

High-Protein Diets and Weight Loss

By Diane Welland, MS, RD

High-protein diets such as the Zone, Atkins, and Sugar Busters have come and gone for decades, their popularity rising and falling like waves in the ocean. While high-protein diets do usually lead to weight loss, they may be unbalanced meal plans that sometimes restrict entire food groups and fail to meet humans' essential needs for vitamins, minerals, and fiber. But that doesn't have to be the case.

Several studies comparing high-protein, low-carbohydrate diets with high-carbohydrate, low-protein diets found high-protein diets to be just as effective and sometimes even more effective than their high-carbohydrate counterparts when it comes to weight loss. One study, published in March 2009 in *The Journal of Nutrition*, looked at how a moderately high-protein meal plan measured up to the USDA's Food Guide Pyramid diet over a 12-month period.¹ Although weight-loss results were similar in both groups, the subjects consuming a high-protein diet lost more body fat and had better blood lipid profiles than the high-carbohydrate dieters, according to the journal article.

More recently, a short-term study, published in 2011 in *Nutrition Journal*, comparing women who were overweight or obese and followed a high-protein diet with those who followed a high-fiber, high-carbohydrate diet showed that although both groups lost weight, the high-protein group lost more weight with greater fat loss and greater decreases in blood pressure.²

These studies are just two in a growing body of scientific evidence suggesting that the right high-protein diet may be a tool worth using in the fight against obesity. Furthermore, high protein diets may also be more likely to help keep the weight from coming back, improving weight maintenance, due to better compliance and increased satiety.^{3,4}

Because high-protein diets gain intermittent popularity, it is likely that some patients and clients will seek guidance from RDs when considering whether to try a high-protein diet for the purpose of weight loss. This continuing education module will provide an overview of the current research regarding the potential benefits and risks associated with high-protein diets so RDs can better discuss these diets with their patients and clients.

The Diet Defined

With the media touting so many different high-protein diets, it's hard to determine exactly what is considered a high-protein diet. Dietary Reference Intakes recommend a wide range of protein consumption—anywhere from 10% to 35% based on total calories. Recommended Dietary Allowances (RDAs) are set at a minimum of 0.8 g/kg of body weight (about 0.4 g/lb). For high-protein diets, however, most nutrition professionals should recommend about 1.2 to 1.4 g/kg but less than 2 g/kg.^{1,2} Which guidelines for a high-protein diet should you use?

“Whenever you’re talking about weight loss, you should always base protein needs on body weight, not percentage of calories,” says Donald Layman, PhD, professor emeritus of nutrition from the University of Illinois. “Percentage of calories is very misleading. Drop your calories and protein can easily dip below minimum levels. Keep the amount of protein the same and it can be considered high protein on one diet and low protein on another, yet it’s still the same amount of protein.”

Layman, who categorizes diets he uses in research and with patients as moderate in protein, aims for intakes between 120 and 130 g/day (about 1.4 to 1.5 g/kg of body weight), which is nearly double the RDA. “The average American woman eats about 70 g of protein a day and a man around 90 g per day, so most people would consider this a high-protein diet,” Layman says.

The rest of a high-protein diet is balanced between carbohydrates and fats. “Most traditional high-protein diets run about 40% to 45% carbohydrates, 25% to 30% protein, and no more than 30% fat, which turns out to be a pretty achievable diet,” says Roberta Anding, MS, RD, LD, CDE, CSSD, a spokesperson for the Academy of Nutrition and Dietetics (the Academy) and director of sports nutrition at Baylor College of Medicine in Houston. She says some high-protein diets even contain as much as 35% protein.

In addition to protein, Layman’s laboratory diets usually include five servings of vegetables, two to three servings of fruit, and three servings of complex carbohydrates. Layman’s laboratory carbohydrate guideline is less than 40% of calories, with no more than 40 g at breakfast and lunch, and his laboratory fat guideline is 30% of calories.

But why do we need so much protein? In his commentary on adults’ protein needs, published in March 2009 in *Nutrition & Metabolism*, Layman cites research showing that increased protein intake can benefit patients with osteoporosis, type 2 diabetes, metabolic syndrome, heart disease, and sarcopenia in addition to obesity.⁵ Furthermore, as we age, our ability to efficiently utilize protein decreases.

“If you asked the average consumer who needs more protein, a 16-year-old or a 65-year-old, most people would say the 16-year-old,” says Layman. “In reality, it’s the 65-year-old. They likely need fewer calories, but they need more high-quality, nutrient-dense protein—along with exercise and, specifically, resistance training—to prevent muscle wasting.”

