

Weight Loss Studies

STUDIES THAT SUPPORT THE MODIFIED CARBOHYDRATE DIET:

Randomized trial on protein vs carbohydrate in *ad libitum* fat reduced diet for the treatment of obesity

Skov, AR., Toubro, S., Ronn, B., Holm, L., and Astrup, A.

International Journal of Obesity. 23: 528-536, 1999

Key points:

- **This study was conducted for 6 months. This is the famous Denmark Study.**
- This study examined the effects of weight loss in obese subjects by replacement of carbohydrates by protein in *ad libitum* consumed fat-reduced diets.
- The researchers divided the subjects into 2 groups: high protein vs. high carbohydrate.
- The HP (high protein) group consumed the following ratio of macronutrients: Carbohydrate= ~46%, Protein=~24% and Fat=~29%.
- The HC (high carbohydrate) group consumed the following ratio of macronutrients: Carbohydrate= ~59%, Protein=~12% and Fat=~29%. **Carbohydrate sources were primarily vegetables, fruits, breads, rice, pasta, but chocolate and simple sugars, in the form of sweets, were also available.**
- **Keep in mind that the only constant (in terms of the ratio of calories) was the total fat percentage—both groups consumed 29% fat. The only difference was the carbohydrate/protein ratios. Both groups were NOT restricted in terms of calories!**
- **Results:** Weight loss after six months was 5.1 kg (11.2 pounds) in the High Carbohydrate group and 8.9 kg (19.5 pounds) in the High Protein group. Fat loss was 4.3 kg (9.4 pounds) in the High Carbohydrate group and 7.6 kg (16.7 pounds) in the High Protein group.
- **Summary:** The study shows that replacement of some dietary carbohydrate by protein in *ad libitum* fat-reduced diets, for treatment of obesity, improves mean weight loss and increases the proportion of subjects achieving a clinically relevant weight loss.

A randomized trial comparing a very low carbohydrate diet and a calorie-restricted low fat diet on body weight and cardiovascular risk factors in healthy women

Brehm, B., Seeley, S., Daniels, D., D'Alessio, D.

The Journal of Clinical Endocrinology & Metabolism 88 (4):1617-1623, 2003

Key Points:

- **This study was 6 months in length.**
- The results of this study demonstrate that a very low carbohydrate diet, taken without a specified restriction of calorie intake, is effective for weight loss over a 6-month period in healthy, obese women.
- Compared with the low fat group, who followed a diet conforming to currently recommended distributions of macronutrient calories, the very low carbohydrate group lost significantly more weight (18.7 vs. 8.5 pounds).
- The mechanism of the enhanced weight loss in the very low carbohydrate diet group relative to the low fat diet group is not clear. Based on dietary records, the reduction in daily caloric intake was similar in the 2 groups.
- Caloric intake in the very low carbohydrate diet group was distributed as 15% carbohydrate, 28% protein, and 57% fat. In contrast, the low fat diet had daily calories distributed as 54% carbohydrate, 18% protein, and 28% fat.
- Despite the high fat consumption promoted in the low carbohydrate diet group, plasma lipids (cholesterol, triglycerides, LDL's) did not significantly change.
- These data suggest that the deleterious effects of diets containing a high percentage of fat on body weight and cardiac risk factors are mitigated by restriction of caloric intake and associated weight loss.
- The authors observed a spontaneous restriction in food intake in the very low carbohydrate diet group. This raises the possibility that the very low carbohydrate diet may have been more satiating, presumably from the increased protein consumption.
- There was a low intake of calcium and fiber in the very low carbohydrate group that would need to be addressed if this diet were to be used for longer periods.

A Reduced Ratio of Dietary Carbohydrate to Protein Improves Body Composition and Blood Lipid Profiles during Weight Loss in Adult Women

Layman, D. et. al.

J. Nutr. 133:411-417, 2003

Key points:

- **This study was conducted for 10 weeks.**
- This study examined the efficacy of 2 weight loss diets (a Zone like diet—40% CHO, 30% protein, and 30% fat vs. a traditional diet--55-60% CHO, 16-18% protein, and 26-30% fat) and their effects on body composition (fat loss/muscle changes) and blood lipids in adult women.
- **Both diets provided the same amount of calories (1700 cal/day), fat (~50 g/day), and fiber (~20 g/day).**
- The **carbohydrate group** followed the guidelines of the USDA Food Guide Pyramid diet which emphasizes the use of breads, rice, cereals and pasta.
- The **protein group** consumed protein rich foods such as red meats, milk, cheese and eggs with a requirement for a minimum of 7 beef containing meals each week. Both diets included extensive use of vegetables (5-6 servings/day).
- The **protein group** consumed ~1.6 grams of protein per kg of bodyweight per day whereas the **carbohydrate group** consumed ~0.8 grams of protein per kg of bodyweight per day.
- Body weight changes did not differ between the 2 groups but body fat did. The higher protein lower carb dieters lost more fat than the high carb lower protein group (12 pounds vs. 10 pounds, respectively).
- Subjects in the Protein Group reported higher satiety and greater energy when consuming the diet with a lower CHO/protein ratio.

