Sugar - The Not So Sweet Truth

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Agenda

- Health effects
- Types of sugars
- Sugar sources
- Sugar sweetened beverages
- Sugar substitutes
- Label reading
We Consume Too Much Sugar

We consume on average:
31 tsp/day (124 grams or 500 calories worth)

We should consume:
No more than 6-9 tsp/day (24-36 grams or 100-150 calories worth)

Note:
1 tsp of sugar = 4.2 grams = 16 calories
1 gram of sugar = 4 calories
1 packet of sugar varies between 2-4 grams
If You Consume More Sugar, You Are More Likely To:

- Get cavities
- Be overweight or obese
- Have high blood pressure
- Have high cholesterol and triglycerides
- Develop type II diabetes
- Have a heart attack
- Die from heart disease
- Get gout
- Get dementia, anxiety or depression
- Consume less nutrients
Sugar-Rich Foods
Low Sugar Foods
Sugar Has No Nutritional Value

- Contains calories but adds ZERO value
- Humans can live without ANY sugar in the diet
- Replaces other more nutritious foods
- The metabolism of sugar requires nutrients like chromium, magnesium, B vitamins, etc. These must be consumed or taken from body stores.
Source: Dietary Guidelines for Americans 2010
Sugar is Addictive

- Sugar stimulates your brain’s reward center
- Short term increase in dopamine
- Eventual down regulation of dopamine system
- Tolerance and withdrawal are hallmarks of addiction

Observe: When you are eating higher amounts of sugar, do you crave even more of it?
Are You Addicted to Sugar?

When someone offers you a sweet treat, do you struggle saying now?
Do you crave sugar at least once a day?
Do you have routines around eating sugar? Like always having a soda after lunch?
If you skip sugar for a day, do you get cranky or get a headache?
Sugar Alters Your Palate

• When consuming high amounts of sugar, our tastes adjust – get muted
• When we quit, we can develop a taste for a wide variety of flavors
• How about enjoying bitter or sour flavors?
Sugar and Dementia

This research looked at blood sugar levels in more than 2,000 older adults—the average age was 76. The vast majority of the study participants did not have diabetes. What the researchers found is that any incremental increase in blood sugar was associated with an increased risk of dementia—the higher the blood sugar, the higher the risk.

“The speculation is that elevated blood sugar levels are causing more vascular disease, but it may be other metabolic issues. For example, people with elevated blood sugar often have insulin resistance which may be the link that affects our brain cells,” says Dr. David M. Nathan.

Sugar Affects Kids’ Brains

• Attention in children and adolescents (1)
• Hyperactivity in children and adolescents (2)

Sugar Interferes with the Immune System

- Study: “Consuming 100 grams of simple sugars can reduce the ability of your immune system to destroy pathogens. The effects start within 30 minutes and last for about 5 hours with roughly a 50% reduction of white blood cell action.”

100 Grams of Sugar

• 1 bottle Naked Juice with a scone = 84 grams
• Venti Starbucks Tazo Green Tea Frappuccino with no whipped cream = 95 grams
• 2 Pop Tarts, 1 Yoplait fruit yogurt, and a glass of orange juice = 110 grams
• Take note!
Increased Risk of Type 2 Diabetes

“There are plausible mechanisms and research evidence that supports the suggestion that consumption of excess sugar promotes the development of cardiovascular disease (CVD) and type 2 diabetes (T2DM) both directly and indirectly. The direct pathway involves the unregulated hepatic uptake and metabolism of fructose, leading to liver lipid accumulation, dyslipidemia, decreased insulin sensitivity and increased uric acid levels. The epidemiological data suggest that these direct effects of fructose are pertinent to the consumption of the fructose-containing sugars, sucrose and high fructose corn syrup (HFCS), which are the predominant added sugars. Consumption of added sugar is associated with development and/or prevalence of fatty liver, dyslipidemia, insulin resistance, hyperuricemia, CVD and T2DM, often independent of body weight gain or total energy intake.”

Sugar and Gout

1 can of soda a day appears to increase the risk of gout by 74% in women and by 45% in men.

2 cans of soda a day appear to be associated with 140% increased risk in women and 85% in men.

There is a similar increased risk when looking at fruit juices.

