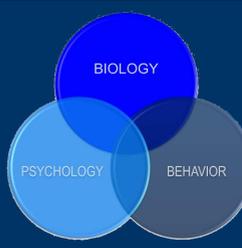




# Bio-psycho-social Approach to the Treatment of Obesity: A Retrospective Review



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## Background

More than one-third of adults and nearly 17% of youth were obese in 2009–2010<sup>1</sup>. Overweight and obesity-related conditions affect an estimated 97 million Americans and are the leading causes of preventable death in the United States. The estimated annual medical cost of obesity in the U.S. was \$147 billion in 2008; the medical costs for people who are obese were \$1,429 higher than for normal weight people<sup>2</sup>.

Numerous randomized trials comparing different diets (e.g., low carbohydrates, low fat) have shown minimal differences in weight loss (mean difference of <1kg) and metabolic risk factors<sup>3</sup>. Adherence was most strongly associated with weight loss in 4 meta-analyses of diet comparison studies summarizing 13 to 24 clinical trials<sup>4-7</sup>.

The importance of biological, behavioral, and environmental factors influencing adherence to lifestyle changes has been previously described<sup>1</sup>. To demonstrate the efficacy of a bio-psycho-social approach to weight loss, a retrospective review of patients completing a weight loss program was performed.

- ❖ Challenge cognitive distortions & reframe thinking
- ❖ CBT given 10-15 min/visit
- ❖ “Weight loss is lowering insulin level.”

- Categorize foods into 4 groups
- Ask if each food will increase insulin
- “No cheating”- Visualize the spiking of insulin
- “think thin, think insulin”

- ❖ “I’m not on a diet!” → “I’m lowering my insulin level.”
- Dieting triggers “feast-famine” mentality

- ❖ “I enjoy eating.” → “I eat for enjoyment.”

## Methods

- ❖ A retrospective review of charts of patients ages 18-75, enrolled in a weight loss program at an outpatient clinic
  - Inclusion- Minimum of 56 days on program
  - Exclusion- More than 140 days on program
- ❖ Weight loss program was constructed using biological, psychosocial, and behavioral interventions
- ❖ Study period: April 1, 2011 – January 1, 2013
- ❖ Patients presented for initial, 1 week follow up, then monthly visits
- ❖ Initial visit was 30 minutes; each subsequent visit was 10-15 min.
- ❖ Patients paid out of pocket for each visit

- ❖ Increase insulin → Fat storage & not burning fat
- ❖ 4 simple food groups that affect insulin:
  - (1) Sweets (2) Grains
  - (3) Starchy vegetables (4) Fruits
- ❖ Medication: phentermine, topiramate, or both

- ❖ Break old eating habits

- ❖ Kill sugar cravings  
(No sweets or artificial sweeteners)

- ❖ Eat 5 meals per day
  - (1) Breakfast Protein  
Meat or dairy products only

- (2) Snack 1 Fruit  
Apple, citrus, grapes, berries

- (3) Lunch Protein + green  
Protein & green, leaf vegetables

- (4) Snack 1 fistful of raw nuts

- (5) Dinner Protein + green  
Protein & green, leaf vegetables

## Statistical Analysis

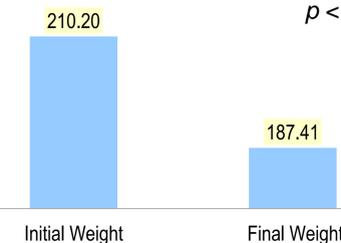
- ❖ Primary Outcome: Decline in weight from baseline
- ❖ Statistical Analysis: Student’s t-test was used to compare weight before and after intervention.

