Sugar, Obesity and Type 2 Diabetes

Sugar:

Sugars often get a bad reputation when it comes to our health and weight. However, when information is explained and understood, we can see how the various sugar sources play a vital role in a healthy lifestyle.

Sugars derived from carbohydrate food sources which, once eaten, are broken down and digested, allowing them to enter the blood system in our bodies. When it is in our blood, it presents in its digested form as glucose and is an important process for our body to use as energy. When high levels of glucose are present in the blood, signals are sent to the pancreas for the release of the hormone insulin. This hormone reduces blood glucose levels by shuttling it to where it needs to be for energy use. It gets stored as glycogen, meaning it hasn't been synthesised to create glucose and is stored in our liver or skeletal muscle cells for when glucose is required.

Insulin is important for other bodily processes, too, such as:

- increasing the rate proteins are broken down and made within the body
- helping to aid triglyceride uptake (fatty acid) to enter the muscle cells for energy use, and
- aiding GLUT4, an insulin-regulated glucose transporter, to transport insulin-regulated glucose into muscle cells and fat.

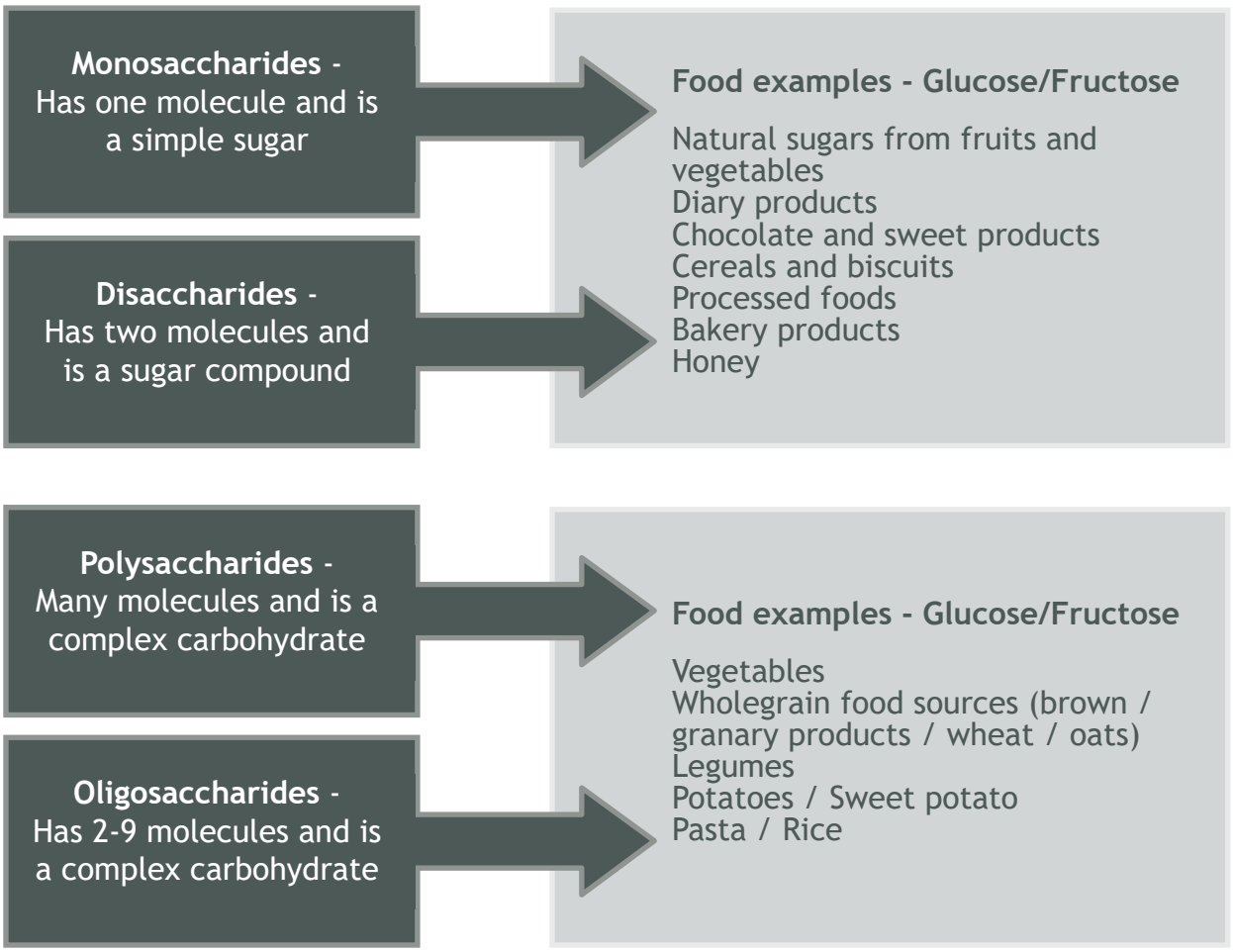
It is essential to understand that blood sugar control and the role of nutrition and movement help us manage the processes above so we can thrive and enjoy all of life's activities.