Increased Mortality from Heart Disease

Over the course of the 15-year study on added sugar and heart disease, participants who took in 25% or more of their daily calories as sugar were more than twice as likely to die from heart disease as those whose diets included less than 10% added sugar. Overall, the odds of dying from heart disease rose in tandem with the percentage of sugar in the diet—and that was true regardless of a person’s age, sex, physical activity level, and body-mass index (a measure of weight).

Sugar is Involved in Glycation

- AGEs: Advanced Glycation End Products
- When sugars combine with proteins
- Highly implicated in the aging process – especially for aging of the skin and atherosclerosis
- Have you ever heard of the blood test HbA1c?
What’s a Sugar?

- Monosaccharides are glucose, fructose and galactose
- Disaccharides are lactose, maltose and sucrose
- Most sugars in the diet are a mix of these
- Eg: table sugar is about 50% fructose and 50% glucose
- Glucose and fructose are metabolized differently
Glucose

- Generates an insulin response
- Cells all around the body use as energy
- Most carbohydrates break down into glucose
- Your body can store it
- Your liver can make glucose if needed
Fructose

- Many now claim that fructose itself is responsible for the obesity epidemic
- Fructose is processed by the liver where it can be converted to fat
- Fructose does not trigger your appetite control system. It does not affect ghrelin or leptin – the hormones that tell us if we are hungry or full. Therefore, it results in us eating more.
In this study, overweight study participants showed more evidence of insulin resistance and other risk factors for heart disease and diabetes when 25% of their calories came from fructose-sweetened beverages compared to glucose-sweetened beverages.

Both groups gained weight during the 10-week study, but the fructose group gained more of the dangerous belly fat that has been linked to a higher risk for heart attack and stroke.

HFCS - High Fructose Corn Syrup

- 20% sweeter than table sugar
- Contains 42% or 55% fructose
- Cheap and shelf stable
- Readily converts to fat with the help of the liver
- Refined, artificial product (mercury)
- Added to sodas, cookies, cakes, cereal, yogurt, canned fruit and also to foods which normally wouldn’t contain any sugar
Crystalline Fructose

- At least 98% fructose
- A high level of sweetness without bulk and about 5% less calories
- Typically used in items like frozen yogurt and baked goods
- Highly negative effect on metabolism
What About Fruit?

- Whole fruit contains fiber, vitamins, minerals, and phytonutrients in addition to fructose
- Highest sugar whole fruit are grapes, pineapple, and bananas
- 1-2 servings of fruit/day are not a concern
- But beware! Fruit juice and dried fruit are concentrated sugars
How Do You Know if Something Has Sugar?

Check the ingredients list and look for:
- brown sugar
- corn sweetener
- corn syrup
- corn syrup solids
- corn sugar
- high-fructose corn syrup
- corn sweetener
- tapioca syrup
- (anhydrous) dextrose
- fructose
- liquid fructose
- fructose sweetener
- malt syrup
- malts
- malted barley
- nectars
- sucanat
- rice syrup
- rice malt
- fruit juice concentrate
- glucose
- honey
- agave
- agave nectar
- invert sugar
- lactose
- maltose
- molasses
- maple syrup
- raw sugar
- sucrose
- syrup
- cane syrup
- can crystals
- rice syrup
- date paste
- evaporated cane juice
- cane sugar
- table sugar
- etc.
Source: Dietary Guidelines for Americans 2010
Sugar Sweetened Beverages

- Socialization
- 50% of us drink them daily
- Soda, soft drinks, sports drinks, energy drinks, powdered drinks, sweetened milk, milk alternatives, sweetened tea or coffee, flavor enhanced water, juice drinks
- SLBs increase hunger, decrease satiety and decrease fullness. (Ranawana, Henry. Int J Food Sci Nutr. 20011 feb;62(1):71-81)
- Sources of empty calories
## Sugar Sweetened Beverages