## Results

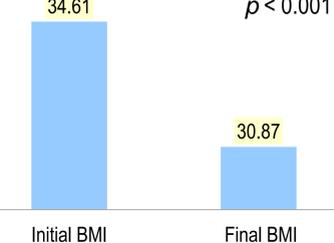
Table 1: Characteristics of Patient Enrollees (N=142)

	N	%
Female	116	82%
Male	26	18%
White	44	31.0%
Hispanic	87	61.3%
Other	11	7.7%
Phentermine 30mg	5	4%
Phentermine 37.5mg	128	90.1%
Topiramate 25mg	7	4.9%
Topiramate 50mg	2	1.4%
Combination Medication Therapy	3	2.1%
No Medications	1	0.7%
	<b>Mean</b>	<b>SD</b>
Age	40.03	11.31
Number of Days in Program	86.37	25.61

### Change in Weight (lbs)



### Change in BMI



Average of 10.8% Weight Loss

## Discussion

- ❖ Most weight loss programs focus on diets, weight loss medications, cognitive behavioral therapy, or behavioral modification programs
- ❖ To our knowledge, this is the first program that integrates biological, psychological and behavioral interventions in an outpatient setting
- ❖ The results show the potential efficacy of an outpatient-based program for weight loss using a bio-psycho-social intervention
  - 10.8% reduction in weight and BMI over 86 days of treatment ( $p < 0.001$ )
- ❖ The study demonstrates that medication, cognitive behavioral therapy, and behavioral modification in short 10-15 minute monthly visits can lead to significant weight loss

## Limitations

- ❖ Small, retrospective study with no control group
- ❖ Large variations in patient participation durations
- ❖ Patients were required to pay out of pocket expenses
- ❖ Study only examined those that completed at least 8-weeks of the program
- ❖ Study did not assess whether these changes are sustained after termination

## References

- National Health and Nutrition Examination Survey, 2009–2010
- Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report
- Pagoto SL, Appelhans BM. A call for an end to the diet debates. *JAMA*. 2013;310(7):687-688.
- Ajala O, English P, Pinkney J. Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes. *Am J Clin Nutr*. 2013;97(3):505-516.
- Wycherley TP, Moran LJ, Clifton PM, Noakes M, Brinkworth GD. Effects of energy-restricted high-protein, low-fat compared with standard-protein, low-fat diets: a meta-analysis of randomized controlled trials. *Am J Clin Nutr*. 2012;96(6):1281-1298.
- Hu T, Mills KT, Yao L, et al. Effects of low-carbohydrate diets versus low-fat diets on metabolic risk factors: a meta-analysis of randomized controlled clinical trials. *Am J Epidemiol*. 2012;176(suppl 7):S44-S54.
- Beuno NB, de Melo IS, de Oliveira SL, da Rocha Ataide T. Very-low-carbohydrate ketogenic diet v low-fat diet for long-term weight loss: a meta-analysis of randomized controlled trials [published online May 7, 2013]. *Br J Nutr*. 2013;1-10.

# Overcoming the Weight Loss Plateau in Patients Treated with a Low Carbohydrate Diet

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## Background

- A common observation in a typical weight loss (WL) program is a plateau in body weight after several months of successful weight reduction.
- It is believed the body protective mechanism called "adaptive thermogenesis" to protect humans from starvation by fighting against weight loss<sup>1</sup>.
- Researchers have shown that weight loss results in biological adaptations, specifically a decline in energy expenditure and an increase in hunger, both of which promote weight regain<sup>2,3</sup>.
- This effect has been seen in many types of programs including those that restrict caloric intake, recommend a particular combination of foods, or use specific WL medications.
- Dynamic energy balance models predict the plateau to occur between one to two years<sup>4,5</sup>.
- Research has shown weight loss typically stabilizes at 6 months or sooner because of an intermittent lack of diet adherence rather than metabolic adaptation<sup>6</sup>.

