

Comparison of 2-Year Weight Loss Trends in Behavioral Treatments of Obesity: Diet, Exercise, and Combination Interventions

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Objective The effects of three cognitive-behavioral weight control interventions for adults were compared: diet only, exercise only, and a combination of diet and exercise. This article reports 2-year follow-up data.

Results At 1 year, no significant differences were noted among the three groups. The diet-only group lost 6.8 kg, the exercise-only group lost 2.9 kg, and the combination group lost 8.9 kg ($P=.09$). During the second year, the diet-only group regained weight — reaching 0.9 kg above baseline; the combination group regained to 2.2 kg below baseline; and the exercise-only group regained slightly to 2.7 kg below baseline ($P=.36$).

Applications The results suggest that dieting is associated with weight loss followed by regain after treatment ends, whereas exercise alone produced smaller weight losses but better maintenance.

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Severe vs moderate energy restriction with and without exercise in the treatment of obesity: efficiency of weight loss.

Thirty obese women were randomly assigned to either 40% [**severe energy restriction (SER)**] or 70% [**moderate energy restriction (MER)**] of their maintenance energy requirements and to no exercise, aerobic exercise (walking), or aerobic exercise plus circuit weight training. Body composition by hydrostatic weighing and energy expenditure by indirect calorimetry were measured at 0, 3, and 6 mo. In addition, we developed a deficit-efficiency factor (DEF), calculated as body energy loss/dietary energy deficit, to attempt to quantify the effectiveness of the weight-reduction interventions. Subjects in the **SER** group lost more weight (mean +/- SE: 15.1 +/- 1.4 vs 10.8 +/- 1.0 kg), fat (11.7 +/- 1.1 vs 8.3 +/- 0.6 kg), and fat-free mass (2.8 +/- 0.3 vs 1.8 +/- 0.3 kg) than the MER group.. **Exercise had no significant effect.**

This study demonstrates that MER may offer an advantage over SER because it produces a greater energy loss relative to energy deficit.

ENDOCRINE CARE

Effect of Dietary Adherence with or without Exercise on Weight Loss: A Mechanistic Approach to a Global Problem

Abstract

Objective: Our objective was to quantify the relationship between dietary adherence, weight loss, and severity of caloric restriction.

Design and Setting: Participants were randomized to 1) diet only, 2) diet+endurance training, or 3) diet+resistance training until body mass index (BMI) was less than 25 kg/m².

Participants: Healthy overweight (BMI 27-30) premenopausal women (n = 141) were included in the study.

Results: All groups had similar weight loss (~12.1 ± 2.5 kg) and length of time to reach target BMI (~158 ± 70 d). Caloric restriction averaged 59 ± 9%, and adherence to diet was 73 ± 34%.

Adherence to diet was inversely associated to days to reach target BMI (r = -0.687; P < 0.01) and caloric restriction (r = -0.349; P < 0.01). Association between adherence to diet and percent weight lost as fat was positive for the diet-endurance training (r = 0.364; P < 0.05) but negatively correlated for the diet-only group (r = -0.387; P < 0.05). **Conclusions:** Dietary adherence is strongly associated with rates of weight loss and adversely affected by the severity of caloric restriction. Weight loss programs should consider moderate caloric restriction relative to estimates of energy requirements, rather than generic low-calorie diets.

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Effect of exercise intensity on abdominal fat loss during calorie restriction in overweight and obese postmenopausal women: a randomized, controlled trial

Background: Exercise intensity may affect the selective loss of abdominal adipose tissue.

Objective: This study showed whether aerobic exercise intensity affects the loss of abdominal fat and improvement in cardiovascular disease risk factors under conditions of equal energy deficit in women with abdominal obesity. The primary outcome was abdominal visceral fat volume.

Results: Average weight loss for the 95 women who completed the study was 12.1 kg (±4.5 kg) and was not significantly different across groups. The CR-only group lost relatively more lean mass than did either exercise group. All groups showed similar decreases in abdominal visceral fat

Conclusion: With a similar amount of total weight loss, lean mass is preserved, but there is NOT a preferential loss of abdominal fat when either moderate- or vigorous-intensity aerobic exercise is performed during caloric restriction.

