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Editorial

The Healthiest Diet in the World

As I write this, I have on my desk the latest diet books. Each one claims to reveal the secret to lasting weight loss and maintenance. Most of them claim that a healthy weight can be obtained without much effort, and some even allege that weight loss can be achieved without dieting or exercise. If only they were right. We are all waiting for that miracle. With obesity now a worldwide epidemic, we need all the help we can get. In the United States, for example, 65% of adults are already overweight or obese. On average, adults are gaining almost 1 kg a year. If present trends continue, by the year 2040 nearly 100% of adults in the US will be overweight or worse. Among US children and adolescents, 34% are already overweight, almost double the rate of 20 years ago. There is no single cause for overweight and obesity; however, weight control is primarily a function of caloric balance. There is no substitute for the simple formula that 'calories in must equal calories out' in order to control weight. Calories count. Most of us need to eat fewer calories, be more active, and make wiser food choices. If it were easy, all of us would be thin. Although we come in different shapes and sizes, and may not all achieve thinness, all of us can be healthy. We can all eat a healthy diet and be more active. The scientific evidence is unequivocal. A healthy diet is one based on a sufficient amount of fruits and vegetables while staying within energy needs. The path to good health is to choose a variety of fruits and vegetables each day. The "miracle" is well known; it is an eating pattern based on fruits and vegetables, along with daily physical activity. Balance, variety and moderation are the keys to achieving and maintaining a healthy lifestyle.

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The importance of Energy Density in Weight Management

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Common strategies to reduce energy intake include limiting portion sizes, food groups, or certain macronutrients such as carbohydrates or fats. These strategies can help moderate calorie intake, particularly during the short-term; but they do have limitations. These approaches may compromise diet quality or cause feelings of hunger and dissatisfaction, which can limit their acceptability, sustainability, and long-term effectiveness. An alternative strategy for managing calorie intake is to encourage people to eat more foods that are low in calories for a given measure— that is, are low in energy density (kcal/g).

What is energy density?

Energy density is the amount of energy or calories in a particular weight of food (i.e., kcal/g). Foods with a lower energy density provide fewer calories per gram than foods with a higher energy density. For the same amount of calories, a person can consume a larger portion of a lower-energy-dense food than a food higher in energy density.

Foods with a lower energy density, such as fruits, vegetables, and broth-based soups; tend to have a high water content, lots of fiber, or little fat. Water, which has an energy density of 0 kcal/g, lowers the energy density of foods as it contributes weight but not energy to foods. Fiber also has a relatively low energy density (1.5–2.5 kcal/g). Fat, however, is the most energy dense component of food (9 kcal/g), providing more than twice as many calories as protein or carbohydrates (4 kcal/g). While most high-fat foods have a high energy density, increasing the water content lowers the energy density of all foods, even those high in fat. For example, adding water-rich vegetables to casseroles lowers the energy density of these dishes.

Low-energy-dense diets, energy intake and satiety

Observational studies have shown people who report eating a lower-energy-dense diet have a lower energy intake yet consume more food by weight than people who eat a higher energy dense diet[1-3]. Experimental studies confirm that consuming foods lower in energy density is an effective strategy for reducing calorie intake and show that calorie intake can be reduced without increasing feelings of hunger. In one of these studies participants were given a standard lunch on different occasions preceded each time with either a first-course salad of differing energy density or by no salad[4]. Participants consumed fewer calories when the meal started with the lower-energy-dense salad and they reported feeling just as full as participants who had no first-course salad or had a salad that was higher in energy density.

Multiple longer-term studies have found that over the course of a few days, people generally consume a fairly consistent amount of food. Therefore, calorie intake is lower when people eat foods low in energy density[5-10]. Encouraging people to eat more foods low in energy density and to substitute these foods for those higher in energy density helps them decrease their caloric intake while eating satisfying portions of food and controlling hunger.

Low-energy-dense diets and body weight

Several observational studies suggest that a relationship exists between consuming an energy dense diet and obesity[1, 11-13]. For example, normal weight adults have been shown to consume diets lower in energy density than obese individuals[1]. Additional evidence supporting the use of diets rich in low-energy-dense foods for weight-loss comes from clinical interventions.

Rolls and colleagues[14] examined the effectiveness of incorporating either a low-energy-dense food or a high-energy-dense food into a reduced-energy diet. During this year long trial overweight and obese men and women were provided with one of the following items to incorporate into their daily diet: one serving of soup, two servings of soup, two servings of a dry snack food, or no special food. The researchers found that weight loss was significantly correlated with the overall decrease in the energy density of the diet. Participants consuming two servings per day of low-energy-dense soup experienced 50% greater weight loss than participants who consumed two servings per day of high-energy-dense dry snacks (7.2 kg vs. 4.8 kg).

