



## Review article

# A new clinical perspective: Treating obesity with nutritional coaching versus energy-restricted diets

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## ABSTRACT

Although current guidelines for obesity treatment endorse lifestyle modifications to achieve weight loss, energy-restricted diets are still the most commonly used method for the management of overweight. Diet restriction, however, not only is ineffective in promoting long-term weight loss but also may have more costs than benefits, predisposing the individual to fat regain. Several physiological and psychological mechanisms protect the body against starvation and explain how food restriction can promote paradoxically the opposite of what it is planned to achieve, triggering changes in energy metabolism, endocrine function and, thus, body composition. New approaches that focus on behavioral treatment without diet restriction, such as nutritional coaching, are showing strong growth that arises as an innovative way to create sustainable and effective lifestyle changes.

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## Introduction

Obesity is an abnormal or excessive fat accumulation that potentially can lead to development of diabetes, cardiovascular diseases, musculoskeletal disorders, obstructive sleep apnea, and cancers, and now affects >1.8 billion people [1]. Lifestyle interventions are often recommended to treat obesity with energy-restricted diets (ERDs), most commonly used for management of this disease. The U.S. weight loss market is valued at >\$66 billion and it seems thousands of new diets are created every year [2]. ERDs, based on dietary prescription, have largely failed in long-term obesity treatment [3]. Despite this, ERDs continue to be the most popular approach to weight management [4]. The continuously growing obesity rate demonstrates that weight loss as an indicator of success is not only fruitless but also may be physiologically and psychologically damaging [5].

Although the management of obesity requires lifestyle intervention, most ERDs focus more on macronutrient composition and less on changing behavior. Recent studies using low-fat or low-carbohydrate diets reported significant weight loss with or without exercise participation [6,7]. However, simply the vast

number of existing diet programs make clear that none are highly successful at inducing and maintaining weight loss, even those with supporting scientific evidence. Sustainable weight loss requires the patient to adopt and incorporate new behavior patterns into their lives. Health and wellness coaching is a relatively novel strategy with demonstrated effectiveness in assisting patients with obesity in their efforts toward weight management [8]. Moreover, this strategy can be adopted successfully in a nutritional coaching (NC) model to specifically work with obese individuals. NC is an intervention with tremendous potential and is the focus for this review [9].

The primary aims of this review were to provide clinicians with an arsenal of reasons to help convince their patients to avoid ERDs and to introduce clinicians to the behavior-changing process of health coaching with emphasis on NC. The intention is to help practitioners acquire new tools to become more effective in promoting weight loss, which in turn should help their patients improve their health.

## Reasons to avoid energy-restricted diets

ERDs may have more costs than benefits, paradoxically promoting exactly the opposite of what is intended [10]. Between 90% and

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95% of individuals following weight loss diets will regain weight in the long term, sometimes ending up weighing more than before [10]. Field et al. [11] followed nearly 15 000 adolescents over 3 y, analyzing the effects of dieting on their body mass index (BMI), and showed dieters gained more weight than non-dieters. Fildes et al. [12] also showed that the possibility of achieving a 5% reduction in body weight through diet varies between 12% (men) and 14% (women), but the majority of those individuals tend to regain lost weight within 2 to 5 y, as evidenced by BMI records. Weight cycling is seen in 30% of individuals [12] and sometimes more, as observed by Mann et al. [13]. Finally, Anderson et al. [14], in a meta-analysis of 29 trials on long-term weight loss maintenance, indicated that participants maintained a reduction of only 3% of the initial weight after 5 y. In summary, it is clear that weight loss is difficult to achieve and may be more difficult to maintain. There are several physiological events that may be causing this poor sustainability of weight loss.

One hypothesis related to weight regain is “metabolic adaptation” or “adaptive thermogenesis” (AT). AT refers to the decrease in resting energy expenditure (REE) or resting metabolic rate (RMR) after caloric restriction and weight loss. Although the precise mechanism is obscure, some say AT is an autoregulatory function that follows reduced activity of the sympathetic nervous system and low plasma concentrations of leptin and T3 (3,5,3'-tri-iodo-L-thyronine) [15,16]. AT acts to restrain the rate of weight loss and is not fully explained by reduction in fat-free mass (FFM) or fat mass [17]. There is a slowing of REE during active weight loss, even when FFM is preserved, as demonstrated by Johansen et al. [18]. This drive for excess energy (fat) storage leads the body to anabolism, allowing the organism to do the same functions with less energy, thus creating an ideal situation for weight regain. AT seems like an evolution-related protection mechanism that is now less necessary in an environment with ready access to food and a sedentary lifestyle [10,15,17]. The extent of AT relates to the degree of energy deficit and it seems AT is a mechanism favoring weight instability and regain.