Our brain relies on glucose as its primary energy source to function; therefore, carbohydrates are important to eat. Whilst they aren't an essential nutrient, they are important, as the body can produce glucose through other ways. Carbohydrates are an enjoyable food source and a vital nutrient needed for energy, blood sugar metabolism, and aid triglyceride and cholesterol metabolism. Carbohydrates are either simple or complex depending on their chemical structure, known as disaccharides, oligosaccharides, polysaccharides, and monosaccharides.

What does this mean?

Carbohydrates are used to categorise different food groups, including fruits, vegetables, whole

grains, legumes, fibre, and sweet products. Their chemical structure depends upon the number of molecule units within the chain, either long or short chain. The four structures mentioned describe the sub-heading of carbohydrate sources as simple and complex. The difference between the two is the digestion and absorption rate within the body. Simple sugars are digested and absorbed at a much quicker rate for the body to use, whereas complex carbohydrates contain digestible and non-digestible components, meaning that their digestion rate and breakdown rates are slower. Therefore, complex carbohydrates release energy in a more sustainable and prolonged timeframe. These carbohydrate sources are encouraged to be included in a healthy balanced diet and to be mindful of the quantities of processed simple sugars eaten. Fruits and vegetables are healthier simple sugars and can easily be included in everyday meals to ensure their full nutritional benefit can be utilised in our bodies.



Whilst thinking mindfully about food quantities, complex carbohydrates would be the healthier choice regarding nutrients, minerals, vitamins and fibre and their slower digestion rate for slow release of glucose. Fibre is an essential nutrient for digestion and gut health function. Due to their quick release of sugar and high blood glucose amounts, simple carbohydrate sources can still be included in lower quantities/frequency in terms of processed foods, e.g., white bread, bakery products, etc. It may prove beneficial when choosing your meals or snacks to think of "what will provide me with the nutrients I need and keep me energised". Thinking of your choices when selecting your meals, try and aim for a variety of sources that go alongside protein and fat sources. For example, this could be breakfast oats with Greek yoghurt, berries and banana and a jacket potato with tuna and cashew nut salad for lunch.

Sugar and diabetes

While we now understand sugars come from carbohydrate sources and occur naturally in foods, sugars are “free sugars” added to certain food products. Foods including smoothies, pure fruit juice, squashes, cakes, table sugar etc. are all free sugars consumed as part of everyday meals. Sugars don’t provide great nutritional value compared to other food sources, and consuming high amounts of processed and high sugar foods increases our risk of developing type 2 diabetes.

Type 2 diabetes is a serious and lifelong health condition depending on different factors and their treatment outcomes. The pancreas is responsible for releasing the hormone insulin, required to moderate the uptake of blood glucose to shift to cells for energy. When insulin production is reduced, the blood glucose levels remain high, and if left for a long period of time with chronic high levels, this can lead to the development of Type 2 diabetes. Chronic high blood glucose levels, which have been left unidentified, can cause tissue and nerve damage leading to other serious health problems.

Sugar isn’t directly the cause of developing type 2 diabetes, and type 2 diabetes is a complex condition associated with other risk factors such as genetics, ethnicity, age, pre-existing medical conditions, high blood pressure, carrying extra weight and smoking.

Symptoms in Type 2

Symptoms for type 2 diabetes arise over time, compared to type 1 (insulin-dependent) diabetes which is often diagnosed from a young age and presents with a quicker onset. Some people may not notice or experience symptoms at all and are unaware they have diabetes. However, those who do experience symptoms may notice the following:

- Increased urinary frequency
- Low energy levels, feeling very tired due to lack of glucose getting into the cells
- Extremely thirsty and frequently drinking
- Blurred vision
- Weight loss unintentionally
- Genital itching or thrush
- Any cuts or injury wounds taking a longer time to heal or scab up
- Frequent infections
- Feeling hungry a lot

Any of the above symptoms or new changes to your health should be investigated by your GP if there are no other confirmed trigger factors present.