In another year-long trial, Ello-Martin and colleagues[15] tested two strategies to reduce the energy density of the diet without providing the subjects with specific calorie limits. One group of obese women was advised to decrease the energy density of their diets by increasing consumption of fruits and vegetables and choosing reduced-fat foods. Another group was counseled only on reducing fat intakes. The group counseled to eat more fruits and vegetables while also reducing fat intake experienced a greater reduction in the energy density of their diets and lost 23% more weight (7.9 kg vs. 6.4 kg). Furthermore, these participants reported consuming more food and experiencing less hunger.

These studies suggest that dietary advice to reduce the energy density of the diet is an effective strategy for weight loss. A benefit of this type of eating plan is that it allows people to eat satisfying amounts of food while restricting their energy intake. Furthermore, it uses positive messages (i.e., eat satisfying portions of low-energy-dense foods) and results in a nutritionally sound eating pattern[16].

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Role for fruit content in low energy diets

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Classically, energy-restricted diets have included fruits as low-calorie fuel. However, depending on fruit type, carbohydrate and fiber composition as well as other components vary, and should be also taken into account as these differences may influence antioxidant power, glycemic index and energy content.

Balanced low-energy diet and weight management

The prescription of nutritionally equilibrated low-energy diets is a common strategy for body-weight reduction. These diets are designed according to traditional nutrient recommendations to supply a balanced ratio of protein (10-20% energy), carbohydrate (50-65% energy), and fat (25-35% energy) in reduced quantities to provide an energy intake of 3350-6280 KJ (800-1500 kcal/d). However, traditional nutritionally adequate low-energy diets have frequently failed to promote stable weight loss, and the explanations for such limited success have been attributed to "poor adherence" to specific low-energy diets. Thus, dietary approaches based upon changes in the macronutrient distribution rather than food restriction to treat overweight are becoming increasingly popular because they might favourably affect weight loss and lipid profile[1]. Consequently, at the present time, clinical trials showing that the enrichment of diets with foods that have antioxidant properties such as fruits with the purpose of reducing the risk of illnesses associated to the obesity like atherosclerosis and diabetes, among others[2] could provide additional value for health.

Fruit and body weight loss

Fruit contains a high amount of fructose, a secondary carbohydrate in supplying energy. Thus, fruit intake could conceivably induce body weight gain. However, moderate fructose intake with a low glycemic index does not adversely affect body composition. This monosaccharide does not require insulin for uptake into cells and moderate fructose intake appears less likely to cause symptoms of reactive hypoglycemia, or to trigger hypoglycemia-related overeating. For these reasons, fructose is often included in many weight-loss products.

However this view concerning the healthy benefits of fructose is being currently challenged. Regarding this fact, one clinical trial included obese women who follow two hypocaloric diets with different fruit content. Results showed that the consumption of a high-fruit energy-restricted diet for 8 weeks involved no remarkable benefits or deleterious effects related to weight loss and general metabolic indicators as compared to a low-fruit hypocaloric diet[3]. These outcomes could be explained as effect of the energy restriction and also because the increased intake fructose is associated to higher fiber content[3].

Fruit and antioxidant protection during weight loss

Increased reactive oxygen species generation has been described in the obese and may result in oxidative injury to cell lipids and proteins that may be associated with co-morbidities in the obese. Cells contain a variety of antioxidant compounds, such as uric acid, bilirubin, ascorbic acid and vitamin E, which provide protection against oxidative stress. The major source of these antioxidants is the diet, although weight loss in obese individuals has been also hypothesized to reduce oxidative stress. So, caloric restriction diets including antioxidants-enriched foods could be a doubly effective strategy to inhibit oxidative injuries[4].

Fruits are often considered a healthy food because they contain a variety of compounds with antioxidant capacity, such as vitamins C and E, carotenoids, flavonoids, and polyphenols which may have beneficial actions. The protective effect of fruit may be related to a decrease in free radical production or stimulation of other antioxidative processes. In this context, obese women consuming a high-fruit hypocaloric diet showed a higher decrease in total cholesterol levels and higher increase in antioxidant capacity than obese women who consumed low-fruit hypocaloric diet specifically due to fiber and fructose content of fruit, while the weight loss was similar in both dieting groups[4].