Summary:

- Both diets were effective weight loss plans and improved the blood lipid profile. However, the protein diet produced greater improvements in body composition with an increased ratio of fat/muscle loss.

Effect of 6-Month Adherence to a Very Low Carbohydrate Diet Program

Westman, E., et al.

[American Journal of Medicine, 2002, 113:30-36](#)(**This is the study that backs up Dr. Atkins claims**)

Key Points:

- **This study was 6 months in length.**
- The goal of this study was to determine the effect of a 6-month very low carbohydrate diet (much like the Atkins plan) on body weight and other metabolic parameters.
- A very low carbohydrate (carbohydrate intake<25g/d) was recommended until 40% of a subject's self determined target weight loss was achieved. The daily amount of carbohydrate was then increased to about 50 g per day.
- There was NO limit on the caloric intake. Daily intake of at least six 8-ounce glasses of water was strongly encouraged. Nutritional supplements (multivitamin formula, essential oil formula, diet formula, chromium picolinate) were provided to subjects to be taken on a daily basis in divided doses.
- The initial diet consisted of unlimited amounts of meat (i.e., beef, pork, chicken, turkey, fish, shellfish), unlimited eggs, cheese (4 ounces per day).
- **Subjects lost approximately 20 pounds (13 pounds of fat and 6.6 pounds of lean body mass) in 6 months.**
- The majority of subjects reduced their LDL, cholesterol and blood pressure and increased their HDL cholesterol (the so called "good" cholesterol).
- **ADVERSE EFFECTS:** Many of the subjects reported constipation, bad breath, headaches, hair loss and 1 woman reported increased menstrual bleeding.
- **POSITIVE EFFECTS:** Many subjects reported increased energy, decreased heartburn, and decreased cravings for sweets. Some women reported they had less menstrual cramping.
- **CAUTION:** Because only healthy volunteers were studied, caution should be used when generalizing these results to patients with medical illnesses.

A low-carbohydrate as compared with a low-fat diet in severe obesity

Samaha, F. et. al.

N Eng J Med 348: 2074-2081
(May 22, 2003)

This study was six-months in duration.

Conclusion: Severely obese subjects with a high prevalence of diabetes or the metabolic syndrome lost more weight during six months on a carbohydrate restricted diet than on a calorie and fat restricted diet (13 Lbs. vs. 4 Lbs., respectively), with a relative improvement in insulin sensitivity and triglyceride levels, even after adjustment for the amount of weight lost.

Additional info:

- The subjects assigned to the low carbohydrate diet were instructed to restrict carbohydrate intake to 30 g per day or less. No instruction on restricting total fat intake was provided. Vegetables and fruits with high ratios of fiber to carbohydrate were recommended.
- The subjects assigned to the low-fat diet received instruction in accordance with the obesity-management guidelines of the National Heart, Lung, and Blood Institute, including calorie restriction sufficient to create a 500 calories per day, with 30% or less of total calories derived from fat.
- **This finding should be interpreted with caution, given the small magnitude of overall and between-group differences in weight loss in these markedly obese subjects and the short duration of the study. Future studies evaluating long-term cardiovascular outcomes are needed before a carbohydrate-restricted diet can be endorsed.**

A Randomized Trial of a Low-Carbohydrate Diet for Obesity

Foster, D.. et. al.

N Engl J Med, May 22,2003, 348;2082-2090

This study was 1 year in duration.

Key Points:

- The results of this study demonstrate that the low-carbohydrate, high protein, high-fat Atkins diet produces greater weight loss than a conventional high-carbohydrate, low-fat diet for up to six months, but that the differences do not persist at one year.
 - The **low carbohydrate diet group** followed the Atkins plan, which involves limiting carbohydrate consumption to 20 grams of carbohydrates/day for the first 2 weeks and is then gradually increased until a stable and desired weight is achieved. Calories were NOT restricted intentionally.
 - The conventional diet group followed the dietary recommendations provided by the food guide pyramid, which is a high carbohydrate, low-fat, low-calorie diet (1200 to 1500 calories per day for women and 1500 to 1800 calories per day for men, with approximately 60% of calories from carbohydrate, 25% from fat, and 15% from protein and received instructions about calorie counting.
 - These data suggest that the increased weight loss associated with the low-carbohydrate diet may offset the adverse effect of saturated fat intake on serum LDL cholesterol concentrations.
 - **The low carbohydrate diet was associated with greater decreases in serum triglycerides and greater increases in HDL cholesterol than was the conventional diet.**
 - The difference in weight loss between the two groups in the first six months demonstrates an overall greater energy deficit in the low-carbohydrate group (i.e., the low carb group ate less calories), despite unrestricted protein and fat intake in this group and instructions to restrict energy intake in the conventional-high carbohydrate diet group.

