The Science of Health, Nutrition and Fitness

The 5:2 Fasting Diet **Author: Carl Conroy**

The ‘fasting’ diet is gaining steady momentum as an effective weight loss method (in theory) and health improvement technique. Although ‘fasting’ type diets have been around for some time an episode of ‘Horizon’ termed ‘Eat, Fast and Live Longer’ (aired Monday 6th August 2013) gave the diet method new impetus to the general population of the United Kingdom.

The theory behind the fasting diet is that by intermittently providing fewer calories on two days of the week; we trick our bodies into thinking we may be experiencing a famine scenario; in which case the body switches into ‘maintenance’ mode and burns energy from fat stores. This is a desirable outcome if weight loss is the desired goal.

The method behind intermittent feeding or 5:2 is that an individual follows a fairly normal meal plan for five days of the week and then reduces that calorie intake by around 25% for the other two days of the week. For males, this equates to around 600 calories and for a female around 500 calories. This calorie requirement is determined from calculations of Resting Metabolic Rate (RMR) or Basal Metabolic Rate (BMR), for males and females.

This might be an initial flaw in the design of the diet regimen as it does not take into account the differing metabolic requirements of the many and varied somatotypes i.e. ectomorph, mesomorph and endomorph and those ‘differentiations’ in-between. An all-encompassing 500 or 600-calorie allocation is perhaps an issue. Also, this prescriptive calorific amount does not lend itself to the rationale that the amount of calories an individual requires is dictated by their activity level. Sedentary ‘calorific provision’ is surely an inaccurate base level. Or could it be qualified that the individual, who does require more calories due to activity status, might benefit more from this diet than the sedentary individual? Due to the ‘fasting’ demand for two days of the week compared to calories required through increased activity. Many of these questions may be answered by the blog and your anecdotal stories and experiences with respect to 5:2.

In respect of fasting type diets there are many claims as to how they might benefit individuals in terms of health status. Some of the claims include:

- Human growth hormone increases (up to 2000% in males - Norrelund, H. et al (2001) and Ho K. et al (1988)
- Normalizing your insulin and leptin sensitivity - Halberg, N., et al**.** (2005) Farschi, H. et al (2005), Weigle, D.S. et al (1997)
- Normalizing ghrelin levels - Natalucci, G. et al (2005)
- Improving biomarkers of disease - Ibrahim, O. (2010)
- Reducing inflammation and lessening free radical damage Sorenson, M. et al (2006)
- Preserving memory functioning and learning. Liaoliao, Li et al (2013)

Wherever there are positive factors you must also accept that there might be some negative connotations with respect to the utilisation of 'fasting' type diets such as 5:2. So let us now peruse the potential issues with this type of diet:

- Increased incidence of dehydration.
- Onset of migraine symptoms or severe headaches.
- Dizziness, nausea or vomiting.
- Abnormal heart rhythms.
- Decreased (low) blood pressure.
- Weight fluctuation.
- Circadian pattern fluctuation and sleep disorders.
- Drowsiness, lack of alertness and cognitive function impairment.
- Binge eating and increase in gastric acidity.
- Increased toxicity of commonly used medication.

Before any individual decides to undertake a dietary intervention such as manipulation of calories in such an extreme way; as proposed by the 5:2 diet, they must first equate the positive to negative risks that are involved within that intervention. The medical issues that could arise from the above list must be considered as a concern; especially where there are already predisposed medical issues. For example, someone with a severe obese condition would already have some of the above issues and could be further exasperating those issues with such a diet regimen. Therefore it would be valid practice to apply a '*rule of thumb'* that if this diet is being considered; and where there are already predisposed health issues; a medical examination from a trained professional might be advisable.

The positives and negatives have now been identified and so the only question that now requires addressing is 'does this diet work?' Does this diet actually facilitate weight loss? Let's look at the evidence.

Heilbronn, K., Smith, S., Corby, M., Anton, S. and Ravussin, E. (2005)

Research Method: Eight females and eight male subjects, who were not obese, fasted every other day for a total period of 22 days. Several measurements were taken from the subjects to ascertain the effects of the diet. Among those measurements were body weight, body composition, resting metabolic rate and free fatty acid blood content.

Results: On average, the subjects lost 2.5% of their body weight, and 4% of their initial fat mass through increased fat oxidisation. Their resting metabolic rate (RMR) did not change significantly. Blood glucose and ghrelin did not change significantly over the period of time from baseline readings.