In conclusion, daily intake of fruit that provides fructose, fiber, and different bioactive compounds that may have specific effects on weight management and oxidant status. The supply of fiber and antioxidant substances naturally occurring in fruits could be a useful strategy in the design of hypocaloric diets that, with body weight reduction, could produce an improvement in cardiovascular risk factors related to obesity.

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DIET AND PHYSICAL ACTIVITY

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Summary of Platat, C, Perrin, A-E, Oujaa, M. et al. Diet and physical activity profiles in French preadolescents. British Journal of Nutrition. 2006; 96, 501–507

There is a need for a better understanding of the relationships between healthy behaviours for more efficient prevention of non-communicable diseases. Several studies have examined the relationships between various dietary behaviours and physical activity in children and adolescents, but none has used both physical activity and diet to investigate lifestyle patterns.

In 2001, Platat and colleagues investigated lifestyle patterns combining diet and physical activity in 12-year-old French preadolescents and studied their association with socio-demographic factors. Physical activity, sedentary activities and dietary habits were assessed by questionnaires in 2724 students. Family income tax and parental educational level, as indicators of socio-economic status, and the size of the household were obtained from parents.

Physical activity associated to fruit and vegetable consumption...

Table 1 presents the findings on dietary habits according to physical and sedentary activity. Physical activity was significantly and positively associated with fruit, vegetables and/or fruit juice being consumed more than four times in the previous 24 hours. It was inversely associated with sweetened drink consumption and with the consumption of French fries or potato chips in the previous 24 hours.

Time spent in sedentary activity was inversely associated with a high consumption of fruit, vegetables and/or fruit juice over the past 24 hours and positively and significantly associated with sweetened drink being the most commonly consumed drink, with the consumption of French fries or potato chips and with snacking while watching television, in the previous 24 hours.

... even after adjusting for socioeconomic factors

Even after adjusting for socio-economic status, physical activity remained significantly and positively associated with a consumption of fruit, vegetables and/or fruit juice on more than four occasions in the previous 24 hours. Nevertheless, the inverse association observed between physical activity and the consumption of French fries or potato chips did not remain significant when taking into account SES indicators.

Sedentary activities were significantly and positively associated with the consumption of French fries or potato chips, with sweetened drink as the most usual drink and with snacking while watching television, and inversely associated with a high consumption of fruit, vegetables and/or fruit juice.

Two distinct behavioural profiles

This study has identified two particular combinations of behaviour related to diet and physical activity. The first is defined by physical activity and the consumption of fruit, vegetables and/or fruit juice, and associated with the size of the household. The second is characterised by sedentary activity, the consumption of French fries or potato chips, sweetened drink as the most usual drink and snacking while watching television, and associated with family income tax and parental educational level.

The results suggest that physical and sedentary activities are distinct behaviours, associated with specific diet habits and also with different determinants.

Prevention programmes should focus on physical and sedentary activities

Recent work suggests that physical activity and sedentary behaviour may be determined by different parameters[1]. Environmental factors, including the urban layout and density, availability of cycle paths, accessibility of sports facilities and proximity of food shops and fast-food outlets, have been identified as potential correlates of both physical activity and dietary habits[2].

Socioeconomic factors such as family income tax and parental educational level have been related to both dietary habits and physical activity[2,3]. The sociodemographic determinants of physical activity and dietary habits may thus have contributed to their clustering. However, some activity patterns may favour specific dietary habits. This is the case for television-viewing and snacking[4], but it is reasonable to propose that regular exercise would also influence food choices.

The combinations of diet and physical activity habits identified in adolescents indicate that prevention programmes targeting both behavioural profiles may have a more effective outcome than focusing on each separately.

Table 1. Diet habits according to physical and sedentary activities (%) in 12-year-old preadolescents (n 2724)*

	Fruit, vegetables and/or fruit juice consumed >4x in the past 24 hours		Sweetened drink as the most usual drink		French fries or potato chips consumed in the past 24 hours		Snacking while watching television in the past 24 hours	
	%	P	%	P	%	P	%	P
PA (h/wk)								
0	28.23	<0.001	46.39	<0.1	35.12	0.02	30.53	0.30
<2.3 h	27.44		39.08		29·31		28.10	
>2.3 h	37.93		42.71		30·92		27.36	
SED (h/wk)								
<8.5 h	33.44	0.02	37.11	<0.001	26.21	<0.001	19.96	<0.001
8.5–14 h	32.20		40.77		30.00		26.15	
>14 h	27.70		50.62		39.46		40.36	

*Differences according to physical activity and sedentary activity levels were tested by means of χ^2 tests.
Abbreviations: PA (h/wk)= physical activity (hours/week); SED (h/wk)= sedentary activity (hours/week)

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