STUDIES THAT SUPPORT THE LOW-FAT/REDUCED CALORIE DIET:

Efficacy and safety of low-carbohydrate diets

A systematic review

Bravata, D. et. al.

JAMA, April 9, 2003--Vol 289, No. 14

- This is a meta-analysis which reviewed 107 studies (between Jan. 1, 1966--Feb. 15, 2003).
- The objective was to review the validity of low carb diets and their effects on weight loss, serum lipids, fasting serum glucose, and fasting serum insulin levels.

Principle finding:

Lower carbohydrate diets (≤ 60 g g/day) were associated with reduced calorie intake and that weight loss was predicted by caloric intake, diet duration, and baseline body weight, but not by carbohydrate content.

- **Conclusion:** There is insufficient evidence to make recommendations for or against the use of low-carbohydrate diets.

Similar weight loss with low-or high-carbohydrate diets.

Golay A, Allaz AF, Morel Y, de Tonnac N, Tankova S, Reaven G.
Department of Medicine, Geneva University Hospital, Switzerland.

Am J Clin Nutr 1996 Feb;63(2):174-8

Key Points:

- **This study was 6 weeks in length.**
- The goal of this study was to evaluate the effect of diets that were equally low in energy but widely different in relative amounts of fat and carbohydrate on body weight during a 6-wk period of hospitalization.
- Forty-three adult, obese persons were randomly assigned to receive diets containing 1000 kcal/d) composed of either **32% protein, 15% carbohydrate, and 53% fat, or 29% protein, 45% carbohydrate, and 26% fat.**

Results:

- **There was no significant difference in the amount of weight loss in response to diets containing either 15% (8.9 +/- 0.6 kg) or 45% (7.5 +/- 0.5 kg) carbohydrate.**
- **The results of this study showed that it was energy intake, not nutrient composition, that determined weight loss in response to low-energy diets over a short time period.**

The Zone Diet Phenomenon: A Closer Look at the Science behind the Claims

Samuel N. Cheuvront, PhD, RD

Journal of the American College of Nutrition, Vol. 22, No. 1, 9-17 (2003)

Key Points:

- The Zone Diet is a carbohydrate-restricted diet that postulates a connection between diet, hormones and eicosanoids that ultimately leads to improved health.
- There is no evidence that a 0.75 protein to carbohydrate ratio (40/30/30), whether eaten as a small test meal or in the form of a complete mixed diet, reduces the insulin response to traditional dietary guidelines meal/food intakes.
- The scientific literature is in opposition to the purported benefits of adopting a Zone Diet for improved health.

In Summary...

- Although the studies are not an exhaustive list, they do provide some insight as to the current knowledge on diet and weight loss. There is a lot of confusion as to what dietary strategy is most effective for inducing weight loss.
- At the center of the debate regarding controlling obesity is the optimal balance of carbohydrates, proteins, and fats for adult health.
- A review of the current scientific literature reveals that *the jury is still out* as to what dietary program (low carbohydrate vs. low fat/low calorie) offers the best **long-term** weight loss solution.
- Many studies support the notion that its calories, NOT restriction of carbohydrates or fats, that predict weight loss. The question still remains, however, as to what dietary plan reduces the associated **hunger** with such calorie restriction, which in most cases predicts the success or failure of a diet.
- Many studies do show that low-carbohydrate diets may “curb” hunger more than the low-fat reduced calorie diets. Many researchers believe that protein has a greater influence on reducing appetite than carbohydrates.
- It appears that reduced caloric intake occurs spontaneously or unintentionally on the reduced carbohydrate diets. This is a favorable occurrence if the goal is reducing bodyweight.
- According to the studies reviewed the harmful effects of diets containing a high percentage of saturated fat on body weight and cardiac risk factors (particularly elevating cholesterol) are reduced or alleviated when one reduces caloric intake.
- At this time it may be premature to gravitate towards either extreme—low-carbohydrate or low-fat. In the meantime, it may be wise to try to adhere to the following guidelines:
 - Consume carbohydrates that contain a minimum amount of sugar and contain high fiber. These are considered “good” carbohydrates. These carbohydrates tend NOT to play havoc with your blood sugar whereby controlling appetite. Keep in mind that the USDA Food Guide Pyramid **DOES NOT** distinguish between “good” and “bad” carbohydrates or more appropriately termed, whole grains versus refined grains, respectively.
 - Engage in regular physical activity since this “boosts” metabolism and is a necessary *staple* if permanent weight control is the goal.

Recommended Books:

1. The South Beach Diet **by Arthur Agoston, MD**
2. Getting to the Bottom of it **by Michael Sylvester**
3. Eat, Drink and Be Healthy **by Walter Willet, MD**