

# UNDERSTANDING TYPE 2 DIABETES and managing it naturally

## The facts:

In the UK alone, there are 3 million diagnosed diabetics, and a further estimated 850,000 people, who probably have the disease, unknowingly.

Worldwide figures for diabetes represent one of the most challenging health crises for the 21<sup>st</sup> century. In 2012:

- Over 371 million people worldwide had diabetes and the numbers are increasing everywhere.
- Half of all people with diabetes are undiagnosed.
- 4.8 million people died due to diabetes and diabetes-related diseases.
- More than 471 billion US Dollars were spent on healthcare for diabetes.

In the USA:

- Diabetes accounts for most new cases of blindness in people aged 20-74
- It is the principal cause of kidney failure, accounting for 44% of all cases and of lower limb amputations, with over 65,700 amputations conducted every year
- 60-70% of people with diabetes, suffer mild to severe forms of nerve damage
- The risk of deadly heart attacks or strokes is 2-4 times higher in people with diabetes
- It's one of the chief causes behind elevated cholesterol levels and excessively high blood pressure levels
- It doubles your risk of death from all causes...and can reduce lifespan by 15-20 years.

**Diabetes Mellitus** is a condition of either absence, deficiency or impairment of insulin activity, the last starting out as insulin resistance, all of which cause varying degrees of disruption to carbohydrate and fat metabolism. Untreated it is characterised by frequent urination and excessive thirst, which led to its name from Greek *diabainein*, meaning 'syphon' (in one end, out the other), plus the Latin word, *mellitus*, meaning honeyed or sweet. In the 17<sup>th</sup> century it was dubbed "the pissing evil".

**Type 1**, or insulin-dependent diabetes is mainly found in young people or children and is generally caused by an autoimmune response or a possible genetic link that destroys the  $\beta$  cells of the pancreas, which make up the islets of Langerhans. These cells are distributed in clusters around the endocrine pancreas and are responsible for excreting the hormone, insulin, into the blood stream in order to reduce blood glucose levels. Type 1 diabetes can currently only be treated by insulin replacement, mostly in the form of injections. However dietary counselling is important for patients to understand how to best manage the difficult balance of insulin dosage versus carbohydrate intake.

**Type 2** diabetes is a metabolic disorder, characterised by high blood glucose as a result of insulin resistance and not usually by insulin deficiency, as is often supposed. Obesity is thought to be the primary cause of type 2 diabetes, but is not always the case. Thin and slim people also suffer from type 2

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diabetes. Dr. David Clark maintains that, according to scientific data, 25% of type 2 diabetics have an autoimmune disease that has caused their diabetes label. Most mainstream doctors do not test for this possibility when confronted with an older patient presenting with high blood glucose and elevated lipid and triglyceride levels. In many cases, unless the patient is particularly keen to manage their diabetes naturally, they will be prescribed blood glucose-lowering drugs immediately and sent to the diabetic clinic.

### **The road to type 2 diabetes:**

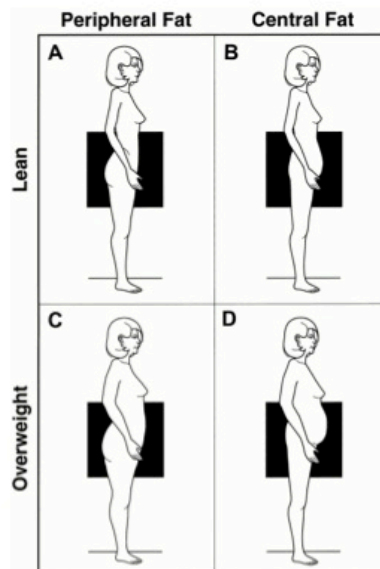
**Insulin Resistance** is a pre-diabetic condition; the body fails to use insulin efficiently, leaving higher than normal levels of glucose in the blood that cannot be converted into energy. The pancreas releases the hormone, insulin, in response to carbohydrate consumption, to transport glucose to the body's cells, where it is needed for energy. Insulin resistance occurs when insulin receptors that facilitate entry into the cells, are dysfunctional, possibly caused by genetics, or a diet overloaded with simple carbohydrates. This allows excess glucose to circulate in the bloodstream, where it can react with proteins, lipids and tissues, forming advanced glycation end products (AGEs), which may lead to inflammation of the tiny arteries of the circulatory system, affecting the brain, eyes, heart, nerves, kidneys and skin. The result, over time, would be diabetic neuropathy that can lead to blindness, heart disease, stroke, kidney disease and amputations.