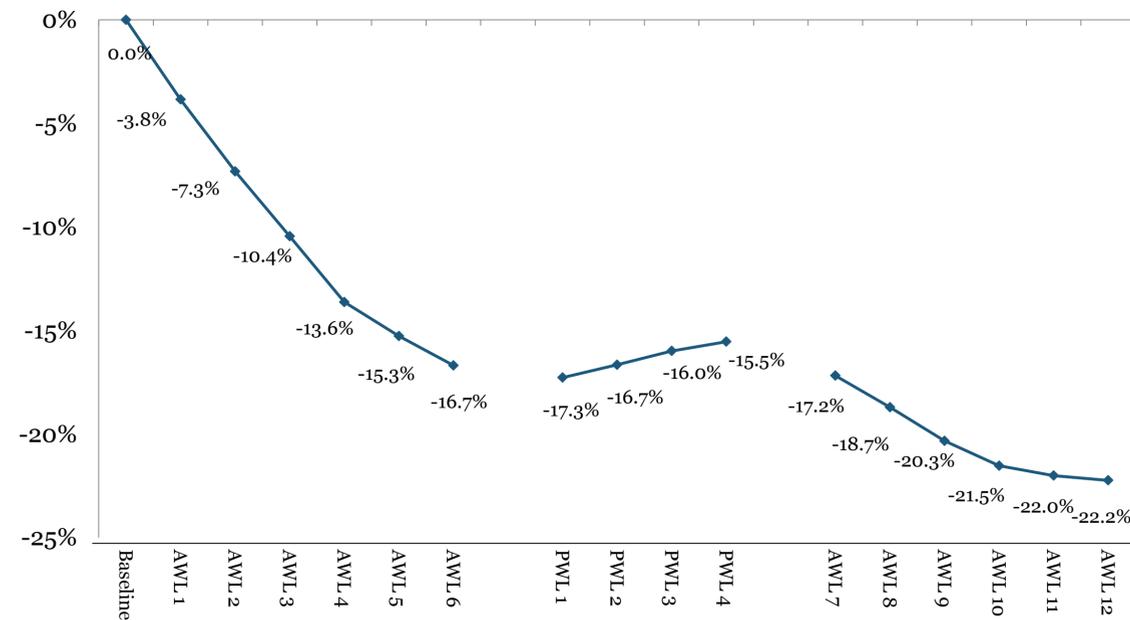
## Objective

To examine the results of a program specifically designed to overcome the WL plateau that is typically observed.