And while conventional weight-loss teachings generally reduce calories across all macronutrients (protein, fat, and carbohydrates), Layman says weight loss itself raises protein needs. “Losing weight is a stress on the body,” he says, “and any stress will increase protein needs.”

Protein Power

What gives protein the edge over carbohydrates when it comes to weight loss? In a word: satiety. Protein promotes greater satiety than either carbohydrates or fat, making people feel

fuller and more satisfied for a longer period of time. As a result, they can better control their appetite and eat less.^{6,7}

“I deal with mainly morbidly obese clients, and you just can’t get that satiety on a high-carbohydrate diet. They’re always hungry,” says Anding. “On a high-protein diet, clients feel less hungry, so they’ll stay with it.”

Some studies have shown that subjects who replace carbohydrate with protein eat roughly 200 to 400 fewer kcal per day than high-carbohydrate dieters and find it easier to self-regulate their intake.^{1,8}

High-protein dieters also reported a reduced desire to eat late at night and a reduced preoccupation with thoughts of food compared with their counterparts consuming moderate amounts of protein during a longitudinal 12-week study on overweight and obese men.⁹ These results support Anding’s observations and suggest high-protein diets could lead to less late-night snacking and overeating in the evening—two of the main factors that lead people to abandon a weight-loss plan.

Although many dietitians recommend eating six small meals per day to keep hunger at bay, the research doesn’t bear out the necessity of such frequent eating. The 12-week study, which also looked at eating frequency, found no difference in appetite and satiety when the subjects had three eating occasions per day vs. six, no matter the protein content of the diet.⁹ These results have been observed in several other studies and are discussed as part of the 12-week study.⁹ In fact, researchers noted a slight but not significant decrease in late-night fullness for subjects on the high-protein diet who ate six times per day and said this eating plan may be harder to follow, particularly for people unaccustomed to eating smaller, frequent meals throughout the day.

More Than Just Satiety

Another way protein benefits weight control is via thermogenesis, or the amount of energy needed to digest, absorb, and metabolize nutrients. Because protein has a higher rate of thermogenesis than both carbohydrate and fat (three times higher than carbohydrate and as much as 10 times higher than fat), the human body burns more calories in the process of digesting protein than it does in the process of digesting carbohydrate or fat.^{5-7,9,10}

But the biggest impact on metabolism and energy expenditure by far involves protein’s role in both muscle building and maintenance. Commenting on his research, Layman explains, “You need at least 30 g of protein in one meal to stimulate muscle building. That’s the minimum. On the other hand, anything over 50 g and you’re maxed out. Protein then just gets oxidized, and there’s no additional muscle benefit. Just to give you an idea of how much that is, sirloin steak contains about 8 g of protein per ounce, so 6 oz would be all you would need per meal.”⁵

Research shows that after three or four days on a high-protein diet, protein turnover, which includes both protein buildup and breakdown, speeds up as a result of the body adjusting to a higher protein intake. This, in turn, increases energy expenditure, raising resting metabolic rate

as well, even with a lower energy intake. Combined with exercise, higher protein intakes can produce an even greater rise in resting metabolic rate.¹⁰

Unfortunately, consuming 30 to 50 g of protein at every meal can be a problem, particularly for adult Americans, who tend to eat almost all their protein in a single meal: dinner. National Health and Nutrition Examination Survey data show Americans consume more than 65% of their daily protein intake in a single large meal (dinner), leaving less than 35% to be distributed throughout other earlier meals.¹¹

“Since positive protein balance only lasts about three hours after ingestion, it’s important to eat enough protein throughout the day,” says Layman, “and that can be pretty challenging for most people.” Thanks to our penchant for high-carbohydrate foods such as pasta, it’s not surprising that our lunches are often short on protein. Breakfast, however, contains the least amount of protein of any meal. According to Layman, most Americans average only 10 g of protein for the morning meal. This is particularly problematic because lean tissues are most catabolic while we sleep.^{5,11} Failing to consume enough protein during breakfast will keep you in a catabolic state and increase protein breakdown until you eat a high-protein meal (more than 30 g).