When cells don't get enough glucose for energy production, the hypothalamus gland sends a message to the pancreas to increase insulin production, leading to an excess of insulin (hyperinsulinaemia). Excess insulin is inflammatory. There are other organs, apart from the pancreas, involved in blood glucose regulation, which affect the balance if not working optimally, e.g.: the thyroid gland produces thyroxine, when blood glucose levels are low, to convert glycogen back into glucose; the adrenal glands respond to stress by secreting cortisol to release glycogen stored in the muscles (known as the "fight or flight" response). Chronic stress, therefore, leads to excessive cortisol being released, also raising insulin levels.

Research shows that this stress / cortisol factor can particularly affect lean women, who have a higher than average waist to hip ratio (WHR); they appear to be more vulnerable to life's stressors. I, myself, was diagnosed with type 2 diabetes 23 years ago, after a prolonged period of stress following a significant trauma in my life. Although I had a genetic pre-disposition, (my mother had type 2 diabetes), the fact that I was and always had been slim confused me a great deal, at the time. This more recent research goes some way towards explaining it to me and de-stigmatizing the diagnosis of diabetes for many slim and fit people.

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Fig. 1.



Epel E S et al. Psychosom Med 2000;62:623-632

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Hyperinsulinaemia (excessive insulin) affects body shape, increasing visceral fat, enlarging waist circumference and affecting various organs. The harmful effects on these organs are manifold and they may fail to cope, e.g.: the liver becomes over-stimulated, creating a rise in blood lipids, increasing the risk of atherosclerosis and coronary heart disease (CHD); the kidneys respond by retaining sodium, leading to water retention, high blood pressure and excessive levels of uric acid; a woman's ovaries may produce too much testosterone leading to polycystic ovary syndrome (PCOS); excess insulin levels also lead to the formation of eicosanoids that aid the development of chronic degenerative diseases. Visceral fat, not the subcutaneous fat (that can be seen and pinched), is not only harmful but, by increasing insulin, can protect itself from being broken down for energy, and produces cytokines, amongst other substances, which cause inflammation. C-reactive protein is produced, in response to cytokines, which also helps visceral fat to deactivate the hormone, leptin, which is crucial for regulating energy intake/ expenditure and appetite, leading to further obesity.

**Metabolic syndrome** (aka syndrome X) is a cluster of 5 risk factors related to insulin resistance that can lead to diabetes, heart disease and stroke. They include: blood pressure of 135/85 or more, increase in visceral fat (waist circumference of 88cm (35")+ for women and 102cm (40")+ for men), fasting blood sugar levels above 7mmol/L, elevated triglycerides >1.7 mmol/L (150) and HDL levels below 1.03 mmol/L (40) for men and 1.29 mmol/L (50) for women. A patient presenting with 3 or more of these risk factors is diagnosed with metabolic syndrome. If less than 3, they still need to address the individual risk factors but metabolic syndrome is not yet present.

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### **Coming to terms with a diagnosis of diabetes:**

Taking the above factors into account, we observe that type 2 diabetes is an insidious disease, requiring very careful management to mitigate further complications.

A diagnosis of **type 2 diabetes** can be daunting, a whole gamut of emotions comes to the fore: anger, disbelief, fear, self-pity. My own reaction was shock, horror and anger towards my mother, “how could this be happening to me?” I didn’t fit the profile, I was slim, physically fit, active and my career was based around good food and wine, so my whole life felt like it was caving in on top of me.

Working through these types of emotions, with healthcare professionals and people closest to the patient is really important. Diabetes, by its very nature, must be self-managed. A person with diabetes needs to take responsibility and make difficult lifestyle choices, but can be extremely vulnerable when first diagnosed, often staying in denial without the proper help. Crucially, they also need the support of family and friends to help them make the necessary changes, which can be very confrontational, so they, too, know what to expect.

In the UK the DESMOND project is available in many areas, largely funded by the NHS. They have various programmes for people with diabetes, such as the Newly Diagnosed and Foundation Programme, to educate them in their condition and management thereof. These programmes do of course follow traditional treatment methods.

When I was diagnosed, in South Africa, there was no such support, but I had already witnessed my mother’s battle with the disease and had no intention of being destined to spend the rest of my days on prescription drugs; gradually losing the fight, ever increasing the dose and eventually deteriorating as the side effects took hold. It was this vision that impelled me to take control of my diabetes naturally.