Sugar and Obesity

Obesity refers to carrying excess body fat and presents a greater risk for a subsequent cause of ill health. Medical and health professionals can identify those at greater risk by working out their body mass index, which utilises a calculation of a person's weight divided by the person's height. Obesity levels have been defined by WHO (World Health Organisation) as those with a BMI that is greater or equal to >30. Another identification more recently found to be accurate is by measuring waist to hip size ratio and with those carrying greater waist circumference compared to hip being at increased risk of health problems.

Obesity is becoming a global health concern and is seen as a chronic health condition. It is often complex how an individual may become obese and can sometimes be a secondary cause of another health condition. There are several reasons why obesity causes ill health, but carrying excess visceral fat, which is what surrounds our organs, causes physical changes and leads to risks of:

- Cardiovascular disease
- Sleep apnoea
- Cancers
- Arthritis
- Renal problems (kidney)
- Digestive issues
- Type 2 diabetes
- High blood pressure

Positive changes in our eating choices, behaviours, increased movement and lifestyle management can reduce the risk of those medical conditions. Studies have reported as little as a 3-5% loss of baseline body weight can help slow the progression of diabetes, improve insulin sensitivity and reduce the risks of the health concerns mentioned (Bramante et al., 2017).

Sugar is often blamed for weight gain due to the types of food people associate with sugars, such as biscuits, cakes, chocolate, sweets etc. Whilst these foods tend to be high in sugar and of more calorific value, it is not the actual sugar that is a direct cause of weight gain but, more so, the over-consumption of these foods. Eating high amounts of products with high sugar content, particularly those in processed foods, can cause an excess in calorie energy intake, which, if greater than the energy expended, will cause weight changes. Consuming excesses of sugary foods can often lead to further overeating. This is due to the nutritional content being very low in benefit and not capable of creating a sense of fullness, known as satiation, leading to the need to eat more for energy acquisition. Sugar itself is further associated with risk of dental problems too.

Eating small amounts of sugar does not present an increased health risk if it can be enjoyed and eaten in healthy quantities and as part of a balanced meal choice. Foods that contain natural sugars such as lactose in milk, fruits, and vegetables, shouldn't cause an issue of health concern. In fact, the more fruit and vegetables consumed, the greater the health benefits due to their other nutritional contents, such as vitamins and minerals, which provides for our bodies' higher-value nutritional needs and functional demands.

Free sugars are those that are added to foods by either the consumer, eateries or manufacturers. Free sugars are often added to processed foods, including cakes, sweets, biscuits, cereals, and soft drinks. Along with processed products, syrups, fruit juices and honey are categorised as free sugars. There is a difference between the natural sugars found in fruits, and these are excluded from free sugars due to their composition, which is high in fibre, and their effect differs from freeing sugars on digestion. This is due to how fruit juices are processed and the pulp and fibre content removal, which creates free sugars and are readily digestible. Sucrose, known as table sugar, is another easy to over consume sugar frequently added daily in teas and coffees. These examples are often easily consumed in high amounts during the day without much thought. This sugar accumulation throughout the day increases our daily sugar intake, putting us at greater risk of poor health outcomes.

Sugar and food labels

Food labels help us understand how much and what ingredients are within the food products we buy. They can help guide us to make healthier choices when choosing meals or weekly shopping choices, which can align with our health goals and needs. Most food labels detail the amount of nutrients per weight of the product and/or per 100g, which is useful if it provides more than one serving. The ingredients which make up the contents of food products are listed from the biggest to the smallest in terms of their weight and how much that food source is made up of that nutrient. To identify the quantity of sugar, we can read this by looking at the amounts under ‘of which sugars’ which present underneath carbohydrates. Whilst this doesn’t break down the amount of ‘free sugars’ there is within the food, it gives us an indication of the sugar content and can inform healthier choices. Sugar can also be listed under its other forms and is commonly seen in text with sources ending in ‘OSE’ but may come under other names. The common sugars that may be listed other than sugar is:

- Fructose, sucralose, maltose, glucose, dextrose
- Syrup
- Honey
- Nectar
- Cane sugar
- Fruit juice concentrate