<table>
<thead>
<tr>
<th>Occasion</th>
<th>Instead of...</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning coffee shop run</td>
<td>Medium café latte (16 ounces) made with whole milk</td>
<td>265</td>
</tr>
<tr>
<td>Lunchtime combo meal</td>
<td>20-oz. bottle of nondiet cola with your lunch</td>
<td>227</td>
</tr>
<tr>
<td>Afternoon break</td>
<td>Sweetened lemon iced tea from the vending machine (16 ounces)</td>
<td>180</td>
</tr>
<tr>
<td>Dinnertime</td>
<td>A glass of nondiet ginger ale with your meal (12 ounces)</td>
<td>124</td>
</tr>
</tbody>
</table>

Total beverage calories: 796

https://www.cdc.gov/healthyweight/healthy_eating/drinks.html
Notes About Beverages

• In order for something to be called a fruit drink, there needs to be some amount of fruit in there
• Packaging is often misleading to make drinks seem as healthy as possible “all-natural”, “real” ingredients or “low-sodium” or have “fewer calories than the leading beverage”
• Portion sizes changed over time
SSBs and Teeth

- pH of saliva is 5.5-6, anything more acidic may harm teeth
- Oral bacteria breaking down sugars produces acidic byproducts
- Many soft drinks contain acidic ingredients (like phosphoric, citric, malic, tartaric acids)
- High amounts of dental enamel loss observed in studies looking at SSB with the list generally topped by non-cola diet and regular drinks along with sweetened ice tea
Increased Belly Fat

“Regular sugar sweetened beverage intake was associated with adverse change in both VAT (visceral adipose tissue) quality and quantity.”

Alternatives to SSBs

- Add fresh fruit or herbs to your water
- Stock your fridge with unsweetened tea, carbonated mineral water, or with unsweetened, flavored seltzer water
- Try a splash of fruit juice with your flat or carbonated water
Artificial Sweeteners

Saccharin, acesulfame, aspartame, neotame, sucralose

- We tend to offset these choices
- They change the way we taste food
- They may cause weight gain
- They may be addictive
- They may damage our gut bacteria
- Their long term health effects in various dosages are still not clear

In this study, consumption of diet drinks was associated with a 36% greater risk for metabolic syndrome and a 67% greater risk for type 2 diabetes.

Diet Soda Intake and Risk of Incident Metabolic Syndrome and Type 2 Diabetes in the Multi-Ethnic Study of Atherosclerosis (MESA); Jennifer A. Nettleton, Pamela L. Lutsey, Youfa Wang, João A. Lima, Erin D. Michos, David R. Jacobs; Diabetes Care Apr 2009, 32 (4) 688-694
Sugar Alcohols

- Provide a sweet taste, less calories, but still affect blood sugar to some degree
- Recognize by the “-ol” ending
  - Mannitol
  - Sorbitol
  - Xylitol

- Do not cause cavities
- May cause intestinal upset in some people (label must note possible laxative effect)
- Toxic to dogs
How to Read a Label

- Remember the ingredients list!
- Currently we are not told how much natural sugar and how much added sugar a product contains.
Savvy Consumer Tip

• Avoid foods with sugar listed as first or second ingredient
• But: Ingredients are listed on the label in descending order by weight

Food manufacturers started using multiple types of sugar with different names so they are represented in smaller amounts, confusing the consumer
Keep in Mind:
Carbohydrates Break Down into Sugars

- Similar metabolic effect as eating sugar
- “White carbs” have a much more pronounced effect.
<table>
<thead>
<tr>
<th>Simple Carbohydrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soda</td>
</tr>
<tr>
<td>Candy</td>
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<tr>
<td>Bread</td>
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<tr>
<td>Frosting</td>
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<td>Cereal</td>
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<td>Cookies</td>
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<td>Flour</td>
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<td>Syrup</td>
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<td>Donuts</td>
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<td>Pancakes</td>
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<tr>
<td>Alcohol</td>
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<td>Bagels</td>
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<td>Pasta</td>
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<td>Sugar</td>
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<td>Chips</td>
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<td>Muffins</td>
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<td>Crackers</td>
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<tr>
<td>Pretzels</td>
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<tr>
<td>Cake</td>
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<tr>
<td>Juice</td>
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In Summary

• Be aware! Check labels, question ingredients
• Shop on the perimeter of stores
• Eat more whole foods, less processed
• Clean out your pantry
• In the majority of recipes, you can easily reduce sugar by 30% without noticing
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