There is a great deal of truth in the cliché “information is power!”

First, it’s essential to gather all available information about one’s particular diabetes condition; learn about health, fitness, exercise, good diet for diabetes and understand the risks of various methods of treatment.

### **E.g. Allopathic diabetes drugs and their potential side effects:**

- **Sulfonylureas:** low blood sugar, upset stomach, skin rash or itching, weight gain.
- **Biguanides / Metformin:** sickness with alcohol, kidney complications, upset stomach, tiredness or dizziness, metal taste, anorexia, nausea, vomiting, diarrhoea (usually transient), abdominal pain, taste disturbance, rarely lactic acidosis (withdraw treatment), decreased vitamin-B12 absorption, erythema, pruritus and urticaria, hepatitis also reported.

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**Metformin** is the most widely used drug for the treatment of insulin resistance and type 2 diabetes, however it's not effective in all people and its effectiveness dwindles over prolonged use, meaning ever-increasing doses.

- **Alpha-glucosidase inhibitors:** gas, bloating and diarrhoea.
- **Thiazolidinediones (TZD):** weight gain, risk of liver disease, anaemia risk, swelling of legs or ankles.

In 2007, the New England Journal of Medicine published a study, carried out by Steven E. Nissen, M.D. and Kathy Wolski, M.P.H., finding that TZD class drug, **Rosiglitazone** (Avandia), was associated with a significant increase in the risk of myocardial infarction and borderline increased risk of death from cardiovascular causes. As a result, Avandia become a restricted use drug, but the FDA is considering reversing or loosening the restrictions, following new findings. Dr Nissen, who was not given the opportunity to state his case at this latest review of the drug, stands by his original findings and maintains that Rosiglitazone increases LDL cholesterol by some 18%.

**Pioglitazone**, also a prescription drug of the TZD class, and marketed under the trademark **Actos** in the USA and UK has also been associated with an increased risk of bladder cancer and long bone fractures.

- **Meglitinides:** weight gain, low blood sugar

Intensive blood-glucose lowering therapy with a variety of the above drugs has also been shown to increase cardiovascular mortality rates.

None of this is reassuring to the millions of people worldwide, currently taking medication for type 2 diabetes, but many seem to ignore these risks, believing "it'll never happen to them", eschewing the considerable effort required, to change their current lifestyle and eating habits. However, the side effects can lead to further medical complications requiring more drugs to cope. My mother ended up taking blood pressure and cholesterol reducing medication, amongst other things, as well as needing to constantly increase her metformin dose.

### The psychology of diabetes:

Sir William Osler, one of the "Big Four" founding professors at John Hopkins Hospital, is quoted as saying "It is much more important to know what sort of a patient has a disease than what sort of a disease a patient has."

Louise L. Hay described people with diabetes as "having lost the sweetness in life" in her book, *You can heal your life*, and diabetes has been linked to depression since the 17<sup>th</sup> century, when English doctor, Thomas Willis, observed that diabetes was the result of sadness or prolonged sorrow. Many studies now scientifically support this idea.

Researchers followed 65,381 women, ages 50 to 75 over 10 years. During this period, depression and new cases of Type 2 diabetes were tracked: 2,844 of the women were diagnosed with diabetes and 7,415 women developed depression — not remarkable numbers given the prevalence of both illnesses.

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Researchers also found an interrelationship between both conditions: women who suffered from depression were 17% more likely to develop Type 2 diabetes during this time than those not depressed; women with diabetes were 29% more likely to develop depression than those without, even when adjustments were made for other mood disorders and risk factors, e.g. weight and lack of frequent exercise. Further findings showed that the more severe the depression or diabetes was, the more likely that women would develop the other disease.

There are several possible reasons why depression is prevalent in people with diabetes, some believe it stems from finding the demands of managing a serious long-term disease (whether diabetes or another illness) overwhelming, leading to hopelessness and fears for the future.

Another view relates to the conditioning received from early childhood that chocolate and sweets are “rewards for being good”, whilst media hype around size zero models and celebrities can lead to massive ‘guilt trips’ over self-indulgence and bingeing on sweet, fatty treats, whilst dieting. Modern weight-loss science is beginning to observe that this is a physiological problem, not necessarily lack of willpower.