Another hypothesis emerged since brown adipose tissue (BAT) was “rediscovered” in humans as a metabolically active tissue, and its role in thermogenesis remains unclear. BAT, which is characterized by high mitochondrial content, is responsible for the production of heat in a process mediated by uncoupling protein 1 [19]. In this context, another way to define AT is as nonshivering heat production in response to changes in environmental and physiological settings, such as cold, diet, fever, and stress [20]. It increases in the presence of cold and weight gain, resulting in heat generation, which promotes energy expenditure and maintains homeostasis [15]. In hunger, however, the low circulation concentrations of bioactive thyroid hormones and leptin attenuate sympathetic nervous system-mediated heat production in BAT to preserve energy, which might partially explain weight gain when following ERDs [15,19,20].

The first to describe AT was Keys et al. [21], in the Minnesota Starvation Experiment, which involved 36 healthy participants and analyzed physiological and mental effects of food deprivation and refeeding. These individuals underwent severe starvation for 24 wk, losing ~25% of their body weight, before being given unrestricted access to food. The participants became increasingly angry, impatient, and tired and presented symptoms of vertigo, myalgia, and alopecia as they lost weight. On the other hand, with refeeding, they became hyperphagic, showing overfeeding even as body weight and adipose tissue returned to basal levels. REE declined by 600 kcal/d (39%), which was unrelated to the FFM, but with refeeding returned or surpassed the initial rate [3,4,16]. It can be concluded that human bodies are programmed for survival and automatically reduce RMR if there is a sudden decrease in food intake or availability.

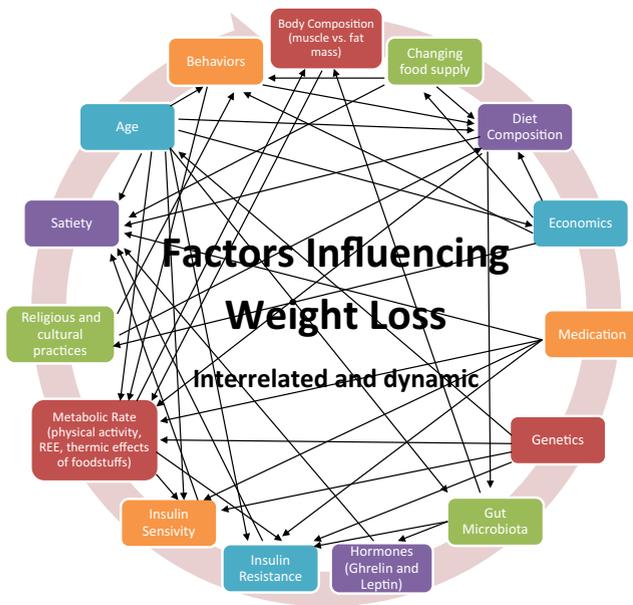
Johansen et al. [18] investigated changes in body composition and energy expenditure in 16 obese individuals involved in a “Biggest Loser” competition. With 30 wk of ERDs and vigorous exercises (90 min/d mandatory aerobic or circuit training with 180 min/d of optional additional exercises), a massive weight loss was observed. By the end of the competition, nearly 40% body weight was lost with relative preservation of FFM (likely owing to the high level of physical activity). Even with relative preservation of muscle mass, RMR dropped out of proportion to the decrease in total body mass, demonstrating the presence of a substantial metabolic adaptation. Leptin levels decreased from 43 ng/mL at baseline to <3 ng/mL at week 30, and adiponectin levels almost doubled. More evidence of how the body combats the rapid loss of weight was seen in the presence of excessive increases in physical activity (energy expenditure increased  $6 \pm 4.1$  kcal/kg per day from baseline to week 30).

Fothergill et al. [22] reevaluated the body composition and energy expenditure of 14 of the 16 individuals previously evaluated “Biggest Loser” contestants and found that all but one regained a significant amount of the weight lost in the competition. Also, despite the weight regain, the mean RMR was not significantly different from the end of the competition. RMR was 500 kcal/d lower than expected, demonstrating an ongoing metabolic slowing years after rapid and massive loss of body mass via ERDs.

Another evolving factor is the understanding of the gut microbiome and how microorganism composition might affect weight loss and regain. Through the fermentation process, trillions of bacteria inhabiting the gastrointestinal tract help digest complex carbohydrates and other substances that cannot be directly metabolized by human enzymes [23]. This fermentation process is estimated to provide  $\leq 10\%$  of the energy required by the host [24]. Studies involving microbiota transplantation have opened the door for understanding the effects of the gut on metabolic function. Germ-free mice increased body fat after being colonized with microbiota from obese mice. Therefore, it seems that certain bacterial populations are more efficient in extracting energy from the diet, meaning that obese mice can extract a greater amount of energy from the same food identifying the gut microbiota as another additional contributing factor to the pathophysiology of obesity [25].