*Nutrition & Metabolism***Comparison of energy-restricted very low-carbohydrate and low-fat diets on weight loss and body composition in overweight men and women**

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Objective: To compare the effects of isocaloric, energy-restricted very low-carbohydrate ketogenic (VLCK) and low-fat (LF) diets on weight loss, body composition, trunk fat mass, and resting energy expenditure (REE) in overweight/obese men and women. Design: Randomized, balanced, two diet period clinical intervention study. Subjects were prescribed two energy-restricted (-500 kcal/day) diets: a VLCK diet with a goal to decrease carbohydrate levels below 10% of energy and induce ketosis and a LF diet with a goal similar to national recommendations (%carbohydrate:fat:protein = ~60:25:15%).

Subjects: 15 healthy, overweight/obese men (mean \pm s.e.m.: age 33.2 ± 2.9 y, body mass 109.1 ± 4.6 kg, body mass index 34.1 ± 1.1 kg/m²) and 13 premenopausal women (age 34.0 ± 2.4 y, body mass 76.3 ± 3.6 kg, body mass index 29.6 ± 1.1 kg/m²).

Measurements: Weight loss, body composition, trunk fat (by dual-energy X-ray absorptiometry), and resting energy expenditure (REE) were determined at baseline and after each diet intervention. Data were analyzed for between group differences considering the first diet phase only and within group differences considering the response to both diets within each person.

Results: Actual nutrient intakes from food records during the VLCK (%carbohydrate:fat:protein = ~9:63:28%) and the LF (~58:22:20%) were significantly different. Dietary energy was restricted, but was slightly higher during the VLCK (1855 kcal/day) compared to the LF (1562 kcal/day) diet for men. Both between and within group **comparisons revealed a distinct advantage of a VLCK over a LF** diet for weight loss, total fat loss, and trunk fat loss for men (despite significantly greater energy intake). The majority of women also responded more favorably to the VLCK diet, especially in terms of trunk fat loss. The greater reduction in trunk fat was not merely due to the greater total fat loss, because the ratio of trunk fat/total fat was also significantly reduced during the VLCK diet in men and women. Absolute REE (kcal/day) was decreased with both diets as expected, but REE expressed relative to body mass (kcal/kg), was better maintained on the VLCK diet for men only. **Individual responses clearly show the majority of men and women experience greater weight and fat loss on a VLCK than a LF diet.**

Conclusion: This study shows a clear benefit of a VLCK over LF diet for short-term body weight and fat loss, especially in men. **A preferential loss of fat in the trunk region with a VLCK diet is novel and potentially clinically significant** but requires further validation. These data provide additional support for the concept of metabolic advantage with diets representing extremes in macronutrient distribution.

Weight Loss with a Low-Carbohydrate, Mediterranean, or Low-Fat Diet

N Engl J Med 2008; 359:229-241 July 17, 2008 DOI: 10.1056/NEJMoa0708681

BACKGROUND

Trials comparing the effectiveness and safety of weight-loss diets are frequently limited by short follow-up times and high dropout rates.

METHODS

In this 2-year trial, we randomly assigned 322 moderately obese subjects (mean age, 52 years; mean body-mass index [the weight in kilograms divided by the square of the height in meters], 31; male sex, 86%) to one of three diets: low-fat, restricted-calorie; Mediterranean, restricted-calorie; or low-carbohydrate, non-restricted-calorie.

RESULTS

The rate of adherence to a study diet was 95.4% at 1 year and 84.6% at 2 years. The Mediterranean-diet group consumed the largest amounts of dietary fiber and had the highest ratio of monounsaturated to saturated fat ($P < 0.05$ for all comparisons among treatment groups). The low-carbohydrate group consumed the smallest amount of carbohydrates and the largest amounts of fat, protein, and cholesterol and had the highest percentage of participants with detectable urinary ketones ($P < 0.05$ for all comparisons among treatment groups). **The mean weight loss was 2.9 kg for the low-fat group, 4.4 kg for the Mediterranean-diet group, and 4.7 kg for the low-carbohydrate group** ($P < 0.001$ for the interaction between diet group and time); among the 272 participants who completed the intervention, the mean weight losses were 3.3 kg, 4.6 kg, and 5.5 kg, respectively. The relative reduction in the ratio of total cholesterol to high-density lipoprotein cholesterol was 20% in the low-carbohydrate group and 12% in the low-fat group ($P = 0.01$). Among the 36 subjects with diabetes, changes in fasting plasma glucose and insulin levels were more favorable among those assigned to the Mediterranean diet than among those assigned to the low-fat diet ($P < 0.001$ for the interaction among diabetes and Mediterranean diet and time with respect to fasting glucose levels).