Diabetes increases low self-esteem, inducing feelings of being solely responsible for one’s disease and its continuation, and fearing that family and friends also perceive that.

It is also known that blood sugar “highs” and “lows” place a tremendous physiological burden on the endocrine system, affecting the body adversely, possibly causing depression. However later research suggests it may be the other way around, i.e. that depression is in fact a risk factor for developing diabetes.

Louise Hay goes on to say that “longing for what might have been”; “a great need to control” and “deep sorrow” are all emotions linked to diabetes. These negative emotions, along with negative thinking, guilt, pessimism and anxiety, common traits amongst people with diabetes, impact adversely on their disease too.

### **The natural way:**

This all underlines the importance of treating diabetes holistically; it is not enough to simply deal with the physiological disease, because depression in diabetes is linked to lack of motivation for self-management, poor dietary and exercise regimes and infrequent monitoring. This picture exacerbates feelings of failure and hopelessness leading to anxiety and increased cortisol levels in the body, discussed earlier.

Sir William Osler is also reputed to have said that “If you want to live a long life, get a chronic disease and learn how to take care of it”, and this is very true. My own diagnosis galvanised me into action that has led me down a path of greater awareness of my body’s nutritional needs and how very important exercise is for mind and body health.

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It helps to be able to embrace diabetes as an opportunity for better health and put an action plan in place to achieve it.

One of the keys to successful natural diabetes management is to get one's healthcare professional on board, this can be challenging if the doctor takes a more traditional approach, believing that they alone are responsible for the patient's care. A more modern approach is preferable, with the physician acting mainly as a resource, encouraging the patient to set goals and develop a realistic self-management plan. It's important to heed the doctor because diabetes is a very serious condition, so if he/she deems it necessary to medicate initially, to reduce an excessively high blood glucose level to kick-start the process, they may be right. However, it is essential for the patient to clearly voice their intention to set a time limit for taking the drugs to achieve that goal, so that they can embark on managing the condition naturally and take control.

It's necessary to set **SMART** goals, i.e.: **S**pecific, **M**easurable, **A**ction-orientated (allied to something the patient already does), **R**ealistic, **T**ime-limited.

As an example of this, below are my first attempts at SMART strategies:

Specific	I want to be more physically active in order to achieve better blood sugar controls
Measurable	I want to reduce my fasting blood glucose levels to 5.5 - 6 mmol
Action-orientated	By swimming, attending gym, and power walking
Realistic	By increasing the frequency of my exercise routine from 3 mornings per week to 5 mornings, for a minimum time of 45 minutes
Time-limited	Results in one month

It's important to explore any potential barriers that might arise to prevent one from achieving these goals, whether they be personal, financial, social or physical and seek to adopt a problem-solving attitude, rather than letting them derail the purpose. It helps to define the problem, find possible solutions, choose the best, take action on and commit to that solution.

### **Regular tests required for good diabetes management:**

These should be scheduled by the healthcare team, due to the risk factors for diabetes, outlined in the definition of metabolic syndrome.

**HBA1c:** This important test measures the level of glycated haemoglobin in the blood and is used to monitor the average blood glucose level over a 2-3 month period. Haemoglobin is the oxygen carrying protein in red blood cells. When sugar builds up in the blood, it combines with the haemoglobin, causing it to become "glycated". Red blood cells, and their haemoglobin, will be broken down by the spleen after approximately 90 days, so by testing the HBA1c levels, blood sugar control for the previous 3 months can be assessed.

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***This test is not a substitute for daily glucose monitoring***, which is a vital aspect of glucose control (see below). NICE (The National Institute for Health and Clinical Excellence) recommend a target for people with diabetes of between 6.5% and 7.5%. Studies show HBA1c levels up to and below this range will result in fewer diabetic microvascular complications.

Another blood test, often performed at the same time, measures **lipid (fat) levels**. Cholesterol is a fatty substance (type of lipid) carried around the body by proteins. Cholesterol is divided into two types:

- Low-density lipoproteins (LDL), “bad cholesterol”, carry cholesterol from the liver to the cells.
- High-density lipoproteins (HDL), “good cholesterol”, carry cholesterol away from the cells and back to the liver to be broken down.

Too much LDL in the blood may cause fatty substances to build up in weakened artery walls and block them. This will be worse if there is a higher level of LDL versus a low level of HDL. The target should be for LDL to be under 2 mmol/l and HDL above 1 mmol/l, with total cholesterol under 4mmol/l, although doctors tend to be more relaxed about these levels as people age.

