30 grams of protein at a time, because doing it 6 times per day, for many folks, would overshoot the total for the day. Contrast this dogma with the fact that the subjects in the present study consumed a 73 g ‘pulse’ of protein, without any negative effects compared with the spread pattern of multiple doses averaging less than half of that.

In previous research by the present investigators, protein pulse feeding was actually seen to improve protein retention in elderly women.<sup>18</sup> They speculate that the menstrual cycle (which was not taken into account) may be a confounding factor leading to intersubject variability, since protein turnover and leucine oxidation increase during the luteal phase. The authors interpret their collective findings as a hint towards the superiority of pulse protein feeding as age progresses:

*“The positive effect of the pulse pattern is specific to elderly women, whereas in young women, the protein feeding pattern did not significantly affect protein retention. This results from alterations of protein turnover regulation that occur during aging, which could be overcome, at least in part, by the use of the pulse pattern.”*

## STUDY COMMENT REFERENCES

1. Maddalozzo GF, et al. Concurrent validity of the BOD POD and dual energy x-ray absorptiometry techniques for assessing body composition in young women. *J Am Diet Assoc.* 2002 Nov;102(11):1677-9. [[Medline](#)]
2. Ellis KJ, et al. Body-composition assessment in infancy: air-displacement plethysmography compared with a reference 4-compartment model. *Am J Clin Nutr.* 2007 Jan;85(1):90-5. [[Medline](#)]
3. Alemán-Mateo H, et al. Body composition by the four-compartment model: validity of the BOD POD for assessing body fat in Mexican elderly. *Eur J Clin Nutr.* 2007 Jul;61(7):830-6. [[Medline](#)]
4. Fields DA, et al. Body-composition assessment via air-displacement plethysmography in adults and children: a review. *Am J Clin Nutr.* 2002 Mar;75(3):453-67. [[Medline](#)]
5. Fields DA, et al. Comparison of the BOD POD with the four-compartment model in adult females. *Med Sci Sports Exerc.* 2001 Sep;33(9):1605-10. [[Medline](#)]
6. Collins MA, et al. Evaluation of the BOD POD for assessing body fat in collegiate football players. *Med Sci Sports Exerc.* 1999 Sep;31(9):1350-6. [[Medline](#)]
7. Wagner DR, et al. Validation of air displacement plethysmography for assessing body composition. *Med Sci Sports Exerc.* 2000 Jul;32(7):1339-44. [[Medline](#)]
8. Ball SD, Altona, TS. Comparison of the Bod Pod and dual energy x-ray absorptiometry in men. *Physiol Meas.* 2004 Jun;25(3):671-8. [[Medline](#)]
9. Shafer KJ, et al. Interaction of clothing and body mass index affects validity of air-displacement plethysmography in adults. *Nutrition.* 2008 Feb;24(2):148-54. Epub 2007 Dec 19. [[Medline](#)]
10. Knapik, JJ, et al. Influence of a 3.5 day fast on physical performance. *Eur J Appl Physiol Occup Physiol.* 1987;56(4):428-32. [[Medline](#)]
11. Riley ML, et al. Effect of carbohydrate ingestion on exercise endurance and metabolism after a 1-day fast. *Int J Sports Med.* 1988 Oct;9(5):320-4. [[Medline](#)]
12. Dox A, Yoder L. Esterification of creatine. *J Biol Chem.* 1922;4:671-73. [[JBC](#)]
13. Child R, Tallon MJ. Creatine ethyl ester rapidly degrades to creatinine in stomach acid. 4<sup>th</sup> Annual International Society of Sports Nutrition Conference, 2007. [[CR Technologies](#)]
14. Deurenberg-Yap M, Deurenberg P. Validity of deuterium oxide dilution for the measurement of body fat among Singaporeans. *Food Nutr Bull.* 2002 Sep;23(3 Suppl):34-7. [[Medline](#)]
15. Alemán-Mateo H, et al. Body composition by three-compartment model and relative validity of some methods to assess percentage body fat in mexican healthy elderly subjects. *Gerontology.* 2004 Nov-Dec;50(6):366-72. [[Medline](#)]
16. Dulloo AG, et al. Efficacy of a green tea extract rich in catechin polyphenols and caffeine in increasing 24-h energy expenditure and fat oxidation in humans. *Am J Clin Nutr.* 1999 Dec;70(6):1040-5. [[Medline](#)]
17. Rumpler W, et al. Oolong tea increases metabolic rate and fat oxidation in men. *J Nutr.* 2001 Nov;131(11):2848-52. [[Medline](#)]
18. Arnal MA, et al. Protein pulse feeding improves protein retention in elderly women. *Am J Clin Nutr.* 1999 Jun;69(6):1202-8. [[Medline](#)]

### The art of war: a guide to online debating.

By Alan Aragon



Debates can be intellectually stimulating; they can potentially force both parties to update their knowledge bases. What follows is a checklist of strategies for “winning” arguments online. I put the word in quotes because winning shouldn’t always be the underlying intent.

**Know your enemy before you engage in combat.** Having an idea of your opponent’s tendencies, tactics, and general knowledge level can help you decide whether or not to even bother with the debate. It’s more fun to debate with a rational person than a doorknob. It’s particularly fun to debate with rational people who think they know it all.