CONCLUSIONS

Mediterranean and low-carbohydrate diets may be MORE effective alternatives to low-fat diets. The more favorable effects on lipids (with the low-carbohydrate diet) and on glycemic control (with the Mediterranean diet) suggest that personal preferences and metabolic considerations might inform individualized tailoring of dietary interventions

A systematic review of the efficacy and safety of herbal medicines used in the treatment of obesity

World J Gastroenterol. 2009 July 7; 15(25): 3073–3085. Published online 2009 July 7. doi: [10.3748/wjg.15.3073](https://doi.org/10.3748/wjg.15.3073)

Abstract

This review focuses on the efficacy and safety of effective herbal medicines in the management of obesity in humans and animals. PubMed, Scopus, Google Scholar, Web of Science, and IranMedex databases were searched up to December 30, 2008. The search terms were “obesity” and (“herbal medicine” or “plant”, “plant medicinal” or “medicine traditional”) without narrowing or limiting search elements. All of the human and animal studies on the effects of herbs with the key outcome of change in anthropometric measures such as body weight and waist-hip circumference, body fat, amount of food intake, and appetite were included. *In vitro* studies, reviews, and letters to editors were excluded. Of the publications identified in the initial database, 915 results were identified and reviewed, and a total of 77 studies were included (19 human and 58 animal studies). Studies with *Cissus quadrangularis* (CQ), *Sambucus nigra*, *Asparagus officinalis*, *Garcinia atroviridis*, ephedra and caffeine, Slimax (extract of several plants including *Zingiber officinale* and Bofutsushosan) showed a significant decrease in body weight. In 41 animal studies, significant weight loss or inhibition of weight gain was found. No significant adverse effects or mortality were observed except in studies with supplements containing ephedra, caffeine and Bofutsushosan. In conclusion, compounds containing ephedra, CQ, ginseng, bitter melon, and zingiber were found to be effective in the management of obesity. Attention to these natural compounds would open a new approach for novel therapeutic and more effective agents.

HUMAN STUDIES

Change in human body weight

All studies showed loss of body weight except one[21] which seemed to have problems with the study design, and one other study[10] which showed a significant decrease only in body fat. Studies with *Cissus quadrangularis* (CQ)[26] or combined with *Irvingia gabonensis* (IG)[15], a combination of *Sambucus nigra* and *Asparagus officinalis*[16], calcium hydroxycitrate in *Garcinia atroviridis*[18], supplements containing ephedra and caffeine[9,13,20], and Slimax as an extract of several plants including *Zingiber officinale*[8] and Bofutsushosan[14] showed significant decreases in body weight.

Body fat

A significant decrease in body fat was shown with CQ[26], supplements containing ephedra and caffeine[9,13], a natural compound containing capsiicum and some lipotropic nutrients[10], Bofutsushosan[14], and calcium hydroxycitrate in *Garcinia atroviridis*[18]. These phytopharmaceuticals showed a significant decrease in triceps skin fold thickness indicating significant loss of fat.

Waist and hip circumference

Efficient decreases in both waist and hip circumferences in trials with a supplement containing

ephedra and caffeine[9] and Slimax (extract of several plants including Zingiber officinale[8] were shown whereas Caralluma fimbriata[19] and CQ with or without IG[15] significantly decreased waist size.

Food intake

Decreases in appetite or amount of food or energy intake with a supplement containing ephedra and caffeine[20] and Caralluma fimbriata[19] were shown (not significant) but hydroxycitric acid (HCA-SX) with or without Gymnema sylvestre[23] decreased the amount of food intake efficiently. A natural compound containing capsicum and other lipotropic nutrients[10] did not significantly change energy intake.

Adverse effects

No significant adverse effects compared to controls were mentioned and no mortality was reported, except in studies with supplements containing ephedra and caffeine[9,20] which caused minor adverse effects such as dry mouth, insomnia, nervousness, palpitation and headache. Bofutsushosan[14] caused loose bowel movements.