Large doses of Vitamin C and L-Lysine, up to 2gs daily can help to boost collagen to strengthen artery walls and boost their slipperiness to reduce cholesterol deposits, according to Dr. Linus Pauling.

Triglycerides (another type of blood lipid) are composed of one molecule of glycerol and three fatty acids. They're found in foods high in saturated fats, such as dairy products and meat, also unsaturated cooking oils. They can also be produced in the body, either by the body's fat stores or in the liver. Ideally, triglyceride levels should be less than 1.7 mmol/l.

**Blood pressure:** should be regularly checked and a level of 140/80 is acceptable in diabetes. A healthy eating plan and plenty of exercise will go a long way to keeping blood pressure under control and the hyperinsulinaemia that may cause it.

**Diabetic retinopathy, nephropathy and neuropathy:** appointments should be scheduled annually, with an ophthalmologist, a podiatrist or chiropractor and for blood tests to check for any microvascular complications that mainly affect eyes, kidneys and nerves of the patient.

### **Self-Monitoring at home:**

**Blood glucose tests:** are vital to successful diabetes management, but avoided by many for practical or emotional reasons. Some experience feelings that their monitor controls their life, or monitoring is either too inconvenient, or expensive, or painful. Resolving these issues is important. There are many types of blood glucose measuring devices on the market today, some with excellent data capturing systems, which in some cases can be uploaded to the healthcare provider. A pre-prandial blood glucose reading of 4–7 mmol/l and a post-prandial level of no more than 11–12 mmol/l, should be targeted, however this figure may vary depending on age, pregnancy,



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lifestyle and work situations. An awareness of dietary intake that “spikes” blood sugar is paramount, e.g. many find that no matter what they do, they can’t keep the post-breakfast figure within the target range. This is often due to hidden sugars in so-called healthy breakfast cereals, or possibly too much fruit or fruit juice.

Another problem, known as the “Dawn Phenomenon”, occurs when the body generates hormones (including cortisol, glucagon, epinephrine), early each morning that instruct the liver to release stored glucose to provide energy to start the day. These hormones are thought to create a period of insulin resistance, resulting in glucose levels rising between 4 a.m. and 8 a.m. and producing higher than expected fasting glucose readings. This may be helped, by avoiding late evening carbohydrate intake.

**Glucose in the urine** occurs when blood glucose levels rise above the average norm of 10 mmol/l and the kidneys start to transport glucose into the urine. Test strips are available, as well as for **Ketones**, which are extremely toxic and form in the blood when the body starts to use fat for energy, in the absence of sufficient carbohydrates, and becomes hyper-acidic. In a person with diabetes this can mean that their insulin levels are dangerously low, more common in type 1 diabetes, but still requires monitoring. Acetone is one of the toxins formed, which is excreted on the breath, with a typical “pear drops” smell that indicates poor diabetes control. Amino acids, alanine (from oats, nuts and seeds) and carnitine can help in ketone prevention and control.

**Calculating Body Mass Index (BMI) and Waist to Hip Ratio (WHR):** although most diabetic clinics measure BMI and waist circumference, they do not all take WHR into account. Both can easily be calculated at home with a tape measure, and scales for BMI. To calculate BMI, divide weight in kilograms, by height in metres, multiplied by itself (see below) and for WHR, divide the waist measurement (half-way between the base of the ribs and the hip bone) by the hip measurement, (taken around the fullest part of the buttocks).

**BMI = weight (kg)**

$$\frac{\text{weight (kg)}}{\text{height x height (m}^2\text{)}}$$

Underweight = BMI < 20, healthy weight = BMI 20-25, overweight = BMI 26-29, obese + BMI 30-39, extremely obese = BMI > 40.