Foods with naturally occurring sugars such as fruit or milk will often have ‘no added sugar’ detailed on the packet. This means no additional ‘free sugars’ have been added and offers a healthier choice when looking for food or snacks. There are various reasons why sugars are added to foods, such as preservation, flavour and textures, which can make them highly palatable and easy to over-consume. For example, it is easy to over-consume fruit juices, biscuits or chocolates compared to eating lots of whole fruits. To recognise sugar quantities within the food we choose can be displayed on either the front of packaging or

listed on the back under the heading, 'nutrient information'. Some manufacturers may also present this information as a colour-coded traffic light system with colours of green, amber and red to highlight their amounts in terms of ideal, medium and above ideal. The amount of sugar per 100g can be read as the following:

- High sugar (Red) = 22.5g or over per 100g
- Medium Sugar (Amber) = Above 4g and below 22.g per 100g
- Low Sugar (green) = 5g or under per 100g

(NHS Sugar facts)

Once we understand how to read food labels, we can make informed and healthy choices. Whilst it is not unhealthy to include added sugar products in our diet, it is beneficial to be mindful to only have, at most, a moderate intake and ideally below 30g daily. All sugars are not created equal. Looking at two products - one of which has natural sugars, such as a banana, versus a sugar-added product, such as chocolate, could have the same numerical number of sugars present in the nutritional content. Still, the effects on the body after digestion will vary, along with their nutritional value.

Sugars digested from confectionary sources or fruit juices etc are absorbed quickly into the blood and often create a spike effect. This effect causes a quick 'crash' of energy shortly after consumption and can leave people feeling groggy, irritable, lethargic and hungry. In comparison to natural sugar foods, which, once digested, are processed slowly and prevent this effect from happening. They contain other nutrients such as vitamins and minerals, which help maintain blood glucose and allow longer periods without feeling lethargic, etc., associated with low blood sugar levels.

Sugar and work

High sugar foods, processed meals and drinks are often readily available for our convenience when at work. However, we now understand that high-added sugar foods contain greater calories which, in turn, over-consumption can lead to detrimental health outcomes. Considering we spend a lot of time in the workplace, reducing our sugar consumption at work could play a vital role in preventing ill-health conditions that would lead to greater sickness absence and presenteeism.

Organisation and preparation can help ingrain healthier habits more easily without friction and reduce our options to reach for quick convenient sugary snacks. Food is meant to be enjoyable and, at times, a very sociable activity. The workplace can be a great enabler for creating healthier lifestyle choices and exemplar areas of our lives that can influence positive changes in our wellbeing culture and practices and champion positive health choices across our communities.

Here are a few ways that can help reduce sugar intake at work:

- Prepare at home, in sustainable boxes, pre-chopped fruits and vegetables that you enjoy eating to make easy go-to-grab snacks or lunch additions
- Swap high sugar fruit juices for reduced, or no added sugar alternatives in vending machines, as well as your own brought-in fom home drinks that save money, environmental resources and your carbon footprint
- Have hot and cold drinking water readily and easily available
- Encourage fruit and nut snack pots for work meetings or training days
- Have protected break times to ensure time away from your desk/laptop and time to slowly eat a meal, without rushing.
- Arrange to have lunch with a colleague and set a challenge of preparing a snack or meal with a chosen fruit/vegetable/theme for the meal to encourage healthy food influences and sustainability
- Reduce your intake of caffeine and tea drinks that have added sugar by replacing one cup throughout the day with water. You could try a walk instead of a caffeine fix break to wake you up and refresh your mind
- Read labels if food or snacks are provided to ensure it fits with your health goals
  Reduce the price of low sugar foods/drinks in the canteen to encourage employees
- Swap ready-made sauces or dresses for healthy oil dressings on salads
- Have plain yoghurt with fresh or frozen fruit and nuts instead of pre-made sugary fruit-flavoured yoghurts
- Place low sugar foods at eye line height in the canteen or around the office for people to see and choose from
- Recipe or snack idea swap with colleagues to create a mini “come dine with me at work” influence
- Replace processed cakes with homemade healthier alternatives in the office or canteen

By reducing and making small tweaks to our daily food options, we can make healthier choices which can lead to long-term health gains. The foods we eat, the environments around us and our self-organisation can help the prevention of developing diabetes, dental problems and obesity, amongst other poor health conditions.

Reference and Resources:

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