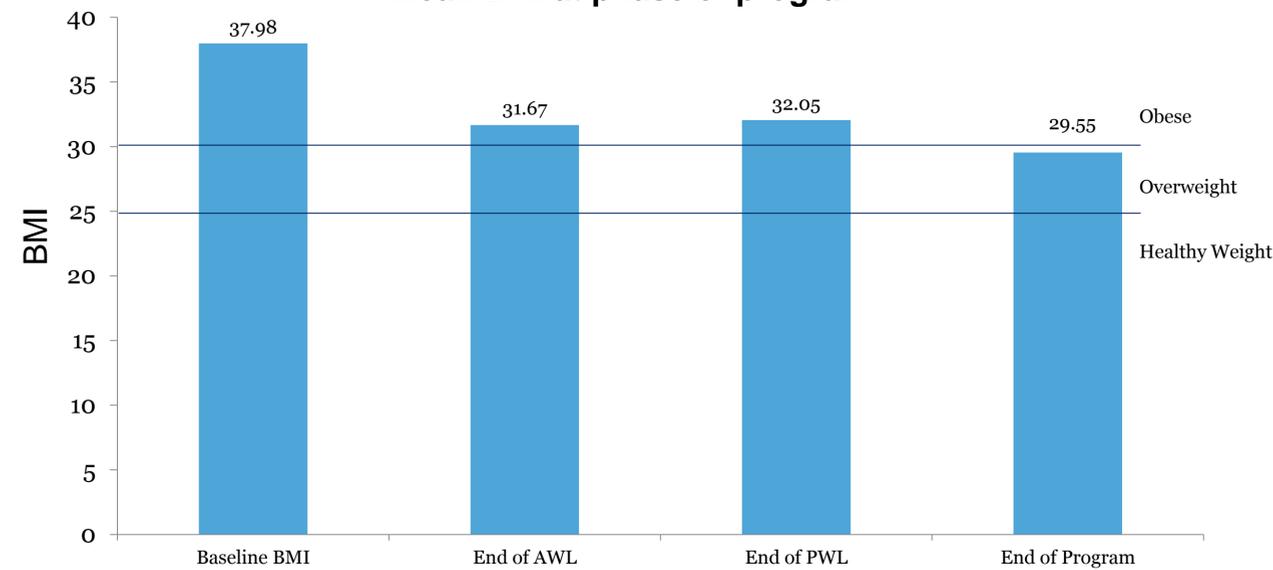
## Methods

- A pilot observational study was conducted with patients enrolled in a physician-supervised medical WL program.
- Patients were included if that had a minimum of 40 continuous weeks in the program.
- Patients in the active WL (AWL) phase of the program had:
  - Regular weigh-ins
  - Offered individualized WL medication
  - Counseled using a biopsychosocial approach
  - Prescribed a low carbohydrate diet to lower insulin level.
- To counter the WL plateau, patients were in the AWL phase for 20 weeks, transitioned to a 12 weeks maintenance phase or passive weight loss (PWL) consisting of:
  - Medication discontinuation
  - Reintroduction of carbohydrates to increase insulin level.
- Patients were subsequently returned to AWL to the end of the study.

Average weight loss (%) during program



Mean BMI at phase of program



## Results

- A total of 10 patients participated in the study, 40% male and 60% female with an average age of 47.10 (sd) years old.
- Mean baseline weight was 106.50 kg (SD=20.84) and mean height was 66.0 inches (3.28). Mean baseline BMI=37.98 (7.98).
- Patients lost an average of 17.75 kg (16.6%) of baseline body weight at 20 weeks (AWL phase).
- Total mean WL at the end of the study was 23.61 kg a 22.2% loss. Ending mean was BMI=29.55 (6.47).

## Discussion & Conclusions

- A diet low in carbohydrates reduces insulin and results in fat burning and weight loss.
- Reintroducing carbohydrates causes insulin level to rise.
- As shown here, the WL plateau can be successfully overcome by actively lowering insulin again.
- Patients plateaued during the maintenance phase but lost additional weight once they returned to AWL treatment.
- This is more difficult if patients remain on a low carbohydrate diet throughout the WL program.

## Limitations

- This was a small pilot observational study with no control group.
- Patients were required to pay all out-of-pocket expenses.
- The study only examined participants who completed at least 40 weeks of the program.
- The study did not assess whether WL changes were sustained after termination.

## References

- 1 Rosenbaum M, Leibe RL. Adaptive thermogenesis in humans. *Int J Obes* (London). 2010 Oct; 34 (01): S47-S55.
- 2 Maclean PS, Bergouignan A, Cornier Ma, Jackman MR. Biology's response to dieting: the impetus for weight regain. *Am J Physiol Regul Integr Comp Physiol*. 2011; 301: R581-R600.
- 3 Rosenbaum M, Kissileff HR, Mayer LE, Hirsh J, Leibel RL. Energy intake in weight-reduced humans. *Brain Res*. 2010; 1350:95-102.
- 4 Thomas DM, Martin CK, Heymsfield SB, Redman LM, Schoeller DA, Levine JA. A simple model predicting individual weight change in humans." *Journal Biol Dyn*. 2011; 5: 579-99.
- 5 Hall KD. Predicting metabolic adaptation, body weight change, and energy intake in humans. *Am J Physiol Endocrinol Metab*. 2010; 298: E449-66.
- 6 Thomas DM, Martin CK, Redman LM, Heymsfield SB, Lettieri S, Levine JA, Bouchard C, Schoeller DA. Effects of dietary adherence on the body weight plateau: a mathematical model incorporating intermittent compliance with energy intake prescription. *Am Journal Clin Nutrition*. 2014 Sep; 100 (3): 787-95.