**WHR = waist circumference**

$$\frac{\text{waist circumference}}{\text{hip circumference}}$$

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## Health risks based on WHR

Men	0.95 or less	Low risk
	0.96 – 1.0	Medium risk
	1.0 or higher	High risk
Women	0.80 or less	Low risk
	0.81 – 0.85	Medium risk
	0.85 or higher	High risk

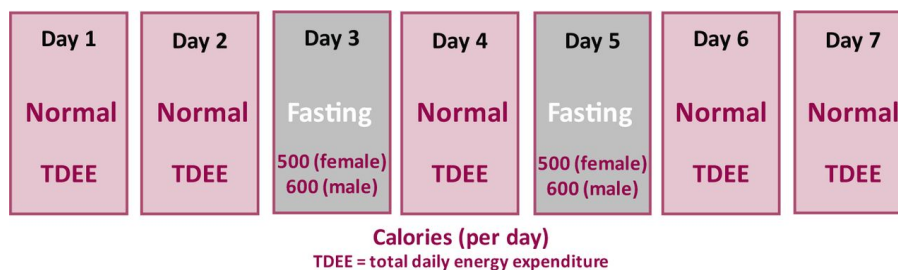
## Healthy weight reduction and dietary advice:

This illustrates the imperative for a person with diabetes to get their weight under control, but is diabetes actually reversible?

Recent studies indicate it's possible. One followed a group of people with type 2 diabetes for 1, 4 and 8 weeks of eating a restricted diet of only 600 Kcals per day. The results showed a normalization of pancreatic beta cell function and hepatic insulin sensitivity, as well as a reduction in pancreatic and liver triacylglycerol stores. The conclusion was that the underlying abnormalities present in type 2 diabetes are reversible by reducing dietary energy intake alone.

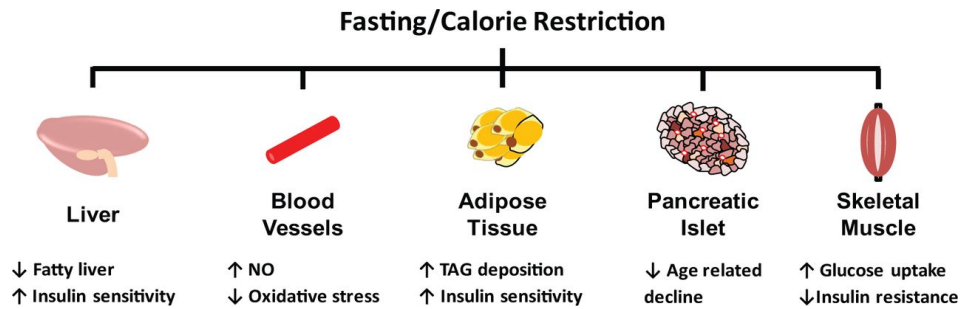
However, living on 600 Kcal daily, long-term, is not practical, but new research suggests that “interval or intermittent fasting” (two days a week) may benefit diabetics, as it has been shown to aid weight loss in obese individuals, reverse type 2 diabetes by cutting calorie intake, protect heart health and reduce cardiovascular risk. The diagram below illustrates this method and the second diagram shows the positive effects achieved on specific tissues, of this type of intervention.

**Figure 1. Diagrammatic representation of a typical intermittent fasting plan. Subjects who undertake this form of diet are required to limit their calorie intake for two days, consecutively or otherwise each week.**



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**Figure 2. Tissue-specific effects of intermittent fasting and calorie restriction. Research has identified several biological effects of intermittent fasting and/or calorie restriction on tissues that are central to metabolic and cardiovascular health.**



Brown J E et al. *British Journal of Diabetes & Vascular Disease* 2013;13:68-72

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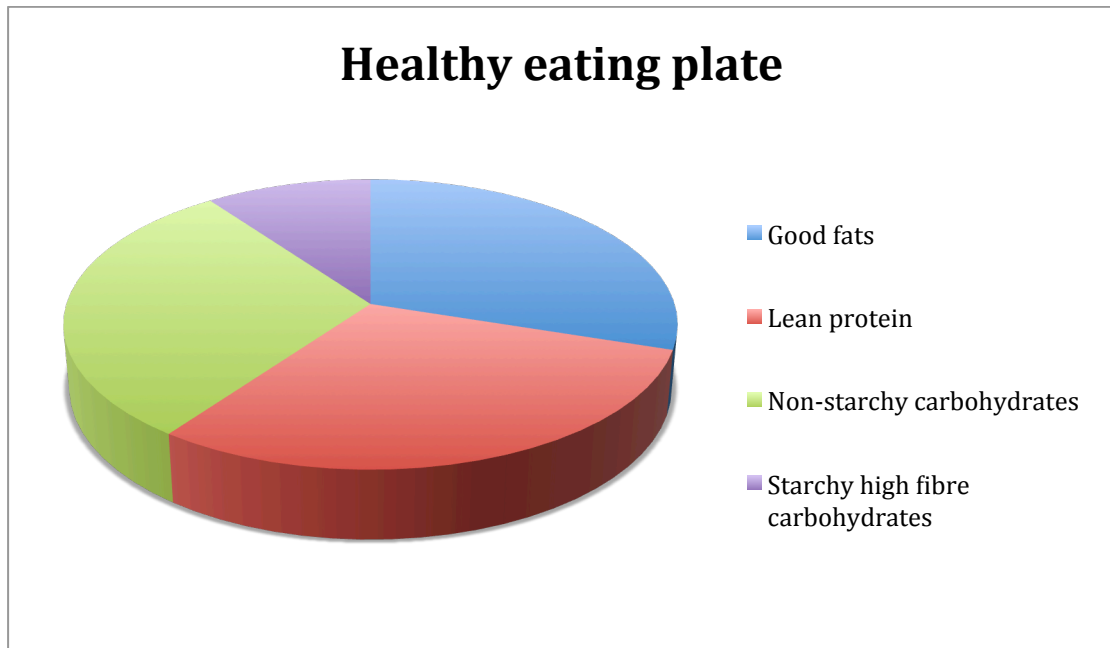
So what, might one ask, is eating *normally* for the rest of the week, certainly not a diet high in sugars and the wrong fats.