Since both breakfast and lunch typically contain less than 15 g of protein per meal, the average person may go up to 20 hours between eating high-protein meals and reversing this catabolic state. During a catabolic state, muscle protein synthesis decreases and muscle protein breakdown rises. At the same time, overall protein turnover (building up and breaking down of protein) slows, resulting in less protein being synthesized. Thus, skipping breakfast or eating a low-protein breakfast will promote protein breakdown rather than fat loss.^{5,11}

Furthermore, a good-quality high-protein breakfast is even more important as we age. While eating your daily protein in a single meal does not adversely affect growth in children and young adults, eating protein throughout the day does become more important for older adults. This is because muscle protein synthesis is regulated by dietary energy and insulin in young people, but in older adults, muscle protein synthesis is regulated by the amino acid leucine. Consequently, protein intake promotes protein synthesis rather than energy intake. For older adults, this means eating high-quality protein throughout the day can protect lean tissues during weight loss and prevent age-related sarcopenia and osteoporosis.^{5,11}

In light of these findings, breakfast becomes the most important high-protein meal of the day. In addition, breakfast eaters are more likely to have a better-quality diet and less likely to overeat, particularly at night. Skipping breakfast, on the other hand, leads to an increased appetite and hunger and poorer food choices later on in the day.¹²

Studies show regularly eating the right kind of breakfast not only helps people lose weight, it also helps them keep the weight off for good. A high-protein breakfast will reduce protein breakdown and keep hunger at bay, helping people feel full longer.

To help clients meet their protein needs during breakfast, dietitians should suggest creative ways to incorporate high-protein items such as chicken, fish, meat, eggs, cheese, Greek yogurt, milk, tofu, or beans into breakfast foods.

Building lean muscle mass isn't the only benefit of high-protein diets; this type of eating also preserves lean body mass during weight loss.¹³ Commenting on his research, Layman notes that "during starvation, we break down about 50% lean tissue and 50% fat. If you lose weight using a high-carbohydrate diet similar to the Food Guide Pyramid, you'll be breaking down about 35% lean tissue and 65% fat. Now go on a high-protein diet, and our research shows lean tissue breakdown drops to 20%, while fat breakdown increases to 80%. Add exercise to the mix, and protein breakdown drops even lower—below 10%."^{5,13}

Anding, who also counsels National Football League (NFL) players, has seen similar results. "We've done a pilot study looking at high-protein diets—1.8 to 2 g of protein per kilogram of body weight—weight loss, and body composition in three groups: walkers, walkers with Pilates classes, and walkers with Pilates classes and weight training," says Anding. "Only the weight-training group hung on to their lean muscle." In fact, high-intensity weight training "using the heaviest weights with meticulous form" along with a high-protein diet was the only type of regime that resulted in no loss of lean muscle tissue and optimum weight loss. "We call this our 'retired' NFL diet," notes Anding.

Other new research points to an inverse relationship between protein intake and abdominal obesity, which is the worst type of obesity because of its association with a statistically higher incidence of chronic disease. To date, only a few studies have been conducted.¹⁴ Preliminary research published in 2012 in *Nutrition & Metabolism* found that eating higher amounts of high-quality protein (milk, eggs, and beef) was associated with a lower percentage of central abdominal fat. This inverse relationship was not seen for carbohydrate and dietary fat.¹⁵

Although the *Nutrition & Metabolism* study involved a relatively small population (27 men), more research is looking at protein quality and timing (when protein is eaten during the day) in relation to weight loss and body composition. Much of this new research now centers on the amino acid leucine, which is believed to stimulate protein synthesis and stave off muscle loss.^{11,16}

What to Keep an Eye On

When counseling patients and clients about high-protein diets or monitoring patients and clients on high-protein diets, it is necessary for RDs to be mindful of the fact that there are potential drawbacks. These include an increased risk of cancer, particularly if the diet is high in animal products and low in plant foods; GI distress as a result of a low fiber diet, ketosis, bad breath, irritability, nausea, dizziness, headache and appetite loss. Dietitians should be aware of the following issues associated with this way of eating:

Fat: Although research has shown high-protein diets produce positive effects on blood glucose and blood lipid levels by decreasing circulating insulin, reducing triglycerides, and raising HDL levels—there is minimal effect on LDL levels—it's important to remember that even with an emphasis on lean protein, this type of diet is still higher in total fat, saturated fat, and cholesterol than lower-protein, high-carbohydrate diets, and long-term effects remain unknown.¹³ Furthermore, keeping a high-protein diet lean can be a challenge, particularly for clients who like fatty meats.