Finally, studying cases of abdominal liposuction provides relevant information about rapid fat reduction. Although not using ERDs, liposuction allows a large decrease in the volume of adipose tissue mass. However, this technique did not improve metabolic health nor prevent regrowth of fat. Instead, liposuction seemed to boost a compensatory increase of visceral fat [26,27]. Therefore, weight loss without sustainable behavioral changes will not achieve desired long-term improvements in health. Therefore, traditional prescriptive methods for weight loss (i.e., ERDs) that do not promote lasting lifestyle changes will not greatly affect health and well-being and may be harmful over the long term [22,28].

The following side effects of successful ERD treatment for obesity are considered natural physiological and psychological consequences: reduced energy expenditure and bone mineral density, slowing RMR, increased food demand, excessive body preoccupation, repeated cycles of weight loss and regain, reduced self-esteem, and potential eating disorders in susceptible individuals. Curiously, these “natural consequences” are what contributes to making obesity a self-perpetuating condition; however, this fact often is ignored [29]. It is clear that nutrition is not an exact science, with many factors affecting body weight and weight loss that are beyond mere concepts of thermodynamics. In addition to biochemical, hormonal, and physiological factors, there are cultural, psychological, emotional, genetic, and epigenetic adaptations; individual responses to exercise training; and economic, religious, and social factors that exist in a complex



**Fig. 1.** Interrelated factors influencing weight loss (adapted from ref. 30). REE, resting energy expenditure.

interplay and affect weight loss. Figure 1 illustrates the complexity of these interactions [30]. Such a complex problem is not solvable on a large scale with ERDs; this simple, yet difficult-to-implement solution, repeatedly demonstrates long-term failure. It is evident that lasting behavior change is the solution to achieving sustainable weight loss and health promotion. Instead of ERDs, a strategy relying on creating a new mindset for health, wellness, and food consumption is a logical alternative. Health coaching, and more precisely NC, is potentially a process that would provide innovation and the needed results.

**Health, wellness, and nutritional coaching**

Health and wellness coaching (HWC) is a partnership between the coach and the client that emphasizes behavior change to better client health [31]. NC is a derivative of the HWC behavioral strategy that promotes sustainable changes in eating habits [9]. The coaching professional supports the clients, helping them achieve self-directed goals aligned with their identified personal values. Therefore, coaching is a patient-centered process based on behavior change theory that encourages self-discovery and active learning processes. Generally, the process facilitates learning and, unlike psychotherapy, coaching looks to the future and not at the past [32,33].

As proposed by the National Consortium for Credentialing Health and Wellness Coaches, “coaching is a client-centered process to facilitate and empower the client to achieve self-determined goals related to health and wellness. Successful coaching takes place when coaches apply clearly defined knowledge and skills so that clients mobilize internal strengths and external resources for sustainable change” [31].

The professional coach rarely, if ever, assumes the role of content expert but instead espouses a client-centered model emphasizing self-discovery. In an NC relationship this means accepting the types and levels of dietary changes a client is willing to suggest and set as a goal. It should be understood that change is best made when it is self-directed and autonomously motivated but is generally resisted when suggested by others. Therefore, when practicing with a coaching model, we must largely give up the role of nutrition expert and instead allow the client to take the lead. Table 1 shows differences between the traditional expert nutritionist and the NC models.

Coaching begins with a respectful and non-judgmental attitude while honoring each client as an expert on his or her own life who ultimately has, or can find, all the answers needed to enhance well-being. The coach supports clients in making plans for action, gives them confidence, and empowers them to drive their own life. By combining theory from positive psychology, motivational interviewing, open-ended questions, active listening, non-violent communication, and tools for behavioral change, the coaching process encourages clients to overcome resistance to change and transform theoretical goals into practical actions, step by step [31,33]. When delivered by a trained health care professional, coaching amalgamates foundational psychological communication theories to develop rapport, express empathy and compassion, and encourage health-promoting behavior change. Motivational interviewing, non-violent communication, appreciative inquiry, social-cognitive theory, self-efficacy, mindfulness, a transtheoretical model, and positive psychology are central concepts providing foundations for key strategies employed by the well-trained and effective coach [38].