DISCUSSION

Currently available anti-obesity medications attack the body fat dilemma in three different ways. They can stimulate metabolism, suppress appetite, affect serotonin, or they can impede digestion of fat. In this review, we can categorize the target effects of herbal medicines in the same way.

Arachis hypogaea[50](<PEANUTS?... O_o) decreased body weight gain, liver triglyceride content and liver size in association with increased fecal lipid excretion, suggesting an inhibitory mechanism on lipid absorption. Phillyrin[52], *Allium victorialis*[32], Pomegranate leaf[43], *Kochia scoparia*[46], *Panax japonicus*[55], Oolong tea[67], and *Aesculus turbinata* Blume[71] also had the same effect.

A decrease in food intake as a result of a decrease in appetite and an influence on hormonal status was observed with **TEQ and DAS**[30], Pomegranate leaf[43], Korean red ginseng[58], Tree peony[69], Gyeongshang angjeehwan containing a variety of plants including platycodon grandiflorum and Magnoliaceae and ephedra[81], and Parasitic loranthus[70], refined Rhubarb[34], *Caralluma fimbriata*[19] and Panax ginseng berry[85]. Possible stimulation of metabolism has been reported as a mechanism of action for compounds such as **Slimax**[8], supplements **containing ephedra**.

Ephedra known as Ma Huang is a well known natural product with amphetamine-like stimulation effects. Although it's efficacy in weight loss need more investigations, its adverse effects are well established in the literature. In this review, nine studies investigated the effects of ephedra as one of the major components in the combinations with caffeine[9,13,22] or with several other plants[14,20,79,81,83] 5 of which were human studies[9,13,14,20,22].

In one study[13], **efficient decreases in body weight and fat** were observed with the **administration of 210 mg caffeine and 72 mg ephedra per day for 12 wk with an improvement in lipid metabolism and blood pressure without serious adverse effects**. In this study, the weight loss at 12-wk was -3.5 ± 0.6 kg with the test compound which was significantly ($P < 0.02$) higher than that of the placebo. The percentage fat loss shown by DXA was $-7.9\% \pm 2.9\%$ and $-1.9\% \pm 1.1\%$, respectively ($P < 0.05$). In another study[20], ephedra at a dose of 40 mg/d and caffeine at a dose of 100 mg/d for a longer time (9 mo) was found to be more efficient than the previous study in lowering body fat and weight, improving lipid metabolism and blood pressure and had no serious adverse effects. The treatment group lost significantly more body

weight (-7.18 kg) and body fat (-5.33 kg) than the control group (-2.25 and -0.99 kg, respectively). The difference in data from these two studies possibly resulted from the different dosages and duration of interventions.

In a human study[9], a significantly greater weight loss was observed (-4.0 ± 3.4 kg or 3.5% of baseline) in the test group vs (-0.8 ± 2.4 kg or 0.09% of baseline) in the placebo group. Four studies[58,59,65,76] investigated different doses and types of ginseng which is a very popular Chinese herbal medicine. Ginseng significantly decreased weight gain and efficiently improved glucose tolerance[59,76].

Anti-Obesity Drugs: A Review about Their Effects and Safety

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CURRENTLY USED MEDICATION

Drug	Mechanism	Effects on weight	Adverse effects	Status	Comments
Medications for short-term weight management or selected medications used off-label to promote weight loss					
Phentermine ^a	Sympathomimetic amine (appetite suppressant)	3.6 kg placebo-subtracted weight loss in studies ranging from 2-24 weeks	Insomnia, tremor, ↑ blood pressure and pulse rate, headache, palpitation, constipation	Currently approved drug for short-term weight management (≤12 weeks) in U.S., Korea and some countries, withdrawn 2000 in U.K.	Diffusion controlled release preparation is available
Diethylpropion ^a	As above	3.0 kg placebo-subtracted weight loss in studies ranging from 6-52 weeks	As above	Currently approved drug for short-term weight management	
Zonisamide ^a	Anti-convulsant agent	5.0% placebo-subtracted weight loss at 12 weeks	↑ Nervousness, sweating, tremors, gastrointestinal adverse effects, hypersomnia, fatigue, and insomnia	Used off-label	No enough clinical trials; should not exceed 400 mg/day
Topiramate ^a	As above	6.5% placebo-subtracted weight loss at 24 weeks	Paresthesia, dizziness, altered taste, fatigue, memory impairment, somnolence, anorexia, and abdominal pain	Used off-label	Associated with teratogenicity; should not exceed 400 mg/day
Medication for long-term weight management					
Orlistat ^a	Pancreatic lipase inhibitor	2.9 kg placebo-subtracted weight loss at 1 year	Abdominal pain, bloating, flatulence, oily stools, diarrhea, ↓ absorption of fat soluble vitamins	Only approved drug for long-term weight management	Available over-the-counter in several countries