Red meat: High-protein diets tend to be heavy on red meat. Even though data are inconclusive, high intakes of both red meat and processed meats, particularly if cooked at high temperatures, have been linked to an increased risk of prostate cancer in men.¹⁷ Dietitians need to encourage and educate clients about other sources of lean protein, such as chicken, turkey, legumes, soy products, and fish.

Calcium: Since high-protein diets are directly related to a higher output of urinary calcium, researchers in the 1990s concluded that high protein intakes had an adverse effect on bone. We now know that's not the case. If accompanied by adequate calcium (about three servings of low-fat dairy per day or the equivalent), high-protein diets can not only increase calcium uptake (absorbing as much as 25%) but also enhance bone health, preserving bone even during weight loss, according to a 2008 *Journal of Nutrition* study.¹⁸

Nevertheless, it's important to watch this nutrient, particularly in postmenopausal women. Keep in mind, too, that calcium supplementation does not protect bone mineral density the same way dietary calcium does, with some studies showing that calcium supplementation has no impact on bone mineral density at all.^{19,20}

Fatigue: While a high-protein diet can be effective for weight loss, it may not be an optimum diet for every client trying to lose weight. "I've seen some clients who cut out carbohydrates, and their energy output goes way down," says Jim White, RD, a personal trainer in Virginia Beach, who has seen individuals attempt to reduce their daily carbohydrate intake to 25 g or less. "They just become very fatigued." For those individuals, higher carbohydrate diets work best.

To prove this point, a 2011 sports exercise study comparing high-protein and low-protein recovery diets in regard to female cyclists showed increased perception of tiredness, soreness, and reduced strength on high-protein diet compared to diets lower in protein.²¹

Kidney function: Despite a long-held belief that high-protein diets strain the kidneys, increasing the chance of problems later in life, there is little clinical evidence supporting this claim. In fact, research has repeatedly shown that kidney function is within normal limits for people who consume large quantities of protein (particularly body builders) even long term.²²⁻²⁴ We do know, however, that in populations where people already have renal disease (or an increased risk of developing renal problems, such as those with diabetes), a high-protein diet may not be appropriate.²²⁻²⁴

How Low Can Carbs Go?

Current research centers on higher-protein diets that are low in carbohydrate and moderate in fat. Dietitians can tailor these diets to consumers and monitor them in a private practice setting. This was not the case with high-protein diets similar to the original Atkins diet that was introduced in the 1970s. These diets were more rigid and strict.

“I sometimes use a high-protein diet we call the ‘medical Atkins diet’ to treat morbidly obese adolescents we see in the clinic at Baylor,” says Anding, “but it’s only as a last resort after they’ve tried everything else. It’s also their last chance to avoid gastric bypass surgery.”

Found in many diet manuals as a protein-sparing fast, this high-protein diet generally sets protein at 2 g/kg of body weight and carbohydrates at 0 to 20 g at most. Still, with each patient who follows the diet, Anding grapples with an ethical dilemma. “When you strip away fruits and vegetables, you’re opening up huge nutrient holes in the diet. And although blood lipid levels improve, we’re more than just our LDLs and triglyceride levels,” she notes. “Are we inducing proinflammatory aspects? At times I worry, ‘Am I creating a perfect storm?’”

But for these teenagers—some of whom need to drop 200 lbs or more—getting the weight off fast is the priority, and high-protein diets work. Once patients are on the diet, they are carefully monitored by an interdisciplinary team, including Anding, a physician, an exercise physiologist, an endocrinologist, and a psychologist. How long each patient follows the diet depends on his or her individual condition. “I’ve had patients on this type of diet for six months,” says Anding, “because they’re so hyperinsulinemic, ketosis isn’t a problem.”

But there are downsides. A lack of carbohydrates alters mood “in the wrong direction,” says Anding, and recent studies have shown disruptions in cognitive function^{25,26} “It’s really a matter of using your own clinical judgment based on your assessment,” she says.

Bottom Line

When it comes to determining whether a client will benefit from a high-protein diet, one size doesn’t fit all; it depends on the client. Anding recommends that dietitians assess all the variables and then use their own clinical judgment. “My first choice would always be a moderate, low-glycemic carbohydrate diet, but if that’s not working or the patient is insulin resistant, you have to try something else,” she says.

Anding recommends looking for two things when assessing patients for a higher-protein diet (25% to 35% protein): a waist circumference of 35 inches or greater in women and 40 inches or greater in men and the appearance of hyperpigmented skin around the nape of the neck (ie, acanthosis nigricans). Both are signs of insulin resistance, which may be a result of hyperinsulinemia and metabolic syndrome.