When considering economics and ease of applicability, HWC appears a highly viable intervention. A controlled study of 1024 patients with cardiovascular disease found a reduction of \$19 419 per person in those who received four or more sessions. The study also found substantial decrease in mortality in those who received four or more coaching sessions. In an apparent dose–response effect, those receiving less than four coaching sessions did not achieve significant reduction in total costs or improved survival [39]. Moreover, flexibility of delivery makes HWC an intervention worthy of serious consideration for nutritional and general health

**Table 1**  
Differences between nutritional coaching and traditional prescriptive (expert) approaches

Traditional prescriptive	Nutritional coaching
Diet prescription: Goals defined by the professional	No diet prescription: Action plan develops through self-determined goals based on client values
Subject as patient: Not making decisions Professional as an educator and prescriber of diet Professional is leader and expert who strives to solve problems	Subject as client: Active and leading in decision processes Professional as a facilitator of dietary change Coach as non-judgmental, partner/ally of equal stature, believing the client has or can find the answers needed for solutions
Distance between professional and patient Professional feels responsible for the patient’s health Asks closed questions requiring, “Yes” or “No” answers (i.e., “Do you eat fruits?” “Do you see yourself as a healthy person?” “Do you exercise?”)	Close relationship, which in itself is part of the process Professional believes that client is responsible for his or her own health Asks open-ended questions with many possible answers (i.e., “Tell me more about your vegetable consumption?” “How do you see your health right now and in the future?”)
“Why” questions with present and past focus Focus on fixing a problem: Sometimes motivated by fear	“How” questions with present and future focus Focus on optimal performance: Behavior change motivated by happiness and growth

Adapted from refs 33–37.

care situations. In a study of encouraging smoking cessation, HWC appeared equally effective whether provided in person or via telephone calls [40]. Furthermore, a web-based coaching program emphasizing motivational strategies and Internet meetings found positive short-term outcomes regarding weight reduction [41].

### Coaching and obesity intervention

A recently published compendium of coaching literature cited 33 peer-reviewed, data-based scholarly articles addressing HWC as an obesity intervention or weight loss strategy [8]. Of these, 14 studies were randomized controlled trials and 87% reported a significant effect on weight reduction. Not all of the studies used purely coaching strategies, so there is some question about the fidelity of these collective results. In general, however, the peer-reviewed HWC literature is growing rapidly and coaching interventions frequently target obesity with highly consistent and beneficial results. It does make sense to examine strict studies of coaching interventions using primarily dietary behavior changes to affect body composition, that is, NC.

#### Nutritional coaching

Lancha et al. [9] presented a case study in which the client had, on multiple occasions, unsuccessfully attempted to lose weight or regained weight after loss. Twelve weekly NC sessions yielded positive changes in eating habits, activity levels, and body composition. There was a loss of 9 kg body weight over this 3-mo period. Although not a controlled trial, the study nonetheless showed that a purely NC intervention could yield beneficial effects on health and body weight.

A web-based coaching study with SMS reminders and weekly meetings via the Internet used a cluster randomized, controlled design. The study placed 186 overweight or obese individuals into coaching or control groups (traditional approach with diet prescription and of physical activity). They participants were given 12 wk of nutrition-focused treatment. Although not a perfect model of NC, the study found weight decreased on average by 4.2 kg in the intervention group and 1.7 kg in the control group [41].

Pearson et al. [42] compared a 12-wk telephone-based coaching intervention to a behavior modification educational weight loss program (LEARN [Lifestyle, Exercise, Attitudes, Relationships, Nutrition]) in obese university students. Both interventions elicited weight loss, with the LEARN process being slightly more effective. However, those in the coaching group had a greater reduction in caloric intake and demonstrated better eating habits. Long-term sustainability of the interventions was good and both groups maintained weight loss for 6 mo after the initial 12-wk program. Pearson et al. concluded that these are two potentially effective strategies and that accommodating individual preferences might be more possible as a result.

The study by Pearson et al. [42] is not the only evidence for a sustainable effect of coaching. A recent systematic review reported about half of HWC studies show  $\geq 24$ -wk positive effect on health [43]. It is this long-term intervention effectiveness, or sustainability, that is the key to preventing weight regain. This is the promise of HWC, and specifically NC: developing new and sustainable eating habits to overcome the negative physiological effects of weight loss (e.g., AT). Although NC requires far more research attention, it appears to be an area very worthy of such focus.

### Conclusions

Although ERD prescriptions are the most popular method for managing overweight and obesity conditions, there is enough

evidence to determine that strategies are overwhelmingly ineffective while also being potentially physiologically and psychologically detrimental. The primary recommendation presented here is to consider changing from conventional weight management (i.e., diet restriction) to behavioral treatments such as NC. A growing number of studies suggest HWC strategies are effective for weight loss both in short- and long-term maintenance. HWC also has the potential to reduce health care costs and provide flexible intervention styles, potentially allowing widespread application to poorly served rural areas. HWC not only provides a prospective nutritional intervention but also can be applied to physical, emotional, social, intellectual, spiritual, and ecological aspects of health promotion. Additional research on NC with longer-term follow-up, considering different intervention times and session durations, is needed. It is clear, however, that HWC is an effective approach for weight loss and healthy behavior change. Specifically, NC is a promising strategy and potentially far more effective intervention than prescription of ERD.

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