Weight loss diet studies: we need help not hype

Over the past several decades, dozens of randomised controlled trials have compared various diets for the treatment of obesity. Ideally, such studies should have provided strong evidence for clear clinical recommendations and also put a stop to society's endless parade of fad diets. Unfortunately, the evidence base remains contested and the "diet wars" continue unabated.

One insight that can be gleaned from the existing weight loss literature is that even the most divergent of diets seem capable of affecting a degree of short-term success, with some diets perhaps leading to marginally greater losses than others over periods of several months. But since obesity is a chronic condition, it is the long term that matters. An effective diet for clinical weight management needs to be established over timescales of years to decades. Studies that have lasted 1 year or more typically do not show significant differences between prescribed diets, much less any clinically meaningful differences in maintenance of lost weight. One example is in the Dietary Intervention Randomized Controlled Trial (DIRECT), which has been hailed as proof of the superiority of low-carbohydrate diets over low-fat diets. The DIRECT investigators used a 2-year workplace intervention and found that a low-carbohydrate diet prescription led to a significant 1·8 kg greater mean bodyweight loss than the prescription of a low-fat diet. These bodyweight differences between the diets are among the largest differences that have been observed over a 2-year period. But from the clinical perspective, such small bodyweight differences do not instil confidence for prescribing one diet over another to a patient with obesity.

What can we learn from the physiology underlying such a bodyweight trajectory? Complex physiological feedback mechanisms regulate bodyweight and resist weight loss. Slowing of metabolism can be substantial and persistent and plays a part in halting weight loss and putting subsequent weight regain into motion. However, the typical bodyweight trajectory is primarily driven by patients experiencing an exponential decay of diet adherence due to an increase in appetite in proportion to the loss of bodyweight, along with difficulties in sustaining changes to dietary choices and behaviours that affect patients’ ability to enjoy, celebrate, and socialise with food.

Figure 1B shows the energy intake changes underlying the DIRECT trial’s observed bodyweight trajectories, which we have calculated using a validated mathematical model of human energy metabolism and bodyweight dynamics. At the plateau point of maximum weight loss, energy intake is balanced by expenditure and has decreased from baseline by about 200 kcal per day. By contrast, mean energy intake at the bodyweight plateau has increased by about 700–1000 kcal per day from its early reduction at the start of the intervention. After 1 year, mean bodyweights, although still reduced by several kilograms, climb back up in response to the average energy intakes returning almost to baseline levels.

Diet adherence is so challenging that it is poor even in short-term studies where all food is provided. When diets are prescribed, adherence is likely to diminish over the long term despite self-reports to the contrary. Figure 1B illustrates that the common self-report methods for measuring food intake (24 h recall and food frequency questionnaire) mistakenly indicate that the reduction in energy intake remained unchanged throughout the intervention. Such erroneous measurements have led to speculation that a reduction in energy expenditure, rather than loss of diet adherence, is the main driver of the bodyweight plateau. However, these self-reported measurements are known to be
Nevertheless, and hearteningly, anecdotal long-term diet success stories abound for most dietary approaches, and focusing on mean bodyweight trajectories masks the high individual weight loss variability within each diet group. The question is: why are some individuals more successful than others? When it comes to clinical weight management, success is predicated on long-term dietary adherence. Therefore, we need to increase our efforts to understand the individual differences between patients that have an effect on diet maintenance and prevent its erosion. Studies should determine how to target effective diets to individual patients, as well as improve our understanding of the real world considerations that impinge on patients’ abilities to sustain healthy dietary changes, such as those wrought by the food environment, socioeconomic factors, cooking skills, job requirements, medical comorbidities, caregiving responsibilities, and many more. After all, as with every chronic disease, successful obesity management requires lifelong treatment and there is a pressing need to help patients navigate day-to-day realities in the face of maintaining a permanent and intentional behaviour change. We also need to better understand how family, community, and society as a whole can help support and sustain healthy lifestyles.

Fewer resources should be invested in studying whether or not a low-carbohydrate diet is marginally better than a low-fat diet, or whether intermittent fasting provides marginally better short-term outcomes than a so-called Paleo diet. Crowning a diet king because it delivers a clinically meaningless difference in bodyweight fuels diet hype, not diet help. It’s high time we started helping.

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YF has received honoraria and travel expenses from Boston Children’s Hospital, Canadian Obesity Network, Centre for Effect Practice, Academy of Medicine Ottawa, Physical and Health Education Canada, North York General Hospital, IDE Health and Fitness Association, and the Royal Society of Medicine, London, for speaking engagements and for his role as clinical lead in the development of a Canadian Ministry of Health funded tool for primary care providers working with families of children with obesity; and has received fees for developing and delivering educational seminars to medical students and residents from the University of Ottawa. YF writes a blog, *Weighty Matters*, that is non-monetised with no advertisements or requests for donations. YF is the co-author of *Best Weight: A Practical Guide to Office-Based Obesity Management*. All royalties from the book go to the Canadian Obesity Network. He is the author of *The Diet Fix* (Random House) and receives royalties from this book. KDH reports a patent pending on a...
method of personalised dynamic feedback control of bodyweight (US Patent Application No 13/754,058; assigned to the National Institutes of Health) and has received funding from the Nutrition Science Initiative to investigate the effects of ketogenic diets on human energy expenditure.


7 Fothergill E, Guo J, Howard L, et al. Persistent metabolic adaptation 6 years after “The Biggest Loser” competition. Obesity (Silver Spring) 2016; published online May 2. DOI:10.1002/oby.21538.