**Know the topic before engaging in combat.** Most battles are won or lost before they even begin. Those who lose debates simply have less knowledge about the topic than the opponent. The good news for the losers is that they’ve been granted a learning opportunity. If your knowledge is shaky on a given topic, be prepared to ease up the attack and be the learner, dishing out more questions than statements.

**Get your goal straight.** The constructive, noble intent would be to teach and/or learn from the opponent. A destructive intent would be to merely make the opponent look foolish. Pick one and stick to it. Although you can mix the two to a certain degree, be consistent with your underlying objective.

**Use the Socratic method to enable your opponent to expose holes in his own argument.** What I often do is simply corner my opponent into providing logical or scientific support for his argument by asking persistent questions. Ask why the claimed effects are important. Ask for scientific proof behind the claims.

**Rectify one point at a time.** Resist the temptation to argue against multiple points simultaneously. This serves to keep your

opponent accountable for each false claim and prevent him from distracting the original argument with extraneous noise.

**Read your opponent’s words carefully.** This way you can spot inconsistencies in your opponent’s stance and dismantle him in later rounds where cohesiveness tends to slip. Remember that the better listener always has the advantage.

**Anticipate the common logical fallacies.** The following are fallacies I see over and over again in online debates. It’s sad to see the uninitiated fall victim to them. A keen awareness of these false paths of reasoning enables you to anticipate and easily strike them down.

- **Strawman.** This is when the opponent accidentally or purposely misstates or misrepresents your argument. This leads to counterpoints against assertions that were never made. Address these fallacies each time they’re perpetrated, and you’ll illuminate your opponent’s lack of attention and comprehension of the issues being debated.
- **Appeal to authority.** People tend to equate the level of one’s academic credentials with their inability to be wrong. For example, medical doctors are generally a smart bunch, but this doesn’t automatically mean they’re abreast of the current research. In fact, many are patently ignorant of it.
- **Appeal to popularity.** Everyone knows that if everyone believes something, it’s gotta be true, right? Once upon a time, the world *must* have been flat.
- **Black-or-white.** This is the implication that there are only two options on extreme opposite ends, and no middle ground exists. This omission is common in discussions of “clean” eating.
- **Appeal to unscientific literature.** Layfolk commonly support their stance by dredging up a blog post or news release instead of directly pulling primary research from PubMed. More often than not, these lay articles discuss irrelevant research, such as rodents fed massive amounts of isolated fructose.
- **Appeal to irrelevant scientific research.** People will often appear to legitimately support their stance with peer-reviewed research, but a closer look can reveal its inapplicability. Examples include acute-effect instead of available longer-term research, correlational research instead of controlled interventions that can show cause-and-effect, research with inapplicable populations, irrelevant exercise protocols, and animal research instead of available human research.
- **Cherry-picking the scientific research.** This is the selective citing of research to support an argument, while conveniently ignoring or denying opposing research.
- **Appeal to aesthetics.** When someone runs out of objective supporting data for their argument, they sometimes will resort to comparing physiques. This is a cardinal sign of

desperation and idiocy. Just laugh out loud when this happens.

- **Appeal to personal observation or experience.** This is the assertion that something is effective because “it works for me”. However, if you know what you’re taking, the experiment is flawed by expectation bias from the very start.
- **Personal attack** (one of the very few fallacies that’s also referred to by its Latin designation, which is *ad hominem*). Resorting to attacks on the person rather than the lack of evidence indicates emotive rather than objective thought. Let your opponent be the first one to get flustered and issue the personal attacks.
- **Out-of-context physiology.** An example of this is the recommendation to manipulate or avoid macronutrient intake so as not to inhibit GH release. People don’t realize that GH release can occur in unfavorable conditions such as sleep and/or nutrient deprivation. Another example is the avoidance of nutrient-mediated insulin elevations, ignoring many overriding factors that can render this a useless concern.
- **Blanket statements & oversimplification.** Contrary to what legions of zealots believe about their favorite program, a universal prescription doesn’t exist.
- **Dismissal of scientific research.** Claiming that every study has an opposing one indicates the inability to critically appraise research. It’s very rare for any topic to have equally weighted evidence on both sides. Ironically, people resort to this dismissal as a convenient cop-out once they run out of scientific data to cite. If they can’t win, they bash it. Scientific research will never be perfect or bias-free, but it will always be a better source of knowledge than hearsay and gym gossip.

## ERRATUM

**August 2008, page 4:** a reference was missing for the Crujeiras study. In addition to fixing that, I discussed a pair of sugar overfeeding studies that I feel are important support to the points I made. If you’ve saved the initial version, it’s time to re-download it.

## PAUL CHEK IS OUT OF HIS MIND

I think Paul Chek is nuts, but that doesn’t matter too much because he’s inspirational and entertaining. My goal is to be as crazy about fitness as he is in 15 years. If you think you’re excited about training, take a look at [this](#).

## UNTIL THE NEXT ISSUE...

If you have any questions, comments, suggestions, bones of contention, cheers, jeers, guest articles you’d like to submit, or any feedback at all, send it over to [aarrsupport@gmail.com](mailto:aarrsupport@gmail.com).