Goodrick CL, Ingram DK, Reynolds MA, Freeman JR, Cider N. (1990)

Research Method: Young male mice from two different strains (A/J and C57BL/6J strains and their F1 hybrid, B6AF1/J), beginning at either 1.5, 6 or 10 months of age; were fed a diet either every day or in a restricted fashion every other day.

Results: The bodyweights of the intermittently fed C57BL/6J and hybrid mice were reduced and their mean and maximum life spans were incremented when the every other day regimen was initiated at 1.5 or 6 months of age for both genotypes. When every other day feeding was introduced at 10 months of age both the genotypes also lost bodyweight relative to the control group. With the A/J mice intermittent feeding did not reduce body weight when introduced at 1.5 or 10 months. However, body weight did decrease in the A/J group when intermittent feeding was introduced at 6 months. This therefore illustrates that genotype and age of implementation might be causal factors behind actual weight loss.

Harvie M, Wright C, Pegintgton, M, McMullan, D, Martin B. (2013)

Research Method: The researchers set out to determine if intermittent energy restriction would result in greater improvements in insulin sensitivity and weight control than daily energy restriction (DER) They used two intermittent energy and carbohydrate restriction (IECR) regimens, including one which allowed *ad libitum* (IECR+PF). protein and fat. Overweight women (n=115) aged 20 and 69 years with a family history of breast cancer were randomised to an overall 25% energy restriction, either as an IECR (2500-2717 kJ/d, < 40g carbohydrate/d for 2 d/week) or a 25% DER (approximately 6000 kJ/d for 7 d/week) or an IECR+PF for a 3-month weight-loss period and 1 month of weight maintenance (IECR or IECR+PF for 1 d/week).

Results: Insulin resistance reduced with the IECR diets and the IECR+PF diet. Reduction of insulin with the IECR diets were significantly greater compared with the DER diet. Both IECR groups had greater reductions in body fat compared with the DER group. During the weight maintenance phase, one day of IECR or IECR+PF per week maintained the reductions in insulin resistance and weight. In the short term, IECR is superior to DER with respect to improved insulin sensitivity and body fat reduction. The researchers determined that longer-term studies into the safety and effectiveness of IECR diets are warranted.

So the research identified above has determined that there is some significance to the claim that intermittent fasting, as would be observed within the 5: 2 diet, has the potential to reduce body weight and fat mass. Within the remit of this article it could therefore be theorised that this method of dieting has a valid construct. But many questions still need asking that are not within the remit of this article. Some of the questions that are still required to be answered are:

- After the diet is completed what is the significance of renewed weight gain?
- What are the long term positive and negative health effects?
- Does the body become accustomed to the diet and will its effects plateau?
- Do calorific values need manipulating for sedentary through athletic populations?
- Does muscle mass become affected by the diet regimen?
- What is the optimal time for the diets use or does it require a lifestyle change?

These questions will be looked at in future articles and we will also look at specific menus that will allow you to develop effective strategies for application of the diet. In the meantime please feel free to comment on this article and place forward your

considered viewpoint on the associated blog. I look forward to hearing your thoughts and experiences.

Glossary

Basal Metabolic Rate (BMR) – The rate that an organism gives off heat while at complete rest. It is measured while the person is awake but at complete rest. It is often conducted in a darkened room upon a person's waking up after at least 8 hours of sleep. Twelve hours of fasting is required before the BMR can be measured accurately.

Ghrelin - Fast-acting hormone produced in the cells lining the fundus of the human stomach and epsilon cells of the pancreas that stimulates hunger.

Insulin - peptide hormone, produced by beta cells in the pancreas, and is central to regulating carbohydrate and fat metabolism in the body. It causes cells in the skeletal muscles, and fat tissue to absorb glucose from the blood.

Leptin – An adipose derived hormone that regulates energy intake and expenditure, including appetite and hunger, metabolism, and behaviour.

Metabolism - Chemical processes that occur within a living organism in order to maintain life.

Resting Metabolic Rate (RMR) – This is measured under less restrictive conditions than Basal Metabolic Rate. It does not require the person to spend the night in the testing facility to ensure at least 8 hours of sleep and rest before testing. He is still required to rest in a reclining position while the test is being taken but he does not need to get 8 hours of sleep.

Somatotypes – Categorisation of physical status according to physical traits:

> **Ectomorph**: Long and thin muscles/limbs and low fat storage
>
> **Mesomorph:** Medium bones, solid torso, low fat levels and a narrow waist; usually referred to as muscular
>
> **Endomorph:** Characterized by increased fat storage, a wide waist and shoulders and a large bone structure, usually referred to as fat, or chunky.

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