A rule of thumb guide for caloric intake is as follows:

- inactive and weight between 130-160 lbs (59-72.5kgs), 1500-1800 calories per day, = 3 meals approx. 400-500 calories and 2 snacks approx. 100-200 calories each.
- active or weight between 170-200 lbs (77-91kgs), 2000-2,500 calories per day, broken down into 600 calorie meals and more snacks.
- weight under 130 lbs (59kgs), 1400-1600, unless very active.

A balanced meal plan for the person with diabetes should comprise 40% of daily calories to be carbohydrates, i.e. starches, fruit and vegetables, 30% lean protein and 30% healthy fat. The following pie chart illustrates how to achieve these proportions, and although it might look heavy on fats at first glance, it's important to remember that fat contains 9 calories per gram, where protein only contains 4 calories per gram, so for every gram of protein consumed, only 0.44 grams of fat are consumed. The same principles apply for healthy snacks.

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This concurs with the low-GI diet (glycaemic index) diet in the book, *The Zone*, by Barry Sears PhD, which provides a very sound plan for losing weight and maintaining a good carbs to protein ratio, ideal for diabetes. More recently, glycaemic load (GL) diets have proliferated, i.e. although similar to GI, GL takes serving size into account and indicates how much blood sugar is raised by eating that food. The formula takes the number of grams of carbohydrate in the serving, multiplied by the glycemic index, and divided by 100, (i.e. a food with a glycaemic load of one point, would raise blood sugar as much as one gram of glucose). The Holford Diet is a good resource for this type of plan and science backs it up.

If the combination of a 500-600 calorie fast for two days and low GI diet for five days is not achieving visceral fat reduction, some form of slow-carb diet may be necessary on the five eating days, for a limited period. Timothy Ferris, in his book, *The Four-Hour Body*, advocates excluding any carbohydrate that is, or can be, white and fruit, (I don't necessarily agree), whilst using legumes for caloric load. His exercise advice, however, is excellent for people with diabetes. Ph balance / hyper-acidity are problems for people with diabetes, so cutting out carbohydrates altogether is not advisable because protein is highly acidic. Legumes, lots of green vegetables, green juices and fresh lemon juice in hot water will assuage this.

On the two fast days, it would be imprudent to skip breakfast to limit caloric intake. It creates an extreme swing in blood glucose levels to fast all night till lunchtime the following day and slows the metabolism. Soup dieting may be the answer. Soup is hugely satisfying on its own, leaving one fuller, longer, without cravings. *The Big Healthy Soup Diet*, by Linda Lazarides contains tasty, healthy soup recipes, even fruit and nut ones, (ideal for breakfast). The spicy ones assist the body's metabolic rate according to oriental medicine, in which Yin represents cool fluid body qualities that damp down the fiery hot metabolism, represented by Yang. If Yin and Yang are out of balance, weight

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and health are compromised. Codes also indicate which soups are appropriate for GI and low carb dieters.

Ayurvedic medicine also uses many foods, herbs and spices to balance the three *doshas*: *vata*, *pitta* and *kapha* in a similar way.