In addition to promoting weight loss, higher-protein diets may also prevent weight gain in healthy-weight adults. Over the last few decades, energy intake has consistently risen while protein in the diet has become more and more diluted. This is mainly due to an increase in the number of processed foods that are high in fat and carbohydrate and generally low in protein. Economics also plays a role, as fat and carbohydrates are less expensive and sometimes more readily available than high quality protein foods.²⁷ Consequently, it’s a good idea to evaluate dietary protein intake whether your client wants to lose weight or just maintain it.

Increasing protein intake no matter the reason has been associated with reducing total energy intake. Thus, a short-term, small, randomized controlled experimental study, published in October 2011 in *PLoS One*, showed that when the proportion of protein in the diet decreased,

energy intake increased even in healthy-weight adults.²⁷ Most of this increase in energy intake was as a result of snacking. In this study, snacking occasions increased throughout the day on the lower-protein diet with a preference for savory over sweet foods. The low-protein group also had greater hunger scores.²⁷

Whether clients want to lose weight or maintain it, Dee Sandquist, MS, RD, LD, CDE, a spokesperson for the Academy, recommends individualized counseling and evaluating where a client currently is in terms of protein intake. “If a person doesn’t eat a lot of protein to begin with, you can’t ask them to jump to a high-protein diet, eating 4 oz of meat 3 times a day,” she says. “You need to consider how motivated they are, their likes and dislikes, and their lifestyle.”

“Certainly not every client needs to increase their protein; however, dietitians should make sure that the protein a client or patient is eating is of the highest quality possible within lifestyle and dietary patterns. As dietitians, we’re trained to assess clients and then make clinical and dietary judgments based on this assessment,” says Anding. “But as the population changes, our skills at assessing and making clinical judgments must change, too.”

For clients who have trouble losing weight or have tried high-carbohydrate diets and failed, high-protein diets may be an excellent option for achieving this goal. RDs should recommend appropriate protein levels based on energy needs and their patients’ and clients’ lifestyle. They should also be mindful of fat intake and make suggestions for increasing whole grain intake, getting five or more servings of fruits and vegetables each day, and drinking a variety of fluids, as high-protein diets increase urinary output.

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Examination

1. An appropriate high-protein diet for most healthy adults contains how much protein per kilogram of body weight?

- A. 0.8 g
- B. 1.2 to 1.4 g
- C. 1.5 to 2 g
- D. More than 2 g

2. Why are high-protein diets recommended for weight loss?

- A. They promote satiety.
- B. They raise resting energy expenditure.
- C. They preserve lean muscle mass.
- D. All of the above

3. What meal occasion is most important when it comes to protein intake and losing weight?

- A. Breakfast
- B. Lunch
- C. Dinner
- D. Snacks

4. How much protein does a person need to eat in one meal to stimulate muscle building and prevent muscle loss?

- A. 2 eggs
- B. 3 oz of pork
- C. 5 to 6 oz of steak
- D. 4 oz of fish

5. Which of the following is not a potential problem when following a high-protein diet?

- A. Consuming too much fat
- B. Too much focus on red meat
- C. Lack of fruits and vegetables
- D. Lack of iron

6. Why should dietitians recommend that clients following a high-protein diet consume at least three servings of low-fat dairy?

- A. High-protein diets are generally low in calcium.
- B. Calcium excretion increases on high-protein diets.
- C. Calcium increases protein synthesis.
- D. All of the above

ANSWER: B

7. High-protein diets should not be recommended for which of these patient populations?

- A. Those with kidney problems

- B. Those who don't like red meat
- C. Those who are very overweight
- D. Those who have metabolic syndrome

8. When assessing clients for a high-protein diet, dietitians should consider all of the following except:

- A. waist circumference.
- B. hyperpigmentation around the neck.
- C. blood lipid levels.
- D. current protein intake.

9. People who follow a high-protein diet are more likely to:

- A. eat breakfast.
- B. snack at night.
- C. feel hungry all the time.
- D. overeat.

10. Preliminary research shows eating high-quality protein as part of a well-balanced diet is associated with:

- A. a lower percentage of central abdominal fat.
- B. a higher percentage of central abdominal fat.
- C. a higher percentage of fat in the extremities.
- D. a lower percentage of fat in the extremities.