WITHDRAWN MEDICATIONS

Drug	Introduced	Mechanism	FDA status
Fenfluramine	1973-U.S.	Sympathomimetic amine (appetite suppression)	Withdrawn 1997: valvular heart disease, pulmonary hypertension
Dexfenfluramine	1996-U.S.	As above	Withdrawn 1997: valvular heart disease, pulmonary hypertension
Rimonabant	2006-Europe	Selective CB1 receptor blocker	Not approved in U.S.: concern over psychiatric side effects Withdrawn 2009: potential of serious psychiatric disorders Temporarily withdrawn 2002
Sibutramine	1997-U.S. 2001-Europe	Selective combined serotonin and noradrenaline reuptake inhibitor (appetite suppression)	Withdrawn 2010: increased risk of heart attack and stroke in high-risk cardiac patients

DRUGS UNDER INVESTIGATION:

Drug	Mechanism	Expected weight loss	Adverse effects	Status	Comments
Monotherapy					
Lorcaserin ^a	Highly selective 5HT-2C receptor agonist	Drug: 8.2 kg Placebo: 3.4 kg	Headache, depression, infection, nausea and dizziness (Possible concerns of the effect on valvular dysfunction)	Not approval in 2010 due to concerns over carcinogenicity observed in animal	Resubmitted the NDA on January, 2012
liraglutide ^a	GLP-1 analogues	Drug: 7.2 kg Placebo: 2.8 kg	Nausea, and increased risks of thyroid C-cell focal hyperplasia and medullary thyroid tumor in rats and mice	Phase 3	Approved in 2009 as a treatment for type 2 diabetes
Tesofensine ^a	Anti-convulsant agent	Drug: 11.2 kg Placebo: 2 kg	Nausea, dry mouth, headache, insomnia, diarrhea and constipation	Phase 3	
Cetilistat ^a	As above	Drug: 4.3 kg Placebo: 2.8 kg	Abdominal pain, fecal urgency and diarrhea	Phase 3	
Combination therapy					
Qnexa ^a (phen-termine and topiramate)	Sympathomimetic amine and anti-convulsant agent	Drug: 14.7 kg Placebo: 2.5 kg	Headache, paresthesia, dry mouth, paresthesias, dry mouth, nasopharyngitis and birth defects	Not approval in 2010 due to concerns over teratogenic potential	Resubmitted the NDA on October, 2011 and completed its review of the Qnexa on April, 2012
Contrave ^a (bupropion and naltrexone)	Norepinephrine/dopamine reuptake inhibitor and opioid receptor antagonist	Drug: 8.2 kg Placebo: 1.9 kg	Nausea, headache, insomnia, constipation	Not approval in 2011 due to concerns over cardiovascular risks and psychological issues	

An ASIDE Regarding Limited Caloric Intake:

With Limited caloric intake. There comes a point in which Protein intake becomes important, to prevent muscle wasting and catabolism. Some facts about Protein intake:

- RDA (recommended dietary allowance) for protein is 0.8 grams per 2.2lb(kilogram) body weight .
- NSCA (National Strength and Conditioning Association) recommends that for active people, endurance and strength training, a higher intake is advised at around 0.4-0.6g/ per lb of bodyweight (and up to 0.8g/lb bw for full time athletes).

Protein = 4 calories/1 g

Carbohydrate = 4 calories/1 g

Fat = 9 calories/1 g

Alcohol = 7 calories/1 g

- 120lb person > 72g Protein=288calories ; 200lb person > 120g Protein=480calories

To prevent muscle loss or wasting, You ideally want to lose fat not muscle. Muscle is the one thing that burns calories for you and continues to do so even at rest especially if you work out. Last thing you want to do is shut down your calorie burning generator.