Blood sugar control, weight loss and antioxidant status can be helped by consuming the following, regularly, either as food or drinks:

- blue and purple fruits
- brazil nuts
- celery
- cruciferous vegetables
- fenugreek
- ginger
- kyolic garlic
- nuts and seeds
- parsley
- pterocarpus marsupium
- turmeric
- seaweed

Most valuable in the fight against diabetes are: **cinnamon**, (particularly 500 mg/day of a specific aqueous extract of cinnamon (Cinnulin PF®) which has been found in studies to potentiate insulin, thereby exerting extremely beneficial effects on virtually all aspects of metabolic syndrome, including insulin sensitivity, fasting blood glucose, lipids, antioxidants, inflammation, systolic blood pressure, and body composition; Epigallo-catechin gallate (EGCG) one of the catechins found in **green tea** performs a similar job of potentiating insulin; **chillies** can reduce postprandial hyperinsulinaemia; **coriander** consumption has also been shown to produce antihyperglycaemic, insulin-releasing and insulin-like activity.

Good fats, for cooking:

- olive oil (up to medium heat)
- groundnut oil (will not easily deteriorate)
- coconut oil (technically a saturated fat), but is a medium chain fatty acid, so does not affect cholesterol in the same way as other saturated fats and amazingly aids weight loss. Excellent for cooking, because it withstands high temperatures.

For salad and vegetable dressings, mayonnaise, dips etc.:

- cold-pressed extra virgin olive oil
- cold-pressed nut and seed polyunsaturated oils.

Dietary recommendations are not complete without mentioning sugar and sweeteners. Eating a wholefood diet, low in saturated fat, including complex carbohydrates and curbing a sweet tooth is essential. There is **NO** safe sugar or sweetener for healthy diabetes control; they all raise insulin levels, even artificial sweeteners and insulin eliminates some blood sugar when it doesn't find the real sugar and leaves us craving more. Fructose, often considered safe because it doesn't spike blood sugar, is even worse, because the liver

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rapidly turns it into fat that goes straight to the waistline, promoting insulin resistance. Whole fruits in moderation, but sticking to berries and low glycaemic fruits are best.

Reducing coffee and alcohol is recommended.

A valuable tip for low GL eating is to clear the kitchen of high GL foods, but enjoy a small treat everyday, not something that is an addiction and not bought in advance, lest raiding the cupboard happens when boredom or depression set in.

### **Exercise:**

Studies show that high-intensity, interval training, exercise is vital for the reduction of visceral fat and in fact works faster on older people. It is thought that the exercise increases levels of growth hormone, which normally becomes deficient with high cortisol and insulin levels, resulting in more body fat. Strength training is also extremely beneficial for people with diabetes as it improves insulin sensitivity and glycaemic control and has positive effects on many other aspects of the condition. Exercise should be alternated over five days per week for optimum results.

Yoga (particularly hatha) and tai chi should not be disregarded as they are good strategies for combatting stress, and along with meditation can assist in keeping cortisol levels down.

### **Supplementation:**

Many nutritional deficiencies may be found in both diabetes and depression, so in addition to eating nutrient dense foods, a good multivitamin / mineral supplement, containing adequate amounts of Vitamins B complex, C and E, magnesium, chromium, and zinc should be taken, as well as antioxidants to help protect against micro and macro vascular deterioration, particularly: Astaxanthin, (naturally occurring in some plants, algae and seafood, particularly in wild Pacific red salmon), alpha lipoic acid, and coenzyme Q10. Cod liver oil, for vitamins A & D, is essential to combat susceptibility to infection. Fish oil, silymarin (milk thistle) and maitake mushrooms are also valuable.

According to leading researcher, R. Anderson of Beltsville Human Nutrition Center in the U.S.A., **Chromium** is an essential nutrient required for sugar and fat metabolism. His findings are that **Chromium** increases insulin binding to cells, insulin receptor number and activates insulin receptor kinase leading to increased insulin sensitivity.

The other most important supplements for working synergistically to potentiate insulin are: **alpha lipoic acid**, which has been found to mimic insulin action and increase cellular glucose uptake and **magnesium**, required for insulin secretion. The best way to increase magnesium levels is to consume more leafy green vegetables, oats, nuts (especially almonds and Brazils and sesame paste (tahini)).

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**Word Count: 5273**

It is impossible to do justice to this complex topic within the limitations of the word count of this document, but I hope to have highlighted the most salient points.

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### and managing it naturally

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